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DEPARTMENT OF THE INTERIOR AND RELATED AGENCIES APPROPRIATIONS FOR 1972

HEARINGS

BEFORE A

SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS HOUSE OF REPRESENTATIVES

NINETY-SECOND CONGRESS

FIRST SESSION

SUBCOMMITTEE ON DEPARTMENT OF THE INTERIOR AND RELATED AGENCIES

JULIA BUTLER HANSEN, Washington, *Chairman*

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DEPARTMENT OF THE INTERIOR AND RELATED AGENCIES APPROPRIATIONS FOR 1972

MONDAY, MARCH 22, 1971.

BUREAU OF MINES *

WITNESSES

DR. ELBURT F. OSBORN, DIRECTOR
DR. THOMAS A. HENRIE, DEPUTY DIRECTOR—MINERAL RESOURCES AND ENVIRONMENTAL DEVELOPMENT
HENRY P. WHEELER, JR., DEPUTY DIRECTOR—HEALTH AND SAFETY
PAUL ZINNER, ASSISTANT DIRECTOR—PLANNING
DR. JAMES J. SCOTT, ASSISTANT DIRECTOR—MINING
J. A. CORGAN, CHIEF, DIVISION OF ENVIRONMENT
ELWOOD THOMSON, CHIEF, DIVISION OF BUDGET
HOLLIS M. DOLE, ASSISTANT SECRETARY FOR MINERAL RESOURCES
FRANCIS M. WILES, DIRECTOR OF BUDGET, INTERIOR DEPARTMENT

INTRODUCTION OF WITNESSES

Mrs. HANSEN. The committee will come to order.

We have this morning the Bureau of Mines and the principal witness is Dr. Osborn, the new Director. Dr. Osborn, it is a pleasure to welcome you.

Dr. OSBORN. Thank you.

Mrs. HANSEN. Please insert at this point in the record your biographical sketch and the biographical sketches of the new members of your staff.

Dr. OSBORN. Yes, ma'am.

(The biographical sketches follow:)

ELBURT F. OSBORN, DIRECTOR, BUREAU OF MINES

Dr. Elburt F. Osborn, an internationally recognized authority on geology and mineral resource development, was appointed Director of the Bureau of Mines on October 23, 1970.

Born in Kishwaukee, Ill., August 13, 1911, he received his B.A. at Depauw University, Greencastle, Ind., in 1932; his master's degree at Northwestern University, Evanston, Ill., in 1934; and his Ph. D. from the California Institute of Technology, Pasadena, Calif., in 1937.

Dr. Osborn has been vice president for research at Pennsylvania State University since 1959. He originally joined the university's staff in 1946 as a professor of geochemistry, and served for 6 years as dean of the College of Mineral Industries before becoming vice president. From 1937 to 1946 he was engaged in research work for several firms and organizations including the National Defense Research Committee of the Office of Scientific Research and Development.

Dr. Osborn is a member of the National Academy of Engineering, and has served as president of three of the major earth science technical organizations: the Geochemical Society, the American Ceramic Society, and the Mineralogical Society of America. He is a member of 16 professional societies and a number of professional committees and boards and has received many honors and awards.

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*For amendments to 1972 budget, see p. 1082 of Part I of these hearings.

He has been elected to many honorary and professional fraternities including Phi Beta Kappa, Sigma Xi, Keramos, Phi Kappa Phi, and Phi Lambda Upsilon. He has published more than 90 technical articles and books.

THOMAS A. HENRIE, DEPUTY DIRECTOR, MINERAL RESOURCES AND ENVIRONMENTAL DEVELOPMENT, BUREAU OF MINES

Dr. T. A. Henrie, a Bureau of Mines scientist and research administrator form Reno, Nev., was appointed Deputy Director (Mineral Resources and Environmental Development) on August 9, 1970. In this position, he is responsible for the administration of all Bureau research and resource development activities for reducing the environmental problems associated with minerals operations and for advancing minerals and fuels technology to meet the Nation's ever-growing needs for minerals, metals, and energy.

Dr. Henrie was born in Sutherland, Utah, February 6, 1923. After working in his family's ranching business, he attended Brigham Young University where he received a B.S. degree in chemistry in 1952. He went on to receive his Ph. D. in metallurgy from the University of Utah in 1955. During World War II he served in Europe as a combat infantryman.

He was first employed as a chemist by the Union Carbide Metals Co. of Niagara Falls, N.Y., where he distinguished himself in research on titanium metal manufacture.

He joined the Bureau of Mines at Boulder City, Nev., in 1958 and became associated with a variety of projects involving the preparation of ultra-pure metals, and quickly gained a reputation for thoroughness and originality.

In 1966, he was appointed Research Director of the Bureau's Reno, Nev., Metallurgy Research Center where he was instrumental in the successful development of several novel electrolytic and chemical processing techniques for recovering many metals from some of the Nation's abundant, but low-grade, mineral resources. As a result of this work, Dr. Henrie is a recognized authority on silver, gold, and mercury processing on rare earth metal extraction and refining processes and on electrolytic technology.

Author of many technical reports and papers, Dr. Henrie holds several patents in the field of extractive metallurgy. He is a member of the American Institute of Mining, Metallurgical, Petroleum Engineers (AIME), the Electrochemical Society, the American Association for the Advancement of Science, and the Utah Chapter of Sigma XI. He has been very active in the work of AIME, and is presently chairman-elect of its extractive metallurgy division.

JAMES J. SCOTT, ASSISTANT DIRECTOR—MINING, BUREAU OF MINES

Dr. James J. Scott, who was appointed Assistant Director of Mining of the Bureau of Mines on Aug. 12, 1970, was born on Apr. 22, 1928, in Wiota, Wis. He received his B.S. in mining engineering from the Missouri School of Mines and Metallurgy in 1950; his M.S. in mining engineering from the University of Wisconsin in 1959; and his Ph.D. in mining engineering from the University of Wisconsin in 1962.

Dr. Scott held the positions of mining engineer, shift foreman, mine foreman, and head mining engineer with the Bethlehem Steel Co. in Cornwall, Pa., 1950–1957; instructor at the University of Wisconsin, 1957–1962; assistant professor at the University of Wisconsin, 1962–1963; associate professor at the Missouri School of Mines and Metallurgy, 1963–1965, and professor, 1965. From Feb. 1, through Sept. 1, 1967, he was on leave to serve as general manager of the Marble Cliff Quarries Co., Black River Division, Columbus, Ohio. On Sept. 1, 1967, he returned to the Missouri School of Mines and Metallurgy and served as professor until Sept. 1, 1969. He was professor and chairman of the department of mining and petroleum engineering from Sept. 1, 1969 to Aug. 11, 1970. His specialization is in the field of geomechanics, rock mechanics instrumentation, and structural analysis. Dr. Scott is member of the American Institute of Mining, Petroleum & Metallurgical Engineers, and he is a registered professional engineer in Wisconsin and Michigan.

From 1962 to July 1, 1970, he served as mining consultant to 18 mining and industrial firms on industrial problems related to rock mechanics and mine management. He is the author of six technical and other publications.

Mrs. HANSEN. Please introduce your associates.

Dr. OSBORN. On the extreme left is Assistant Secretary Dole, whom you know.

Mrs. HANSEN. He is one of our favorite witnesses.

Dr. OSBORN. Next to him is Dr. Henrie, Deputy Director of Mineral Resources and Environmental Development who until last summer was Director of our Reno laboratory.

Next is Mr. Thomson who works with Paul Zinner in connection with our planning.

At the far left is Henry Wheeler, Deputy Director for Health and Safety. And Mr. Lipper, and I am sure you know him.

And Mr. Joe Corgan, the very fine assistant director from Pennsylvania.

Mr. MCDADE. Stop right there. He received the Department award for 50 years of outstanding service to the Federal Government. He was the Chief Architect of one of the most successful mine fire projects ever undertaken by the U.S. Bureau of Mines. He is a fellow who in my district and the districts adjacent to it, and I think all around the country, speaks with the voice of authority because everyone knows his intelligence and his integrity.

Dr. OSBORN. It is very nice of you to say that. I have known Mr. Corgan for about 20 years, and I have never heard anything but good about him.

Next is Dr. James Scott who until this summer was head of the Department of Mining and Metallurgy at the University of Missouri. He got his Doctor's Degree at the University of Wisconsin in mining, prior to which for about a decade he was with the mining industry.

So he came to the Bureau as head of our mining having had very fine academic experience and good experience in industry. Right behind me is Paul Zinner whom you know very well.

GENERAL STATEMENT

Mrs. HANSEN. Please insert your general statement in the record at this point and summarize it for us.

(The statement follows:)

Madam Chairman.

I am grateful for the opportunity to appear before this committee and discuss the programs and funding requirements of the Bureau of Mines for 1972. My remarks will deal primarily with the items for which we are requesting increases, but I will try to sketch in briefly enough detail on the Bureau's current mission to give you a good understanding of the context in which our work is being done.

The increases we are seeking are in three areas, each of vital importance to the future of our society and the destiny of our people. First, there is the pressing need to develop safer and more healthful mining systems for the workers who supply us with essential minerals and fuels; second, the urgent necessity for attacking more effectively the serious environmental problems associated with the extraction, processing, and use of minerals and fuels; and third—the issue on which our very survival hinges—the need to assure adequate supplies of these raw materials at costs that we can afford.

These areas all are interrelated, and failure to surmount the difficulties that we face in any one of them will inevitably weaken our efforts in the others.

MINE HEALTH AND SAFETY

In the field of mine health and safety, the Bureau is charged with the administration of two landmark pieces of legislation: the Federal Coal Mine Health and Safety Act of 1969 and the Federal Metal and Nonmetallic Mine Safety

Act of 1966. Under both of these laws our programs are of three distinct types: (1) we enforce standards designed to provide maximum protection for the workers in our most hazardous major industries; (2) we provide education and training that can give these workers a better chance to pursue their vocations without accident or occupational illness; and (3) we conduct research and development work aimed at eliminating or minimizing mining hazards. These programs directly affect some 400,000 workers in more than 20,000 mining operations across the country. Indirectly, they affect every one of us, for on their success hinges our continued economic access to our mineral and energy resources.

As you know, the Bureau began in 1970 the demanding job of enforcing health and safety standards under both laws. We were ill-equipped for this task at the beginning of the year, having less than a third of the inspectors that we required. Intensive recruitment and training efforts are paying off, however, and by the end of this summer we expect to have enough qualified personnel to meet the minimum inspection requirements of both acts. Our education and training programs for mineworkers also have progressed rapidy. New instructional materials and improved training courses have been developed and are now being made available to the mining industry. We have stepped up our efforts to train mineworkers as qualified health and safety instructors, and we are developing plans for a mine health and safety academy that can provide continuing education in advanced health and safety practices for our own people, for State enforcement agencies, and for industry personnel. A strenuous effort is being made to advance the technology of mine safety. Research is being carried out at Bureau laboratories and on over 100 research contracts with industrial and university laboratories to develop, test and evaluate devices and methods that will assure greater safety for miners.

From a budget standpoint, we believe that the current funding level is adequate for both the enforcement and the educational programs in coalmining. We are asking for a $1,900,000 increase in these programs for metal and nonmetal mining, which is needed to maintain the level of effort made possible by a recent supplemental appropriation and to obtain additional enforcement and training personnel. I want to emphasize, however, that these programs are designed to cope with the hazards that exist in mining as it is practiced in this country today. You will, I'm sure, agree that we must do more than cope with these hazards. We must, insofar as it is humanly possible, eliminate them. And that can be done only through research and development work that will give us inherently safe and healthful mining systems.

The Bureau's research and development in coal mine health and safety was expanded with the passage of the Coal Mine Health and Safety Act, about 14 months ago. Already it is beginning to provide results. Recently, for example, we demonstrated prototype equipment that will allow rescue workers to locate and communicate with miners trapped underground after an accident, a fire, or an explosion. Later this year, we will move forward in the preventive field with testing of equipment designed to take accurate samples of all coal dust—both float and respirable sizes—right at the working face of a mine. We expect also by the end of this year to have perfected devices that can suppress methane ignitions before they can develop into full-scale explosions. And by next year we will be field-testing and demonstrating prototype continuous mine and face haulage equipment that is far safer than the equipment now in use.

Even after these developments materialize, however, much will remain to be done before mining can become safe enough for a worker to make a mistake without being hurt or killed. We are, therefore, requesting major increases in our health and safety research program. Our proposed budget calls for a $2.4 million increase in metal and nonmetal mine research and a $6.5 million increase in coal research. These amounts will enable us to expand health and safety research in metal and nonmetal mining, and will approximate the $30 million statutory limit established by the Coal Mine Health and Safety Act.

Environmental Problems

The second area in which we want to expand our efforts is the area of environmental quality. The mining, processing, and use of our mineral resources has brought us serious problems affecting the quality of our land, air, and water resources. If we are to retain our access to minerals and fuels, we must solve

the environmental problems associated with these raw materials. The Bureau now is working and achieving concrete results across the full spectrum of mineral related environmental problems.

We have made significant progress in developing new ways to restore mined lands. We are demonstrating means for abating mine subsidence, detecting and quenching mine and culm bank fires. We have made exceptional progress in the development of methods for recovering, processing, and utilizing mineral and energy values from urban and industrial wastes. In addition, we are developing technology to remove sulfur oxides from metallurgical smelter gases and from plants using fossil fuels, conducting research on automotive exhausts and on ways to recycle mineral and metal wastes from mineral and chemical processing plants.

By April, we hope to have demonstration work underway on a major culm bank fire in Pennsylvania. Last year, the Bureau participated in a project in a residential area of Rock Springs, Wyo., where a new technique for protecting land surfaces menaced by mine subsidence was successfully demonstrated. We are now investigating the use of a similar technique for a subsiding area in Scranton, Pa., whereby we would backfill the underground mine voids with culm bank wastes. This would yield the multiple benefits of shoring up the subsiding area, protecting the surface areas involved, eliminating an unsightly and potentially hazardous culm bank, and making the culm bank land available for more beneficial uses.

The Bureau has recently developed what appears to be the best process yet devised for recovering sulfur dioxide produced by copper smelters. Work is being intensified to establish processes for removal of sulfur oxides from stack gases of powerplants. In other areas, the Bureau has developed new techniques that are expected to effectively reduce air and water pollution from mercury processing and electrolytic processes, and to reduce or eliminate the land pollution associated with the mineral wastes.

For the most part, the 1972 funding for minerals research related to environmental problems will continue at the same level as in 1971. The budget does, however, include increases for research in three environmental programs. An increase of $500,000 is requested to expand the scale of highly promising work the Bureau is doing on the development of technology for extracting minerals and energy from urban wastes which have been described as the country's fastest growing resource. Most of the funds will be used for design of a model urban refuse reclamation plant. In addition, $300,000 is sought to initiate research on application of petroleum technology to develop safe techniques for underground disposal of liquid wastes. Underground injection of such wastes is a rapidly growing practice—yet, this injection is often accomplished with little understanding of the long-term environmental effects. Finally, an increase of $300,000 is sought to keep the program of mining surveys of wilderness areas on schedule.

Mineral Intelligence

The third area in which we are asking for an increase bears directly on our continuing ability to assure adequate supplies of mineral and energy at costs that we can afford.

We know dangerously little today about the complex forces and factors that influence mineral demand and supply. That is how it happens that we can find ourselves face to face with an energy shortage before we had any idea that it was coming. Not only do we have too meager an understanding in this vital area of mineral intelligence, but we also lack much of the capability we need to gather and analyze essential facts.

The Congress has recognized the weaknesses in this area and has recognized too that conflicts and crises in mineral and fuel supply are increasing. Congressional awareness is reflected in the recent establishment of a National Commission on Materials Policy and the even more recent passage of a National Mining and Minerals Policy Act.

The Bureau of Mines, as you doubtless know, has the only Federal capability in mineral intelligence, inadequate though it is to the task that now confronts us. To make a start toward expanding this existing capability and making it adequate to the job of informing the Congress and other Federal entities on patterns and problems of mineral supply, we are requesting a $400,000 increase in the budget for 1972.

MINERALS RESEARCH AND DEVELOPMENT

One of the most vital areas of Bureau activity * * * one on which the future adequacy of our mineral and fuel supply heavily depends * * * is research and development. In this area the Bureau has imaginative and constructive programs underway, aimed at making better use of our domestic mineral and fuel resources and thereby slowing the pace at which we grow more and more dependent on foreign sources of supply. I should point out here that we now depend on foreign sources for approximately 22 percent of the minerals we use—20 years ago it was only 13 percent. We now depend on other countries for better than 40 percent of our metal supply.

The research and development programs of the Bureau are responding to these trends in the way that we should respond, with improved technology. While the 1972 budget includes no additional funds for these programs, I want to assure you that the Bureau will not decrease its efforts to develop this new technology. Examples of the objectives that we seek are:

Increased recoveries from our reservoirs of oil and natural gas;

Development of economic methods for producing oil from oil shale and from tar sands;

Improvements in mining technology that can give us safe and economic access to our lower-grade deposits of metals, minerals, and fuels;

More efficient use of our abundant coal reserves in power generation.

In the Bureau we are looking to the day we can recover much of the energy from coal by gasifying it underground, and capture the metal values from lean ore deposits by leaching them in place, thereby avoiding both the hazards and the costs inherent in conventional mining. These efforts are important to national security and to our economic well-being. I assure you that we intend to get results.

Dr. OSBORN. I would like to emphasize two points that are most important to the Department of Interior and the Bureau of Mines.

INCREASING ENERGY REQUIREMENTS

First is the question of how we are going to meet the regularly increasing energy needs of this country, and, secondly, the impact of the Mining and Minerals Policy Act of 1970. I would like for a moment to talk about these two things.

The energy situation has been so widely publicized I don't need to dwell on this, but just point out that conservative predictions indicate that our energy demands will be double what it is now by about 1985.

Mrs. HANSEN. What is the total energy demand?

Dr. OSBORN. May I put into the record in answer to that question a very fine summary which the Bureau of Mines has just released which gives the picture in concise tables along with a little commentary with respect to what the demand is right now and how it was met with all of the various sources of natural gas and coal and so on.

(The information follows:)

DEPARTMENT of the INTERIOR

news release

BUREAU OF MINES

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For Release March 9, 1971

U.S. ENERGY USE SETS NEW RECORD

The United States used more energy last year than ever before, the Interior Department's Bureau of Mines said today.

The all-time high energy demand--equal to 68,810 trillion British thermal units--was met principally through increased use of natural gas, bituminous coal, petroleum, and nuclear energy, the Bureau said. Consumption went up 4.5 percent over 1969, a growth rate slightly below the previous year's.

Energy "lost" in converting fuels to electricity amounted to 11,770 trillion Btu. As a result, the energy actually used by all energy-consuming sectors of the U.S. economy in 1970 amounted to 57,040 trillion Btu, an increase of 3.3 percent over 1969 energy use.

Electric utilities accounted for the biggest consumption gain by using 9.2 percent more energy for power generation than they did in 1969. Energy for household and commercial needs grew by 3.7 percent, while energy use went up more than three percent for both industry and transportation.

Unsurprisingly, petroleum was 1970's biggest energy source, supplying 43 percent of all domestic energy demands. Natural gas was next, supplying 33 percent, followed by bituminous coal (20 percent), water power (4 percent), anthracite (0.3 percent), and nuclear energy (0.3 percent).

Coal was still the most important fuel for generating electric power, but its share of the electric utility market dropped from 58 percent in 1969 to 55 percent last year. Demand for bituminous coal and lignite rose 2.3 percent to 519 million tons, and electric utilities accounted for 62.4 percent of all the coal consumed in 1970.

The country's demand for natural gas increased 7 percent to nearly 22 trillion cubic feet. Natural gas consumption rose in all consuming sectors of the economy, particularly in electric power generation by utilities.

Demand for petroleum and natural gas liquids was up 4 percent to 5.4 billion barrels, with an especially large increase of 34 percent in demand for residual fuel oil used in power generation. Domestic crude oil production was over 3.4 billion barrels, up 4.4 percent compared to an increase of only one percent in 1969. Crude oil imports declined by 6.4 percent and imports of refined petroleum products gained by more than 19 percent.

Anthracite consumption declined 13.4 percent to 7.7 million tons. Hydroelectric power consumption declined 2.2 percent to 245.8 billion kilowatt-hours. Nuclear power, despite its small share of the energy market, gained nearly 39 percent in consumption to 19.3 billion kilowatt-hours.

Official energy statistics are published each year in the Bureau's Minerals Yearbook in energy balance form. Because of wide interest in spotting trends, preliminary figures, based on data reported to the Bureau of Mines and to the Federal Power Commission, are made public as soon as possible.

The attached tables show the preliminary 1970 energy balance in detail, including supply and demand by energy sources, use categories, and major producing and consuming sectors of the economy.

x x x

Table 1. - Apparent consumption of primary energy resources and related products

Commodity	1969	1970 (Preliminary)	Percentage change from 1969
Primary energy sources:			
Bituminous coal ----------million short tons-------	507.3	519.0	+2.3
Anthracite ---------- do -------	8.8	7.7	-12.5
Crude petroleum, runs to stills ----million barrels----------	4,148.4	4,230.3	+2.0
Natural gas 1/ ----------billion cubic feet ----------	20,387.8	22,000.0	+7.9
Hydropower, utility 2/ ---------million kilowatt-hours ------	251,264.3	245,829.0	-2.2
Nuclear power, utility 3/------ do ------	13,927.8	19,321.0	+38.7
Products:			
All oils, domestic product demand 4/--million barrels -------	5,159.9	5,366.8	+4.0
Coke ---------- million short tons ----------	64.8	66.7	+2.9
Electricity, conventional fuel burning plants:			
Utility 3/----------million kilowatt-hours --------	1,178,062.0	1,258,085.0	+6.8
Industrial 3/ ---------- do --------	P/110,359.5	108,456.0	-1.7

P/ Preliminary.
1/ Residue gas--excludes extraction loss but includes transmission loss.
2/ Net generation, adjusted for net imports or exports. The bulk of net trade is hydropower with an undetermined portion of steam plant power.
3/ Net generation.
4/ Includes natural gas liquids.

Source: Division of Fossil Fuels, Bureau of Mines, U.S. Department of the Interior.

Table 2. - U.S. gross consumption of energy resources by major sources and consuming sectors (Trillion Btu) 1/

Consuming sectors	Anthracite	Bituminous coal and lignite	Natural gas dry 2/	Petroleum 3/	Hydropower 4/	Nuclear 4/	Total gross energy inputs 5/	Utility electricity purchased 6/	Total sector energy inputs	Percentage change from 1969
Household and commercial:										
1969	107	375	6,897	6,268	-	-	13,647	2,752	16,399	
1970 (preliminary)	85	314	7,350	6,349	-	-	14,098	2,904	17,002	+3.7
Industrial:										
1969	70	5,504	9,894	5,027	-	-	20,495	2,155	22,650	
1970 (preliminary)	61	5,499	10,500	5,069	-	-	21,129	2,275	23,404	+3.3
Transportation: 7/										
1969	-	9	651	15,263	-	-	15,923	17	15,940	
1970 (preliminary)	-	9	671	15,756	-	-	16,436	18	16,454	+3.2
Electricity generation, utilities 8/:										
1969	47	7,403	3,598	1,628	2,706	150	15,532	-	-	
1970 (preliminary)	48	7,776	4,025	2,263	2,647	208	16,967	-	-	
Miscellaneous and unaccounted for:										
1969	-	-	-	235	-	-	235	-	235	
1970 (preliminary)	-	-	-	180	-	-	180	-	180	
Total energy inputs:										
1969	224	13,291	21,040	28,421	2,706	150	65,832	4,924	55,224	
1970 (preliminary)	194	13,598	22,546	29,617	2,647	208	68,810	5,197	57,040	+3.3

1/ Gross energy is the total of inputs into the economy of the primary fuels (petroleum, natural gas, and coal, including imports) or their derivatives, plus the generation of hydro and nuclear power (converted to equivalent energy inputs; see footnote "5/").
2/ Excludes natural gas liquids.
3/ Petroleum products including still gas, liquefied refinery gas, and natural gas liquids.
4/ Outputs of hydropower and nuclear power are converted to theoretical energy inputs at prevailing heat rate of all fossil fuels at central electric stations. Excludes inputs for power generated by nonutility plants, which are included within the other consuming sectors.
5/ Gross energy resource inputs with electricity generation shown as separate consuming sector.
6/ Utility electricity generated and imported, distributed to the other consuming sectors as energy resource inputs. Distribution to sectors is based on historical series in Edison Institute Statistical Yearbook. Conversion of electricity to energy equivalent by sector was made at the value of contained energy corresponding to 100 percent thermal efficiency using a theoretical rate of 3,412 Btu/kwh.
7/ Includes bunkers and military transportation.

Source: Division of Fossil Fuels, Bureau of Mines, U.S. Department of the Interior.

Table 3. - Domestic supply and demand for coal

	1969		1970 (Preliminary)		Percentage change from 1969
	Thousand short tons	Trillion Btu	Thousand short tons	Trillion Btu	
Anthracite:					
Supply:					
Production 1/	10,472.9	266.0	9,300.0	236.2	-11.2
Exports 2/	-1,600.5	-40.7	-1,585.0	-40.3	-1.0
Stock change; withdrawals (+), additions (-)	+167.0	+4.2	-1.0	-	
Losses, gains, and unaccounted for	-230.4	-5.8	-64.0	-1.6	
Total supply	8,809.0	223.7	7,650.0	194.3	-13.2
Demand by major consuming sectors 3/					
Household and commercial 4/	4,209.0	106.9	3,350.0	85.1	-20.4
Industrial 5/	2,751.0	69.9	2,400.0	61.0	-12.8
Electricity generation, utilities	1,849.0	46.9	1,900.0	48.2	+2.8
Miscellaneous and unaccounted for	-	-	-	-	-
Total demand	8,809.0	223.7	7,650.0	194.3	-13.2
Bituminous coal and lignite:					
Supply:					
Production 1/	560,505.0	14,685.2	590,000.0	15,458.0	+5.3
Imports	109.0	2.9	35.0	0.9	-67.9
Exports	-56,234.0	-1,473.3	-70,000.0	-1,834.0	+24.5
Stock change; withdrawals (+), additions (-)	+5,496.0	+144.0	-1,035.0	-27.1	
Losses, gains, and unaccounted for	-2,601.0	-68.2	-	-	
Total supply	507,275.0	13,290.6	519,000.0	13,597.8	+2.3
Demand by major consuming sectors:					
Fuel and power:					
Household and commercial 4/	12,666.0	374.7	10,500.0	313.5	-17.1
Industrial 5/	180,149.0	5,332.4	178,653.9	5,332.9	-0.8
(Coal carbonized for coke)	(92,901.0)	(2,749.9)	(96,000.0)	(2,866.6)	(+3.3)
Transportation 6/	313.0	9.2	300.0	9.0	-4.2
Electricity generation, utilities	308,461.0	7,403.1	324,000.0	7,776.0	+5.0
Total fuel and power	501,589.0	13,119.4	513,453.9	13,431.4	+2.4
Raw material: 7/					
Industrial:					
Crude light oil	1,284.7	39.0	1,205.4	36.2	-6.2
Crude coal tar	4,401.3	132.2	4,340.7	130.7	-1.4
Total raw material	5,686.0	171.2	5,546.1	166.4	-2.5
Total demand	507,275.0	13,290.6	519,000.0	13,597.8	+2.3

1/ Includes use by producers for power and heat.
2/ Includes shipments to U.S. Armed Forces in West Germany.
3/ With the exception of small quantities used as raw material for coal chemicals, all anthracite is used for fuel and power.
4/ Data include "retail dealer deliveries to other consumers." These are mainly household and commercial users, with some unknown portion for use by small industries.
5/ Includes consumption by coke plants, steel and rolling mills, and other industrial users.
6/ Includes bunkers and military transportation.
7/ Coal equivalent based on British thermal unit value of raw materials used for coal chemicals.

Source: Division of Fossil Fuels, Bureau of Mines, U.S. Department of the Interior.

Table 4. - Domestic supply and demand for natural gas

	1969		1970 (Preliminary)		Percentage change from 1969
	Million cubic feet	Trillion Btu	Million cubic feet	Trillion Btu	
Supply:					
Production 1/	20,698,240	22,857.9	22,000,000	24,295.2	+6.3
Imports	726,951	750.2	920,000	949.4	+26.6
Exports	-51,304	-52.9	-45,000	-46.4	-12.3
Stock change: withdrawals (+), additions (-)	-119,500	-123.3	-128,000	-132.1	--
Transfers, out, extraction loss 2/	-866,560	-2,391.7	-900,000	-2,520.0	+3.9
Losses, gains, and unaccounted for	--	--	--	--	--
Total supply	20,387,827	21,040.2	21,847,000	22,546.1	+7.2
Demand by major consuming sectors:					
Fuel and power:					
Household and commercial	6,682,804	6,896.6	7,122,000	7,349.9	+6.6
Industrial 3/	8,895,419	9,180.0	9,500,000	9,804.0	+6.8
Transportation	630,962	651.2	650,000	670.8	+3.0
Electricity generation, utilities	3,486,391	3,598.0	3,900,000	4,024.8	+11.9
Total fuel and power	19,695,576	20,325.8	21,172,000	21,849.5	+7.5
Raw material 4/ : Industrial:					
Carbon black	98,251	101.4	95,000	98.0	-3.3
Other chemical 5/	594,000	613.0	580,000	598.6	-2.4
Total raw material	692,251	714.4	675,000	696.6	-2.5
Total demand	20,387,827	21,040.2	21,847,000	22,546.1	+7.2

1/ Marketed production includes wet gas sold or consumed by producers, losses in transmission, producers' additions to storage, and increases in gas pipeline fill; excludes repressuring and vented and wasted. British thermal unit value of production is for wet gas prior to extraction of natural gas liquids. Higher values assigned to extraction loss are reflected in value of production for each year.

2/ Extraction loss from cycling plants represents offtake of natural gas for natural gas liquids as reported to Bureau of Mines. Values for extraction loss are based on annual outputs of natural gasoline and cycle products at 110,000 Btu per gallon, liquefied petroleum gases at 95,500 Btu per gallon, and ethane at 73,390 Btu per gallon.

3/ Includes transmission losses and unaccounted for of 381,587 million cubic feet in 1969 and 335,000 million cubic feet in 1970.

4/ Includes some fuel and power use by raw materials industries.

5/ Estimated from partial data.

Source: Division of Fossil Fuels, Bureau of Mines, U.S. Department of the Interior.

Table 5. - Domestic supply and demand for petroleum 1/

	1969		1970 (Preliminary)		Percentage change from 1969
	Million bbl	Trillion Btu	Million bbl	Trillion Btu	
Supply:					
Crude oil: 2/					
Production	3,371.7	18,922.0	3,518.5	19,579.0	+4.4
Imports	514.1	2,885.1	481.0	22,676.5	-6.4
Exports	-1.4	-7.8	-4.3	-23.9	+207.1
Stock change; withdrawals (+), additions (-)	+7.0	+39.3	-10.0	-55.6	--
Losses and transfers for use as crude, and unaccounted for	-11.8	-66.2	-18.8	-104.6	+59.3
Total	3,879.6	21,772.4	3,966.4	22,071.4	+2.2
Petroleum input runs to stills:					
Crude oil 2/	3,879.6	21,772.4	3,966.4	22,071.4	+2.0
Transfers in natural gas liquids 3/	264.6	1,178.1	257.8	1,148.6	+2.6
Other hydrocarbons	4.2	22.0	6.1	32.0	+45.2
Total	4,148.4	22,972.5	4,230.3	23,252.0	+2.0
Output:					
Refined products	4,148.4	22,972.5	4,230.3	23,252.0	+2.0
Unfinished oils, net	34.3	215.6	31.7	199.3	-7.6
Overage or loss	122.4	674.2	127.4	703.0	+4.1
Total	4,305.1	23,862.3	4,389.4	24,154.3	+2.0
Imports 4/	641.4	3,924.7	764.6	4,798.3	+19.2
Exports 4/	-83.4	-475.7	-87.6	-508.3	+5.0
Stock change, including natural gas liquids	+10.5	+57.8	-26.6	-146.8	--
Transfers in, natural gas liquids 3/5/	315.6	1,213.6	336.4	1,371.4	+6.6
Losses, gains, and unaccounted for	-29.3	-161.4	-9.4	-51.9	-67.9
Total Supply	5,159.9	28,421.3	5,366.8	29,617.0	+4.0
Demand by major consuming sectors:					
Fuel and power:					
Household and commercial	947.6	5,259.6	951.9	5,283.1	+0.5
Industrial	538.8	3,200.7	547.5	3,252.5	+1.6
Transportation 6/	2,817.9	15,137.8	2,905.8	15,602.4	+3.1
Electricity generation, utilities	259.8	1,627.8	362.1	2,262.8	+39.4
Other, not specified	25.5	144.0	18.5	102.9	-27.5
Total fuel and power	4,589.6	25,369.9	4,785.8	26,503.7	+4.3
Raw material: 7/					
Petrochemical feedstock offtake	291.0	1,307.6	298.6	1,345.3	+2.6
Other nonfuel use	262.7	1,652.4	268.5	1,691.3	+2.2
Total raw material	553.7	2,960.0	567.1	3,036.6	+2.4
Miscellaneous and unaccounted for	16.6	91.4	13.9	76.7	-16.3
Total domestic product demand	5,159.9	28,421.3	5,366.8	29,617.0	+4.0

1/ Supply and demand for crude oil and petroleum products. Petroleum products include products refined and processed from crude oil, including still gas and liquefied refinery gas; also natural gas liquids transferred from natural gas.

2/ Btu value for crude oil for each year shown is based on average British thermal unit value of total output of petroleum products (including refinery fuel and losses) adjusted to exclude natural gas liquids inputs and their implicitly derived values.

3/ Btu values for natural gas liquids for each year shown are implicitly derived from weighted averages of major natural gas liquids, with natural gasoline and cycle products converted at 110,000 Btu per gallon, liquefied petroleum gases at 95,500 Btu per gallon, and ethane at 73,390 Btu per gallon.

4/ Btu values for imported and exported refined products for each year shown are based on the average values of the respective products.

5/ Includes natural gas liquids other than those channeled into refinery input as follows: Petrochemical feedstocks, direct uses for fuel and power, and other uses.

6/ Includes bunkers and military transportation.

7/ Includes some fuel and power use by raw materials industries.

Source: Division of Fossil Fuels, Bureau of Mines, U.S. Department of the Interior

Table 6A. - Petroleum consumption by major products 1/and by major consuming sectors, 1969

	Household and commercial		Industrial		Transportation 2/		Electricity generation, utilities		Miscellaneous and unaccounted for		Total domestic products demand	
	Million bbl	Trillion Btu	Million bbl	Trillion Btu	Million bbl	Trillion Btu	Million bbl	Trillion Btu	Million bbl	Trillion Btu	Million bbl	Trillion Btu
Fuel and Power:												
Liquefied gases and ethane	182.3	731.2	27.5	110.3	34.9	140.0	-	-	4.6	18.4	249.3	999.9
Jet fuel (kerosine and naphtha types)	-	-	-	-	361.7	2,016.6	-	-	-	-	361.7	2,016.6
Gasoline	-	-	-	-	2,042.5	10,719.0	-	-	-	-	2,042.5	10,719.0
Kerosine	75.4	427.5	24.8	140.6	-	-	-	-	0.2	1.2	100.4	569.3
Distillate fuel	511.8	2,981.2	105.8	616.3	258.1	1,503.4	12.2	71.1	12.4	72.2	900.3	5,244.2
Residual fuel	178.1	1,119.7	167.2	1,051.2	120.7	758.8	247.6	1,556.7	8.3	52.2	721.9	4,538.6
Still gas	-	-	160.4	962.4	-	-	-	-	-	-	160.4	962.4
Petroleum coke	-	-	53.1	319.9	-	-	-	-	-	-	53.1	319.9
Total fuel and power	947.6	5,259.6	538.8	3,200.7	2,817.9	15,137.8	259.8	1,627.8	25.5	144.0	4,589.6	25,369.9
Raw Material: 3/												
Special naphtha	-	-	29.6	155.3	-	-	-	-	-	-	29.6	155.3
Lubes and waxes	-	-	32.8	196.6	20.6	124.9	-	-	-	-	53.4	321.5
Petroleum coke 4/	-	-	27.7	166.9	-	-	-	-	-	-	27.7	166.9
Asphalt and road oil	152.0	1,008.7	-	-	-	-	-	-	-	-	152.0	1,008.7
Petrochemical feedstock offtake 3/												
Liquefied refinery gas 5/	-	-	44.7	179.3	-	-	-	-	-	-	44.7	179.3
Liquefied petroleum gas 6/, 7/	-	-	151.6	608.1	-	-	-	-	-	-	151.6	608.1
Naphtha (-400 degrees)	-	-	57.6	302.3	-	-	-	-	-	-	57.6	302.3
Still gas	-	-	10.0	60.0	-	-	-	-	-	-	10.0	60.0
Miscellaneous (+400 degrees)	-	-	27.1	157.9	-	-	-	-	-	-	27.1	157.9
Total raw material	152.0	1,008.7	381.1	1,826.4	20.6	124.9	-	-	-	-	553.7	2,960.0
Miscellaneous and unaccounted for	-	-	-	-	-	-	-	-	16.6	91.4	16.6	91.4
Total domestic product demand	1,099.6	6,268.3	919.9	5,027.1	2,838.5	15,262.7	259.8	1,627.8	42.1	235.4	5,159.9	28,421.3

1/ Includes liquefied refinery gas and natural gas liquids.
2/ Includes bunkers and military transportation.
3/ Includes some fuel and power use by raw material industries.
4/ Includes some fuel uses.
5/ Partly estimated.
6/ Includes ethane.
7/ Includes LP gas for synthetic rubber.

Source: Division of Fossil Fuels, Bureau of Mines U.S. Department of the Interior.

Table 68. - Petroleum consumption by major products 1/ and by major consuming sectors, 1970

	Household and commercial		Industrial		Transportation 2/		Electricity generation, utilities		Miscellaneous and unaccounted for		Total domestic products demand	
	Million bbl	Trillion Btu	Million bbl	Trillion Btu	Million bbl	Trillion Btu	Million bbl	Trillion Btu	Million bbl	Trillion Btu	Million bbl	Trillion Btu
Fuel and Power												
Liquefied gases and ethane	184.0	738.0	28.5	114.3	37.5	150.4	-	-	5.0	20.1	255.0	1,022.8
Jet fuel (kerosine and naphtha types)	-	-	-	-	355.8	11,988.2	-	-	-	-	355.8	1,988.2
Gasoline	-	-	-	-	2,128.0	11,167.7	-	-	-	-	2,128.0	11,167.7
Kerosine	73.9	419.0	22.1	125.3	-	-	-	-	-	-	96.0	544.3
Distillate fuel	513.0	2,988.2	107.0	623.3	262.5	1,529.1	29.8	173.6	4.5	26.2	916.8	5,340.4
Residual fuel	181.0	1,137.9	170.5	1,071.9	122.0	767.0	332.3	2,089.2	9.0	56.6	814.8	5,122.6
Still gas	-	-	165.0	990.0	-	-	-	-	-	-	165.0	990.0
Petroleum coke	-	-	54.4	327.7	-	-	-	-	-	-	54.4	327.7
Total fuel and power	951.9	5,283.1	547.5	3,252.5	2,905.8	15,602.4	362.1	2,262.8	18.5	102.9	4,785.8	26,303.7
Raw Material: 3/												
Special naphtha	-	-	31.3	164.2	-	-	-	-	-	-	31.3	164.2
Lubes and waxes	-	-	27.5	164.5	25.4	154.1	-	-	-	-	52.9	318.6
Petroleum coke 4/	-	-	23.7	142.8	-	-	-	-	-	-	23.7	142.8
Asphalt and road oil	160.6	1,065.7	-	-	-	-	-	-	-	-	160.6	1,065.7
Petrochemical feedstock offtake 5/												
Liquefied refinery gas 6/	-	-	40.4	162.0	-	-	-	-	-	-	40.4	162.0
Liquefied petroleum gas 6/7/	-	-	160.0	641.8	-	-	-	-	-	-	160.0	641.8
Naphtha (-400 degrees)	-	-	56.6	297.0	-	-	-	-	-	-	56.6	297.0
Still gas	-	-	12.3	73.8	-	-	-	-	-	-	12.3	73.8
Miscellaneous (400 degrees)	-	-	29.3	170.7	-	-	-	-	-	-	29.3	170.7
Total raw material	160.6	1,065.7	381.1	1,816.8	25.4	154.1	-	-	-	-	567.1	3,036.6
Miscellaneous and unaccounted for	-	-	-	-	-	-	-	-	13.9	76.7	13.9	76.7
Total domestic product demand	1,112.5	6,348.8	928.6	5,069.3	2,931.2	15,756.5	362.1	2,262.8	32.4	179.6	5,366.8	29,617.0

1/ Includes liquefied refinery gas and natural gas liquids.
2/ Includes bunkers and military transportation.
3/ Includes some fuel and power use by raw material industries.
4/ Includes some fuel uses.
5/ Partly estimated.
6/ Includes ethane.
7/ Includes LP gas for synthetic rubber.

Source: Division of Fossil Fuels, Bureau of Mines, U.S. Department of the Interior.

Conversion Factors

		Btu
Bituminous coal and lignite		
National average/ short ton		26,200,000
Electric generation/short ton		24,000,000
Anthracite	short ton	25,400,000
Crude petroleum: Average British thermal unit of total output of petroleum products (including refinery fuel and losses) adjusted to exclude natural gas liquids inputs and their implicitly derived values.		
Petroleum products:		
Natural gasoline	barrel	4,620,000
Liquefied gases	"	4,011,000
Jet fuel, naphtha-type	"	5,355,000
Jet fuel, kerosine-type	"	5,670,000
Gasoline (including aviation)	"	5,248,000
Special naphtha	"	5,248,000
Kerosine	"	5,670,000
Distillate (including diesel)	"	5,825,000
Residual fuel oil	"	6,287,000
Still gas	"	6,000,000
Lubricants	"	6,065,000
Waxes	"	5,537,000
Petroleum coke	"	6,024,000
Asphalt and road oil	"	6,636,000
Natural gas liquids		
Natural gasoline and cycle products	gallon	110,000
LP-gases	"	95,500
Ethane	"	73,390
Natural gas, dry	cubic foot	1,032
Natural gas, wet: Total value of dry natural gas adjusted to include natural gas liquids inputs and their implicitly derived values.		

Hydro and nuclear power:
Outputs of hydropower and nuclear power are converted to theoretical energy inputs at prevailing heat rate of all fossil fuels at central electric stations. Excludes inputs for power generated by nonutility plants, which are included within the other consuming sectors.

Mr. HANSEN. What portion of the energy needs is met by coal, oil, and nuclear energy?

Dr. OSBORN. At the moment bituminous coal is about 20 percent of the resource for energy. Natural gas is about 33 percent. Oil is about 43 percent, water power is about 4 percent, anthracite coal about 0.3 percent, and nuclear energy about 0.3 percent.

The Bureau's position is exceedingly important in this because it is the principal Federal agency having to do with both developing technology and keeping track of what the state of the technology is in order to advise the legislative and executive departments in connection with energy policies.

So the Bureau is concerned and working on all aspects to some extent, and at least keeping track of it, as, for example, keeping track of the statistics on resources and demand.

As an example, uranium is much more of a problem than most people realize perhaps with respect to supply, and we are doing research in our laboratories on recovery of uranium from phosphate slimes and copper leach liquors in the West.

Mrs. HANSEN. Is this largely in the West?

Dr. OSBORN. Yes.

Mrs. HANSEN. Which States?

Dr. OSBORN. Utah and Idaho principally.

We also probably will be working on uranium mill waste to remove the radioactivity, and thus removing a health hazard.

I will be glad to later develop the picture, which I think is very serious, for nuclear energy, but perhaps I should move on now because this is a brief statement I am trying to make.

But we are working on that. We are working on coal from the standpoint particularly of converting it to more useful forms, particularly the gas and liquid forms.

We are working on problems that have to do with pollution of the atmosphere by the fuels we are using. We are working on the very important problem of secondary recovery of petroleum. You know we recover only about a third of it.

In Pennsylvania we have gotten a little more than that through extensive secondary recovery practices over the years. But generally only about a third of our petroleum is recovered and we are doing work on the problem as well as keeping track of what the industry is doing.

Also, research is directed to the heavy oils, and to the oil shales of the West so that we can keep ahead of probable developments in this field.

MINING AND MINERALS POLICY ACT OF 1970

I will conclude with this, Public Law 91–631, which is also called the National Mining and Minerals Policy Act of 1970, we consider an extremely important piece of legislation.

It provides essentially that a continuing study of the demand and supply of mineral resources be made and reported annually by the Secretary with recommendations for legislation instead of this business of creating a commission every 10 or 15 or 20 years to make a big study like the Paley Commission and soon forgetting it.

This is an important responsibility to the Department of the Interior and the Secretary must respond annually to Congress. Much of

the information he will need for this will fall to the Bureau of Mines to provide.

I wanted to call your attention especially, Mrs. Hansen and members of the committee, to the energy problem and this new National Mining and Minerals Policy Act.

FOSSIL FUEL SUPPLIES

Mrs. HANSEN. I notice in your justifications that the consumption of crude oil now exceeds 5 billion barrels per year and natural gas use is more than 20 trillion cubic feet annually. Proved domestic reserves of crude oil are about 40 billion barrels.

At this rate of use, you have about an 8 years' supply. Is that correct?

Dr. OSBORN. That is right. It is going fast.

Mrs. HANSEN. You also say in your justification that there are known, presently unrecoverable resources of 250 billion barrels of oil, which is a 50-year supply. Does that include all of your oil shale reserves?

Dr. OSBORN. No.

Mrs. HANSEN. What does it include?

Dr. OSBORN. I am sure this is referring to the petroleum that is left in the ground that I referred to. We are taking out of any oil field on an average not more than about 32 percent of the oil.

Mrs. HANSEN. Why?

Dr. OSBORN. The oil is around every little sand grain.

Mrs. HANSEN. I understand. But at the present time the processes to remove the oil are not known or are too expensive. What is the answer?

Dr. OSBORN. It is mostly the technology. This we are working on and working on hard. The easy things have been done, like water flooding, and gas repressuring and so on. Now we are coming to the hard job of developing the technology where we might add, for example, an appropriate solvent in a particular area mixed with water or with steam to wet the sand grain and wash the oil off.

I would say without any question the main question is the technology.

OIL AND GAS RECOVERY FACTORS

Mr. DOLE. I would like to supplement this. This is something of big concern to me. It has to do with the two things you mentioned, one, not having the technology, and, second, the price.

Unfortunately I feel the price here has a greater bearing on this than I would like to see.

The reason I state this is because if we do not and can't put the investment into the recovery of oil and gas in the future to a higher degree than we have now, this means we are losing a natural resource and a natural resource that will be unrecoverable due to the water flooding and destruction of the pressures in the reservoir itself.

Here we come up against the classic argument of the resource manager versus the dollar manager, or, if you wish, the economist. They can prove and they can show that we can take flash production from a reservoir for a short period of time and recover the same amount of

cash as if we could take this oil at a slower rate of production or using secondary and possibly tertiary recovery getting a larger quantity of oil over a longer period of time.

So what we are confronted with here, I think, is of great interest to this committee and to the Department of Interior, and that is, should the greatest emphasis be on cash flow or should it be on the recovery of a nonrecoverable resource.

Mrs. HANSEN. If you deemphasize your cash flow, would that entail a price escalation on the cost of oil?

Mr. DOLE. Indeed it does.

Mrs. HANSEN. If you are going to recover 100 percent of the oil from the ground, what would the escalation be pricewise?

Mr. DOLE. In answer to that, I do not believe technology exists or will it ever exist to recover 100 percent of your oil from the ground or of your gas from the ground except certain types of reservoirs such as your limestone caverns. Where it is mixed with sand, I don't think the technology will exist.

It is not a matter of how much you get, 70 percent or 80 percent, as compared with the present average of 31 or 32 percent. It is a matter of a small increase in price of oil in order to accommodate the increased costs due to secondary and tertiary recovery and the research needed to accomplish this.

This gives you a source of oil and a saving of natural resources rather than depending strictly upon the flash production of our reservoirs as mixed with the lower priced oils from insecure sources.

So we feel further research both by Government and by industry at a much higher rate than they are doing now is very much in the national good in order that this resource shall be recovered.

PETROLEUM IMPORTS AND RECOVERY

Mrs. HANSEN. Does the 5 billion barrels of crude oil consumed a year represent all domestic oil?

Dr. OSBORN. No, ma'am.

Mrs. HANSEN. What amount is domestic oil?

Dr. OSBORN. It is approximately like this: Each day we consume about 15 million barrels of oil. Of that, we produce about 11.

Mrs. HANSEN. So the remaining four million barrels comes from imports?

Dr. OSBORN. That comes from imports and the amount is increasing about a half a million barrels a day each year. That is about the rate at which we have depended on foreign imports. In other words, we are leveling off on our domestic production.

Mrs. HANSEN. Hasn't some of your foreign oil imports been very high in sulfur.

Dr. OSBORN. Some of it is and some of it is quite low.

Could I comment on your first question with regard to the reserve we have that we haven't been able to recover.

Much more possible quantitatively than most people realize, let's say we have averaged about 32 percent of the oil we have recovered. If we just increased this by 2 or 3 percent, we have a resource about equivalent to all of that Alaska oil we are talking about. This is one way to look at the significance of improving recovery.

Mrs. Hansen. Can this be done if you develop the technology?

Dr. Osborn. And could pay for it.

Mrs. Hansen. You would have to say to the consuming public that the price is going to be this much higher.

Dr. Osborn. Or if it is this much higher, that will come in as a resource.

Mr. Dole. I would prefer to say there are two elements as regards energy to the consuming public. One is the price at which they get it, and the second one is security of supply. We could furnish energy at a very minimal cost; the problem is we couldn't furnish sufficient for their needs.

To furnish the need, or as Governor Curtis said, at 22 degrees below zero you will pay almost any price for fuel oil—to furnish the security they need of supply I am afraid we are going to have to make an accommodation with price and the price will be escalated upward.

Mrs. Hansen. The price will be escalated upward?

Mr. Dole. Yes, ma'am, if you are going to get all the energy you need.

Mrs. Hansen. This has been an exceptionally bitter winter in certain areas of the United States. Hasn't there been an increasing demand for energy this winter?

Mr. Dole. Yes.

Dr. Osborne. Every year it goes up between 4 and 5 percent.

MEANS OF REDUCING ENERGY DEMAND

Mrs. Hansen. Is there any practical way of curtailing the need for energy? Could you ration power, for instance, and put some of the high-use areas on brownouts?

Dr. Osborn. If we were in an emergency or wartime type of footing, it would be entirely feasible, but it is hard to do unless there is a real crisis.

Mrs. Hansen. Supposing technology is not developed to keep the price of oil down, couldn't the import countries determine whether the United States has an adequate supply or not? They may decide there are better markets in other parts of the world. What would happen then?

Dr. Osborn. I would like to make two comments on this. One, you will recall during the war we all had the gasoline ration stamps. In other words, it is possible just to curtail the use, and transportation is one of the very great consumers of energy.

POTENTIAL OF NUCLEAR ENERGY

Second, we have two tremendous sources of energy that are not being used to the fullest by any means. One of them is nuclear energy, which has not developed as fast as was predicted just a few years ago, partly because of technology, partly because of the environmental powerplant siting problem, partly because the cost has gone up.

The nuclear people keep telling us that, "Well, we are having these little troubles, but we are going to get back almost on schedule again." We have heard that before. We think they will continue to be behind.

But looking ahead to say 1985, the big question is when the breeder reactor may be perfected. Because if they do perfect it, we can make use of the abundant resource uranium 238.

In other words, the reactors we have now, and will have for at least 15 years, can only burn the rare isotope uranium 235 as I am sure you know. So we are using only a very small fraction of the potential energy of the uranium in this inefficient type of reactor.

The Atomic Energy people are putting much emphasis in the development of the breeder. If that comes about, we can use U–238 as well. We can then afford to get into lower grade deposits such as the Chattanooga shale which has tremendous reserves of uranium, say 60 grams to the ton, something like that, tremendous reserves.

So if this is speeded up a little, or even at its present rate, we ought to be going pretty well say by the middle of the 1980's if we can hold out that long, or certainly by the 1990's. We have to count on nuclear energy. We have to.

COAL RESERVES

Secondly, I think some of the Bureau's finest work has been in the conversion of coal which is the other great resource we have. On that subject, as of course you know, there are environmental problems like the sulfur problem.

As a resource we have, just in round numbers, a thousand billion tons of coal. That is an easy number to remember. Whether we have 1,500 billions or we have only 500 billions depends on whether technology is developed that permits us to mine coal that is only 14 inches thick or if 20 inches is the limit.

Mrs. HANSEN. How much of that requires deep mining and how much require the so-called strip mining?

Dr. OSBORN. It is mostly underground mining, but I can't come up with a figure.

Mr. DOLE. About 400 billion tons of coal would be closer than 28 inches and less than 1,000 feet.

Dr. OSBORN. I don't know how much you could strip.

Mrs. HANSEN. How many underground coal miners are there?

Dr. OSBORN. About 140,000 underground coal miners.

Mrs. HANSEN. How many were there 5 years ago?

Mr. WHEELER. We were two or three times that many.

Mrs. HANSEN. Why the decrease?

Dr. OSBORN. Machines, mechanization. Last year was one of our greatest production years. We produced about 600 million tons of coal. That was about 30 million tons more than the year before. So we are producing more coal with less men.

Mrs. HANSEN. Is the technology going to improve to the extent you could practically be able to operate a coal mine without men?

UNDERGROUND COAL GASIFICATION

Dr. OSBORN. One way we can do that is through gasification underground so nobody has to go underground. We do want to get back into experiments on this within the next few years. The Bureau is laying plans for it now.

Mrs. HANSEN. You don't have anything developed presently?

Dr. OSBORN. We are laying out a program we think will give us the information we need first.

You probably recall, Mrs. Hansen, back in the early fifties the Bureau of Mines had an experiment along these lines going in Alabama. The main objective there was to see if thin seams or low-grade coal might be gasified this way where it wasn't possible to mine the coal economically.

There are an awful lot of engineering problems involved because you have to burn under controlled conditions until you can recover the right mixture of carbon monoxide and methane and so forth at the surface.

Since then the Russians have conducted four different experiments for a number of years producing a gas for powerplant use by underground gasification. These are small powerplants, maybe 100 megawatts or something like that. I had understood from our report that three of them were still going, but in talking to the Commissioner of Mines and Geology from Romania, who was in town talking to us the other day, I was advised that Russia had abandoned the last one of these. The principal reason is they have all the natural gas they can possibly use for a long time.

RUSSIAN ENERGY SUPPLIES

Mrs. HANSEN. What is Russia's supply of energy as compared to the United States?

Dr. OSBORN. It is probably considerably larger.

Mr. DOLE. Madam Chairman, Russia's demands for energy are not nearly as great as ours. There is a belief in this country that they have not been developed to as high a degree as ours have been. There is also reason to believe that they have many undeveloped areas or lesser developed areas as compared to the lower 48 in the United States.

Mrs. HANSEN. Haven't they just signed contracts with Austria, Belgium, West Germany, France, and Italy for gas?

Dr. OSBORN. For delivery to Western Europe.

Mrs. HANSEN. That is right.

Dr. OSBORN. They have large supplies. How large is hard to know because, as the Secretary says, they haven't had the demand we have and haven't used them up so fast. Also they don't give out the precise information on such subjects.

NEED FOR ADDITIONAL INFORMATION ON COAL RESERVES

Mr. DOLE. If I may, Madam Chairman, I think the record should be clear on these statistics that we quoted on reserves for coal and we put them out pretty firmly. They truly are not this firm.

As a matter of fact, the amount of studies we have made on our coal reserves—and this not only applies to the Western States but also the Eastern States—are based pretty much on extrapolations. In the past it has been assumed that we have such a large quantity of coal there hasn't been a great necessity to go out and definitely determine the full reserves.

One of the areas I am sure we will be talking to you about in the future is to get better information on our coal reserves. This is true in the East because so much is private land it is difficult to get from the owners of this land what the reserves might be.

So even though we talked in what appears to be quite firm terms on the known reserves of coal and even though we know they are large, they are not as definite as I think is in the best interests of this country to know.

Mrs. HANSEN. In the West are your coal reserves largely on public lands or private lands?

Mr. DOLE. They are largely on Federal lands. However, there are, Madame Chairman, very large reserves on railroad lands.

Dr. OSBORN. The remarks of the Secretary brings to mind another important point, and that is that our recovery rates vary considerably depending on the type of mining. In the stripping you are referring to we get almost all of it, but in some operations, like one of the very thick coal seams in Wyoming I think, where the coal was like 30 or 40 feet thick, the recovery has been only about 26 percent.

Mrs. HANSEN. Why?

Dr. OSBORN. Because of the problem of supporting the weak roof over this thick coal seam.

Mr. DOLE. I think it is so-called hard coal that is in Carbon County in Utah. They are mining underground 40 foot seams with a net result that the roof support is insufficient to maintain a void of 40 feet. Consequently, only very small portions of the coal is mined out in order to leave the pillars necessary for support.

I think you will find the same thing also prevalent in Alberta in the Rocky Mountain foothills where they are doing the same thing.

COAL GASIFICATION POTENTIAL

Dr. OSBORN. If I could get back to gasification technique for a moment, now we are looking at a very different picture than we were before. We want to produce a marketable gas from coal if we can, whereas before there was no great advantage but just an alternate way of getting coal out of the ground.

If we carry on the experiment, it probably would be where otherwise only a small amount of coal could be recovered by conventional mining, so we might be able to recover more.

Also, there is the matter of the sulfur in coal, Almost surely we need to go to gassification either above or below ground, because once we produce a gas we can then quite easily separate the sulfur.

At the present time, in most areas, 1-percent sulfur is the maximum that can be used, burned, in powerplants. So this is limiting the amount of coal, or location of the types of coal that can be used.

Mrs. HANSEN. Where are the deposits of heavy sulfur?

Dr. OSBORN. The coals with the most sulfur are in the East where we need the most coal; 95 percent of the coal we use in powerplants is mined east of the Mississippi where only 20 percent of the coals contain 1 percent or less sulfur, and much of this is metallurgical coal we wouldn't use for powerplants. We are exporting a great deal of the metallurgical coal, for example.

COAL EXPORTS

Mrs. HANSEN. Where are you exporting coal?

Dr. OSBORN. Japan and Western Europe, about 60 million tons a year.

Mrs. HANSEN. What States export most of the coal?

Dr. OSBORN. Pennsylvania, West Virginia, Alabama, Kentucky, Virginia among others.

Mr. DOLE. We had the largest export of coal last year. We had over $1 billion worth. We exported 71 million tons. That compares with 56 for 1969. The bulk of our coal—Canada is still our largest importer of coal followed by Japan and Western Europe.

Mrs. HANSEN. Has Canada developed very much coal mining?

Mr. DOLE. They are developing a great deal of coal now. In the western part of the country. The materials we are exporting to Canada does have to be the lower grade steam coal. The higher metallurgical grade coal is very much a necessity for export to Japan and Western Europe for the development of the rapidly increasing steel industry.

This coal is needed to blend with coals from South Africa and Australia. It also works very well in keeping our ties with Europe, otherwise they would probably have to turn to Poland and Iron Curtain countries. I think it is very necessary and essential that we maintain these exports.

Mrs. HANSEN. What percentage of the domestic sources of coal is used by U.S. steel companies?

Mr. DOLE. I don't believe I understand.

Mrs. HANSEN. What percent of metallurgical coal is used by our own domestic steel companies?

(The information follows:)

An estimated 307 million tons of high-grade and marginal-grade metallurgical coal was distributed in 1968, the latest year for which data are available. Of this amount, 87 million tons or 25 percent was used by domestic steel companies.

Mr. DOLE. I can't give you that offhand. I am sure the Bureau can get that figure for you. It is extremely high percent.

I might also point out as far as steam coal for generation as compared with metallurgical grade coal, the former is about 2 to 3 times as great.

Mrs. HANSEN. West Germany signed a contract with Russia for use of her gas and West Germany is to supply the steel pipe.

Dr. OSBORN. Using our coal.

Mrs. HANSEN. Yes. The same thing is true of the pipe shipped to Alaska. It was manufactured in Japan and we have supplied the coal.

Dr. OSBORN. When the Rumanian Commissioner of Mines and Geology was here, one of his principal concerns was to try to line up a contract for metallurgical coal. They want to import several million tons a year. They don't have it in Rumania and want to get it from the United States at any price, at least the going price. He finds he can't get it from the large companies at all.

FUNDING FOR HEALTH AND SAFETY PROGRAMS

Mrs. HANSEN. Mr. McDade, of Pennsylvania, has a great interest in the mining programs.

Mr. McDade. Thank you, Madame Chairman.

Dr. Osborne, it is a pleasure to have you before the committee. The discussion we have had I think was both enlightening and very interesting.

I noticed that the major increase in your budget this year is for the health and safety program.

Dr. Osborn. Yes, sir.

Mr. McDade. Can you give assurances to the committee that the increase you have requested will fund your health and safety program to the fullest?

Dr. Osborn. Yes. My understanding is that we have the funds we need in this budget to carry out next year the health and safety programs to the best of our ability. In other words, we should not be short of money next year.

Mr. McDade. I think that is the kind of assurance the committee wants to have at this point.

Dr. Osborn. Do you want to raise any question to that, Mr. Wheeler? That is true is it not?

Mr. Wheeler. Yes.

FUNDING LEVELS FOR COAL AND NUCLEAR RESEARCH

Mr. McDade. I was interested in your discussion about coal reserves and your comments about atomic energy. Can you tell me or would you furnish for the record the amounts that are being spent on research to make optimum use of this coal vis-a-vis the amounts being spent by the Atomic Energy Commission or related agencies to develop nuclear power?

Dr. Osborn. I can get these figures for you. I will be very glad to.

(The information follows:)

EXPENDITURES ON NUCLEAR ENERGY AND COAL RESEARCH BY GOVERNMENT AGENCIES

[dollars in millions and tenths]

	1969	1970	1971
ATOMIC ENERGY COMMISSION:			
Uranium and thorium:			
Fast breeder reactors	90.0	97.0	124.0
Other breeders and converters	54.0	43.0	54.0
General reactor technology and safety	86.0	89.0	81.0
Thermonuclear fusion:			
Basic research	6.0	6.0	6.0
Applied research and development	24.0	29.0	28.0
Plowshare underground engineering	1.0	1.0	2.0
Grand total, all programs	261.0	265.0	295.0
Expenditures on coal research by Government agencies:			
U.S. Bureau of Mines		6.4	7.9
Office of Coal Research		16.8	17.5
U.S. Geological Survey		.4	.5
Tennessee Valley Authority		.4	1.2
Grand total, all programs		24.0	27.1

BUDGET FOR RECYCLING OF MUNICIPAL REFUSE

Mrs. Hansen. Mr. Obey.

Mr. Obey. Just one question from last year. If I recall correctly,

last year you had asked for about $6 million, was it, for research into recycling of municipal waste.

Mr. THOMSON. That is right.

Mr. OBEY. How much did you get in the budget?

Dr. OSBORN. I remember this committee made possible an additional $150,000 for us.

Mrs. HANSEN. Let's get that straight, you had requested this item from the Office of Management and Budget but they had not approved the item?

Mr. THOMSON. That is correct.

Dr. OSBORN. That is the way I recall it. This was put to good use and we can report on its use if you want.

Mr. OBEY. How much did you ask from the Bureau of the Budget this year?

Dr. HENRIE. A $500,000 increase.

Mr. OBEY. Is that what you asked for this year?

Mr. THOMSON. Yes, sir.

Mr. OBEY. Did you get all you asked for?

Dr. OSBORN. Yes.

RESULTS OF OIL SHALE RETORTING EXPERIMENTS

Mrs. HANSEN. Mr. Yates.

Mr. YATES. There is an item in the Washington Star, February 22, which said this:

> Successful removal of oil from oil shale boulders without crushing has been reported by the Bureau of Mines. Two recent experiments centering around two oil shale boulders weighing about 7,500 pounds to 10,000 pounds were conducted as parts of a cooperating effort to find practical ways of removing the petroleum-like oil from oil shale without removing the shales from the ground.
>
> The two tests involved shale of sizes varying from powder to huge boulders, in an effort to stimulate what was being encouraged in underground treatment of shale. Aboveground retorting of the oil in the past has been done with the shale crushed to uniform size, a process which along with the cost of removing the shale from the ground has proved too expensive for commercial operation. Oil shale is found in enormous quantities in the United States.

Does this mean that the removal of oil from oil shale will be more economical?

Dr. OSBORN. We have something like 600 billion barrels of shale oil that can be recovered from shales averaging 25 or more gallons of oil per ton.

In the past the Bureau has developed the technology for retorting the shale aboveground. In order to make an impact on our petroleum needs which Mrs. Hansen referred to at the beginning, we need to produce shale-oil in terms of say 1 million barrels a day. A few thousand barrels isn't going to help us much.

If we produce a million barrels a day, and we now consume about 15 million barrels a day, even this would have only a small impact anyway. This shale contains about three-fourths of a barrel a ton. So this would mean mining much more than a million tons of rock a day.

ENVIRONMENTAL PROBLEMS WITH MINING OIL SHALE

Mrs. HANSEN. What is that going to do to the environment in this area?

Dr. OSBORN. That is the point. We have to mine it, move it, retort it, and then we have to get rid of the waste rock which has a larger volume, incidentally, because after processing it is expanded and we have to put it someplace. This may be feasible and our mining people think it is.

Mrs. HANSEN. Was that the purpose of the announcement by the Bureau of Mines?

Dr. OSBORN. No. There may be just extreme difficulties from the environmental standpoint just as there may be from the standpoint of simply being able to handle this much material.

UNDERGROUND RETORTING OF OIL SHALE

A possible alternative we think is underground retorting, where we will drill a series of wells and start a fire in one of them in the oil shale. We are doing that now at a depth of about 140 feet in the oil shale in western Wyoming. By controlling the flow of air which we put down, we can control the fire and the flow of hot gases that will liberate the shale oil in place.

We are producing several barrels a day now at this little pilot plant.

One of the things we didn't understand was how much the rock would have to be fractured underground in order to get the gases to move. In other words, we want to know if we need to extensively fracture the shale to get satisfactory retorting or if a fracture only large enough to get the fire started would work.

We started with the ordinary fracture technique that is common practice used in the petroleum industry and started the fire.

At the same time we carried out the experiments you are reading about there. We took some very large chunks weighing a couple of tons and put them in our surface retort to see if the heat in there would push the oil out without extensive fracturing and careful sizing, and it works. We can move the heat, which has to be up around 400 or 500 degrees centigrade, through the large boulder and push the oil out. On a small scale it looks as if it may be practical to do just a minimum amount of fracturing to get the fire started on the ground, and accomplish the retorting without fracturing to a very small size as we have done in the previous retorting experiments.

Mrs. HANSEN. How are you going to control your underground fires?

Dr. OSBORN. By means of the amount of air we put down. We want to have the temperatures just right to accomplish the retorting, and, of course, we don't want to burn any more of the shale in the process than we have to.

So it is a long-range thing. We are set up to carry out this series of field experiments, including these large surface retorting experiments, so that we will have answers by about 1975.

Mr. YATES. Then you can't at this time give me an answer to my question as to whether this is more economical?

Dr. OSBORN. No.

Mr. DOLE. This is a point on a research curve point toward in situ treatment of oil shale. This is a point on the curve. Whether or not this research will prove successful or not we don't know. This press release was a progress report on some of the research we were doing pointing toward in situ control of recovery of oil from shale.

DEVELOPMENT OF OIL SHALE

Dr. OSBORN. You have raised, of course, a very important question. If we are ever going to make use of this tremendous resource, we will have to know the cost by conventional methods.

The Department of Interior hopes by the fall of 1972, to have several contracts with industry permitting leasing a maximum of, I think, 5,120 acres to any one company. The purpose will be to have several prototype plants to produce about 50,000 barrels a day which is pretty good production. Then they can get pretty good cost figures.

Mr. YATES. When you say "lease to industry," what does that mean? Does that mean a lease to oil shale companies or petroleum companies?

Dr. OSBORN. Petroleum companies or other corporations who want to build a prototype plant and develop this. Oil companies would be principally involved in this, I believe.

Mr. YATES. Are oil companies really interested in developing processes for extracting oil from oil shale?

Dr. OSBORN. The major industrial groups so far have been oil companies, Union Oil, for example.

Mr. YATES. That really doesn't answer my question does it?

Dr. OSBORN. What was the question?

Mr. YATES. My question is whether or not oil producing companies are interested in developing processes for extracting oil from oil shale?

Dr. OSBORN. The answer is yes.

Mr. YATES. Isn't this a competitive field to their operation?

Dr. OSBORN. They are in the energy business, whatever the source. They have been buying up coal companies in order to get more energy.

Mr. YATES. That is true, and I want to ask you about that, too. I was in the congressional reading room last Saturday and came across a statistic which impressed me, something I hadn't known before. It seems most of the coal lands owned by the Government are leased to oil companies. Is this correct?

Dr. OSBORN. I haven't any knowledge of that, I am afraid.

Mr. DOLE. I think that question would probably be best directed to the Bureau of Land Management when they come up here.

Mr. YATES. Wouldn't the Bureau of Mines know it?

Dr. OSBORN. We would, but I don't know.

Mr. DOLE. The leasing is done by BLM.

BLM OIL SHALE PROGRAM STATEMENT

Mrs. HANSEN. I have a statement to insert in the record at this point from the Bureau of Land Management on the oil shale program.

(The statement follows:)

BUREAU OF LAND MANAGEMENT—OIL SHALE PROGRAM

Funds appropriated for oil shale title clearance programs (in thousands of dollars):

1968	$110
1969	475
1970	475
1971	475
1972	475

The funding increases of $365,000 was allowed by Congress in fiscal year 1969. The increase was requested to initiate a field mineral examination and land classification program to clear title to the oil shale bearing lands of the Green River Formation in Colorado, Utah, and Wyoming. This program was a result of the Secretary of Interior on January 27, 1967, announcing an oil shale development program. This program contained briefly the following items:

1. Title clearing of public oil shale bearing lands in Colorado, Utah, and Wyoming.
2. Possible land exchanges to permit some consolidation of private holdings which are at present too scattered for efficient mining operations.
3. Development of economic processes for the recovery of oil and associated minerals from shale.
4. Development of processes to retort the oil from the shale in situ.
5. Research and investigation to develop more information about the location, characteristics, and values of the oil shale and other associated minerals and their development consistent with sound conservation and environmental protection principles.

The major portion of the richest domestic oil shale resources are on public lands. The Bureau has the entire responsibility to clear title to public oil shale bearing lands. Progress in accomplishing any oil shale program, or for that matter, any resource program, is dependent on title clearance to the land.

Oil shale test lease sales were held December 20, 1968. There were only three bids:

Tract No. 1:

The Oil Shale Corp. ($199/acre)	$249,000
Fred C. Craft, Eugene, Oreg. ($0.50/acre)	625,000

Tract No. 2:

The Oil Shale Corp. ($48/acre)	250,000

The Secretary rejected all bids as completely inadequate.

CURRENT STATUS OF OIL SHALE TITLE CLEARANCE WORK

Inventory of county records to identify claims

The Oil Shale title clearance project office has the responsibility to clear title on Federal oil shale lands in Colorado, Utah, and Wyoming lands. The first step is to identify the mining claims located on oil shale lands. To obtain this information, county records are microfilmed, and information, such as date of location, date of recordation, name of claims, acreage in the claims, and legal description of the lands is abstracted from the film and coded into an ADP system. To date, 60 percent of the county records have been abstracted in Colorado, 10 percent of the records have been abstracted in Utah (all in Uintah County), and 9 percent of the records have been abstracted in Wyoming (all in Sweetwater County).

Field examinations

The second step is to do field reconnaissance examinations in order to obtain information such as geology, mineralization, topography, exploratory activity (drill holes, bulldozer cuts, et cetera, and other indications of mining and exploration activity), and identify access. Sixty-five percent of the lands in Colorado, 5 percent in Utah, and 5 percent in Wyoming have been field examined.

Adjudication actions in land offices

Upon completion of these preparatory actions, claims are processed in the land office for adjudicative title clearance action; that is, determination of the validity of the mining claim, which may include preparaton of complaints in contest actions against the claims, service of complaints, hearings, decisions, and appeals; 10,808 post-1920 claims are in various stages of adjudicative actions. This is about 13 percent of the total claims to be processed. It leaves about 72,000 claims remaining to be processed.

Completed adjudicative action has resulted in the following to date: 1,339 mining claims relinquished by the claimants and 51 invalidated by contest and administrative decision. These actions cover about 60,000 acres.

Anticipated accomplishments during fiscal year 1972

It is anticipated that during 1972, 4,400 claims in Colorado will be readied for processing in the land office, and that 3,400 claims will be invalidated.

Twenty percent of the land in Utah will be inventoried and 12 percent will be field examined; 1,500 claims in Wyoming will be readied for processing by the land office.

Summary of the recent Supreme Court decision, Secretary of the Interior vs. *the Oil Shale Corp.*

The Supreme Court held, in *Secretary of the Interior* v. *The Oil Shale Corp.*, decided December 8, 1970, that it has been well established that failure to do assessment work on mining claims may be evidence of abandonment, that token assessment work, as assessment work which does not substantially satisfy the requirements of the 1882 mining law is not adequate to maintain the claims. The Court disagrees with dicta in previous decisions that failure to do assessment work inures only to the benefit of relocators. The Court takes the position that section 37 of the Mineral Leasing Act makes the United States the beneficiary of all claims which are invalid for lack of assessment work or otherwise; that is, that oil shale deposits in such invalidated mining claims are subject to leasing only under the provisions of the Mineral Leasing Act.

The implications of the decision on the Department's workload is presently under close consideration. Our initial reaction is that the State offices in Colorado, Utah, and Wyoming are now confronted with the task of maintaining constant surveillance of the oil shale areas in order to prevent undue disturbance by mining claimants attempting to do assessment work, such as indiscriminate bulldozing, roadbuilding, blasting, etc.

This is what they say:

This program contained briefly the following items: (1) Title clearing of public oil shale bearing lands . . . (2) possible land exchanges to permit some consolidation of private holdings . . . (3) development of economic processes . . . (4) development of processes to retort the oil from the shale in situ, and (5) the research and investigation. . . .

They go on to say:

The major portion of the richest domestic oil shale resources are on public lands. The Bureau has the entire responsibility to clear title to public oil shale bearing lands. Progress in accomplishing any oil shale program, or for that matter, any resources program, is dependent on title clearance to the land.

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The oil shale title clearance project office has the responsibility to clear title on Federal oil shale lands in Colorado, Utah, and Wyoming lands. The first step is to identify the mining claims located on oil shale lands.

To obtain this information, county records are microfilmed, and information, such as date of location, date of recordation, name of claims, acreage in the claims and legal description of the lands is abstracted from the film and coded into an ADP system. To date, 60 percent of the county records have been abstracted in Colorado, 10 percent of the records have been abstracted in Utah (all in Uintah County) and 9 percent of the records have been abstracted in Wyoming (all in Sweetwater County).

. . . 10,808 post-1920 claims are in various stages of adjudicative actions. This is about 13 percent of the total claims to be processed. This leaves about 72,000 claims remaining to be processed.

. . . 1,339 mining claims relinquished by the claimants and 51 invalidated by contest and administrative decision. These actions cover about 60,000 acres.

It is anticipated that during 1972, 4,400 claims in Colorado will be readied for processing in the land office, and that 3,400 claims will be invalidated. Twenty percent of the land in Utah will be inventoried and 12 percent will be field examined. One thousand five hundred claims in Wyoming will be readied for processing by the land office.

I think the difficulty comes about from the old land patents. Some carried the mineral rights and others did not. I have noticed this even in my own county where there are certain patents that carried the mineral rights and certain that did not, depending on the time the grant was made. As you go through these leases you are struck by the

appalling lack of similarity in the granting of the patents. Various administrations granted mineral rights and various administrations did not. I imagine these lands have not changed hands a great many times and, therefore, have had no title studies and no abstracting to any great degree.

OIL SHALE PILOT PLANT AT RIFLE

Mr. YATES. Mrs. Hansen suggests the cost of prototypes for research on oil shale as being high. Do we have a prototype plant? By "we" I mean does the Government have a prototype plant?

Dr. OSBORNE. On oil shale?

Mr. YATES. Yes.

Dr. OSBORN. No, we never had a prototype. We just had a pilot plant.

Mr. YATES. Was the pilot plant the one at Rifle, Colo.?

Dr. OSBORN. Yes.

Mr. YATES. Why was that closed?

Dr. OSBORN. Well, we obtained the information that we thought was sufficient for that scale plant. The next stage, then, is to go to a prototype, which is a much larger thing.

PETROLEUM COMPANY INTERESTS IN OIL SHALE DEVELOPMENT

Mr. YATES. Are you concerned at all by the fact that control over oil shale lands may be obtained by the oil companies? They are in the fuel business, you suggest. Presumably that would justify their going into not only oil shale but also into coal, as they have gone into coal, and presumably even going into the business of atomic energy. Shouldn't we be somewhat concerned about the concentration of power in the fuel industry?

Dr. OSBORN. I think so.

Mrs. HANSEN. I think they have been deeply concerned, and this is the reason these proposals weren't accepted.

Mr. YATES. That is the reason I asked my question. He said that the oil companies were the ones who were engaged in the oil shale extractions and I thought this was a sufficiently huge frontier——

Mrs. HANSEN. Should the Federal Government operate timber cutting operations, operate coal mines, operate oil wells, as businesses? This is the problem.

Mr. YATES. I think that isn't quite to the point of the question that I was asking.

Dr. OSBORN. You are talking about the monopolistic angles.

Mr. YATES. I am talking about the concentration of power by the relatively few companies of all the fuel resources in the country.

Mr. DOLE. Madam Chairman, may I respond to that?

Mrs. HANSEN. Please do, Mr. Secretary.

Mr. DOLE. Eighty percent of the coal is owned by other than oil companies, or, if you want to put it the other way, 20 percent is owned by companies under control of the oil companies.

Mr. MCDADE. How much by railroads.?

Mr. DOLE. This I can't tell you. It is a sizable percentage.

Mrs. HANSEN. How much is owned by developers?

Mr. DOLE. This would be the other 80 percent. Now, as far as the oil shale land, as you know, these lands have been withdrawn from leasing since 1930, and it is trying to get an oil shale program underway that the Department of the Interior has been concerned about for the last, essentially 2 years as far as I am concerned, and certainly it was before that time.

The development of oil shale could very well add to our energy needs for the years to come and it could very well be that if the price that we can get for this oil from the oil shale is right it will establish a ceiling on the price of oil that we might expect to be charged to us by the insecure sources.

Now, as far as the interest of the oil companies in oil shale, it is my understanding from several canvasses that, yes, indeed, that they are the ones who appear to be the most interested in the development of this energy resource. However, it is not entirely the energy companies that are involved in the oil shale business.

Now, as to the concern, yes, there is a concern that the energy resources will be tied up within a certain segment. However, I assure you that this is under consideration by those in Government who have responsibility for this.

Mrs. HANSEN. Mr. Secretary, isn't it true that this could be one of the requirements in your leasing policy?

Mr. DOLE. This could very well be one of the requirements within the leasing, yes, ma'am.

Mr. YATES. What do you mean by that answer—this could be? Do you mean by that that oil companies would not be permitted to lease oil shale lands? Is this what you have in mind by that answer?

Mr. DOLE. It is not what we have in mind for it, Mr. Congressman; this could be a requirement in the lease if it was deemed in the best interest of the United States.

Mr. YATES. But who determines that? Does not your Department determine that?

Mr. DOLE. This would be the Department of the Interior, in the Bureau of Land Management at the present time.

Mr. YATES. What is the policy of the Department in that respect at the present time?

Mr. DOLE. The policy in the Department in that respect has not been determined. This is part of the study of the oil shale prototype program.

Mrs. HANSEN. They have issued no leases. Isn't that correct?

Dr. OSBORN. That is correct.

SUMMARY OF OIL SHALE RESEARCH BY THE BUREAU OF MINES

Mrs. HANSEN. I will insert in the record at this point a summary of the oil shale research by the Bureau of Mines.

(The summary follows:)

OIL SHALE RESEARCH BY THE BUREAU OF MINES

Oil shale research by the Bureau of Mines dates back to 1916 when small-scale studies were started to characterize the massive oil-shale deposits of Colorado and other Western States that had only recently been generally recog-

nized as a potential fuel source. This early work also represented the first effort of note in the United States to investigate the fundamentals of retorting to produce oil from domestic shales and of refining the oils into useable products. Expenditures were modest, totaling as is indicated in the enclosed table only about $100,000. This pioneering effort by the Bureau was recessed after several years before more than a sketchy background of knowledge had been gained.

Over the period of 1925 through 1929, the Congress appropriated $304,000 to the Bureau for the primary purpose of investigating the feasibility of producing shale oil as an emergency or future fuel supply for the Navy. In keeping with this purpose, a small mine was opened and two batch-type retorts were constructed and operated on naval oil shale reserve No. 3 near Rulison, Colo. Starting in 1927, laboratory and small pilot-scale refining research also was undertaken in a facility located at Boulder, Colo. This combined program demonstrated for the first time that the Nation's western oil shales could in fact be utilized as a source of fuel oil and, with some degree of suitability, for production of higher grade products such as gasoline. However, the processes demonstrated at that time fell far short of being efficient or economically attractive, and even left much to be desired in regard to acceptability of products for general public use.

Discovery of the east Texas and other large oil fields in the early 1930's and the impact of the Great Depression stifled practically all interest in oil shale over the next decade, and no further work was undertaken by Government until 1944. In this year, mounting concern regarding the adequacy of petroleum supplies led to passage of Public Law 290 (78th Congress), commonly known as the Synthetic Liquid Fuels Act. This act, plus two extensions thereof, was the authority for a coordinated program of laboratory and engineering-scale research on oil shale and its products extending over an 11-year period until mid-1955. Two facilities were established to serve this purpose: An engineering installation providing for relatively large-scale mining, retorting, and refining experimentation on naval oil shale reserves 1 and 3 near Rifle, Colo., and a laboratory and pilot-scale installation at Laramie, Wyo., for more fundamental studies and for providing guidance to the larger scale work at Rifle. The total oil-shale appropriations under the Synthetic Liquid Fuels Act amounted to approximately $22 million as shown in the table, with $16.8 million of the total expenditure being at Rifle. Processing work at the latter facility was discontinued at the end of June 1955; however, a 1 year's extention of mining experimentation was authorized by the Congress and provision was made for placing the plant in standby condition at a combined additional expense of $1 million (Public Law 219, 84th Cong.). This amount plus appropriations under which the Laramie oil shale program has continued to date have been made pursuant to the Organic Act of the Bureau of Mines, totaling $19.3 million through fiscal year 1971. Overall, as shown in the table, oil shale research expenditures by the Bureau since 1916 come to about $41.7 million.

Highlight accomplishments of the Rifle program between 1944 and 1956 included development and demonstration of an efficient, generally accepted, underground mining system featuring a room and pillar approach; conception and development through a 150-ton-per-day pilot stage of the Bureau's patented gas combustion retorting process which is considered one of the prime candidates today for commercial adaptation; and demonstration that well-established petroleum refining methods could be applied to shale oil to produce such major products as gasoline, diesel fuel, and a range of fuel oils, all of a quality commensurate with petroleum counterparts of that time. Further attesting to the excellence of the Rifle program are the facts that both the Union Oil Co. in the mid-1950's and Colony Development Corp. in the 1960's adopted the Bureau's mining system in their oil shale research and development programs in Colorado, and that the Colorado School of Mines and six sponsoring companies chose the Bureau's gas combustion retorting system for advanced development between 1964 and 1968. This latter program was conducted under a lease agreement with the Department using the Bureau's Rifle plant under the authority of Public Law 87–796 of the 87th Congress, the total industry cost being $7.2 million.

Concurrent with the Rifle operations under the Synthetic Liquid Fuels Act and continuing to the present time, oil shale work at the Bureau's Laramie Center was devoted largely until recent years to laboratory research and bench-scale process work. This effort now has been expanded to include field experimentation on in situ retorting, a promising and environmentally attractive possibility of

supplying enough heat to the oil shale in its parent underground location to effect retorting to yield oil without the need for mining and above-ground processing.

Considering first the smaller scale work, the Laramie program has yielded the bulk of the information now available concerning the extent and quality of the oil shale deposits of Colorado, Wyoming, and Utah; a wealth of basic information, needed to guide development of an oil shale industry, concerning the composition, physical properties and chemical characteristics of oil shale and its products; a retorting system (the entrained-solids process) capable of processing, in contrast to most other known retorting methods, the fine particles of oil shale inevitably produced in mining and crushing operations; and reasonable assurance that modern refining methods involving hydrogenation can be successfully applied to shale oil to yield the high-quality products of today's petroleum industry.

In the in situ retorting area, one field test has been successfully completed at a shallow site near Rock Springs, Wyo., demonstrating that the process is at least technically feasible under rather idealized conditions. A second test at greater depth and covering a considerably larger area than the first now is underway. Although firm conclusions cannot yet be reached concerning such important factors as extent of resource recoverability and economic feasibility of in situ retorting, the early results are encouraging enough that further experimentation appears fully warranted. Complementing the actual in situ field tests, experimentation also is being done in aboveground equipment to develop a better understanding of the retorting process under conditions simulating those of in situ processing. This effort not only is providing guidance to the fieldwork but also is directed toward laying a groundwork of knowledge applicable to retorting masses of broken shale such as might be formed by an underground nuclear explosion should such a technical approach be tried at some future date.

Other investigations currently featured in the Bureau's oil shale program include study and experimentation directed toward solving the anticipated environmental problems of an oil shale industry; for example, spent shale management, control and reclamation of process waters, and treatment of process gases.

Beyond conducting research and engineering experimentation as such, the Bureau of Mines also cooperates closely with other Government agencies in providing technical guidance and assistance as needed in connection with such endeavors as clearing of oil shale land titles and the Department's currently developing land leasing program. Overall, then, the Bureau's oil shale program is designed to obtain information needed by Government for planning purposes and in establishing policy as well as to provide a firm technologic base for efficient industrial development of the Nation's oil shale resources.

BUREAU OF MINES—OIL SHALE EXPENDITURES

(Fiscal years 1916 through 1971)

	Millions
1916–1924	$0.1
1925–1929	0.3
1944–1955	[1]22.0
1956–1965	8.1
1966	1.1
1967	1.3
1968	1.6
1969	2.3
1970	2.4
1971	2.5
Total	41.7

[1] Appropriated under Synthetic Liquid Fuels Act.

PROGRAMS FOR SHALE OIL PRODUCTION

Mr. YATES. Has a request been made for the establishment of the oil shale prototype producing plant?

Mr. DOLE. Such a study is underway now, and has been for, as I say, the past 2 years and it has yet to be presented to the Secretary.

Mr. YATES. Does your study indicate what this would cost?

Mr. DOLE. I beg pardon, sir?

Mr. YATES. Does your study indicate what such a program would cost? Does your study indicate the cost of such a project?

Mr. DOLE. Well, the development, the building of a commercial plant for the extraction of oil from oil shale is estimated to be somewhere on the order of $180 million to $250 million, and this is at a production rate of 50,000 barrels per day.

Mrs. HANSEN. What will the operation cost be?

Mr. DOLE. The operation cost I can't tell you.

Mr. YATES. Are there any such plants in existence at the present time?

Dr. OSBORN. No.

Mr. YATES. Did you say no to that?

Dr. OSBORN. Yes; the answer is no.

Mr. YATES. Is there a plant that is in existence that has been built by the oil shale companies?

Dr. OSBORN. Some of their experimental work was in cooperation with the Bureau.

Mr. DOLE. There is a pilot plant that has been run off and on by one company. I believe it is Tosco. Union Oil Co. had a pilot plant about 10 years ago. It is not operating. There are several segments on a bench scale or project development units within various oil companies, the full extent of which I am not aware of.

Mrs. HANSEN. Are they on public lands?

Mr. DOLE. No, ma'am. These are on their own property.

Mr. YATES. You talked about the fact that we are threatened with running out of our fossil fuels because of the increasing consumption. Does it make sense in your mind to have such a project plant, a prototype?

Mr. DOLE. Mr. Congressman, I don't think that our problem is running out of fossil energy sources. I think our problem is misallocation of these resources and where we get our energy from. I think the decision that we are faced with is how much do we want to depend upon the insecure sources for this, which is not only a national problem but an international problem. It has to do with the reserves of our fossil energy sources that we have.

For instance, on natural gas, as was brought out earlier, we expect to reach our peak production time in about 3 years. With oil, we could very well be close to it now, certainly within the next couple of years. On the other hand, coal has a very large resource and it is only doing 20 percent of our present demands. We have other sources of energy here in this country if we want to develop them. Those would include oil shale, tar sands, heavy oils.

Mr. YATES. "If we want to develop" was the key phrase. Do we not want to develop them? Aren't we reaching the point in our consumption of our resources where we ought to be thinking of developing them?

Mr. DOLE. Yes, indeed, Mr. Congressman, and I agree with you that "want to develop" is certainly the key phrase, and we are reaching

this point where we must develop them, and I think that want speaks to the price of the energy and the price which we want to pay for that energy.

Mrs. HANSEN. As I understand, from the 8 years I have sat on this committee, your oil shale lands have posed the problem of lack of technology for the type of development that will protect the environment.

Dr. OSBORN. Right.

Mrs. HANSEN. The West didn't particularly want to see the lands destroyed until technology was developed to protect the environment.

Dr. OSBORN. Mrs. Hansen, one of our principal laboratories is at Laramie, Wyo., as you know, and part of the work there is on the environmental aspects.

Mrs. HANSEN. Yes. So there is work going on and has been going on for a great many years on oil shale technology. Is this not correct?

Dr. OSBORN. Exactly.

PETROLEUM TECHNOLOGY

Mr. YATES. May I ask one other question? You say if we were able to improve our technology in extracting the oil from the ground by 2 or 3 percent this would be the equivalent of the total Alaska oil resource. Did I understand that correctly?

Dr. OSBORN. That was my statement, yes.

Mr. YATES. What is being done to try to improve that technology?

Dr. OSBORN. Much of the work at our Bartlesville plant, which I think you will take up later——

Mrs. HANSEN. Yes.

Dr. OSBORN (continuing). ——is directed to the matter of secondary recovery methods, that is, research on additives that can be used in secondary recovery, and so on.

Mr. YATES. O.K. Thank you, Madam Chairman.

Mr. DOLE. I think this also should be made clear: of Alaska's known resources as of now, not their potential.

Mr. YATES. But we still have the problem of obtaining Alaska's oil resources, in a sense? We haven't decided the pipeline versus the tanker problem, have we?

Dr. OSBORN. There are serious problems to be solved in both.

Mrs. HANSEN. That is being studied. Funds have been provided in several agencies in the Department of Interior for environment protection before the pipeline is constructed.

ORGANIZATIONn CHANGES IN THE BUREAU OF MINES

Since the Bureau of Mines last appeared before this committee for its budget hearing, various reorganizational changes have been made. Please summarize for the committee what these changes have been and indicate what impact the reorganization is expected to have on your Bureau.

Dr. OSBORN. The principal change was in organizing the main functions of the Bureau under two deputy directors. One for health and safety, under whom there are then three assistant directors, one for coal mines, one for metal and nonmetal mines, and one for education.

The second large effort of the Bureau is under a deputy director for mineral resources and their conservation and development, and under him four assistant directors, one for mining, one for metallurgy, one for energy, and one for mineral supply.

So this has been the principal reorganization, but also a very important increment was to consolidate our mineral supply work. The Bureau has felt, and I am sure they are right, that we can do a much more effective and efficient job in the collection of production and consumption statistics and appraising mineral supply including developing trends on mineral demands, and so on, by having the people concentrated in one place. So this was a major move also.

Mrs. HANSEN. Do you anticipate any further reorganization in the near future?

Dr. OSBORN. No.

IMPORTS OF MINERALS

Mrs. HANSEN. Please insert in the record a report on the imports of minerals to the United States, indicating what country we obtain them from.

Dr. OSBORN. Be very glad to do that.

(The information follows:)

Mineral Imports -- Selected Commodities

Commodity	1969 Imports	Source (1966-1969 Average)
Alumina	1,912,000 tons	Australia 50%, Surinam 31%, other 19%
Aluminum	558,000 tons	Canada 69%, Norway 11%, other 20%
Arsenic	18,517 tons	Mexico 42%, Sweden 27%, France 23%, Other 8%
Asbestos	694,000 tons	Canada 92%, South Africa 6%, Other 2%
Barite	614,000 tons	Mexico 24%, Canada 21%, Ireland 17%, Peru 14%, Other 24%
Bauxite	14,236,000 long tons	Jamaica 59%, Surinam 26%, Other 15%
Beryllium	6,400 tons	Brazil 36%, India 27%, Argentina 8%, Other 29%
Bismuth	895,000 lbs.	Peru 58%, Mexico 28%, Canada 7%, Other 7%
Cadmium metal	1,078,000 lbs.	Canada 29%, Japan 28%, Australia 15%, Peru 12%, Other 16%
Cement	9,687,000 barrels	Bahamas 41%, Canada 28%, Norway 18%, Other 13%
Chromium	1,106,000 tons	South Africa 40%, U.S.S.R. 24%, Philippines 17%, Turkey 12%, Other 7%
Cobalt	5,988 tons	Congo (Kinshasa) 43%, Belgium-Luxembourg 30%, Norway 9%, Other 18%
Copper	414,000 tons	Chile 29%, Canada 23%, Peru 20%, South Africa 7%, Other 21%
Diamonds (Indus. includ. syn.)	14.1 million carats	Ireland 47%, South Africa 15%, United Kingdom 10%, Other 28%
Fluorspar	1,150,000 tons	Mexico 75%, Spain 14%, Italy 8%, Other 3%
Germanium	12,000 lbs.	Belgium-Luxembourg 29%, Italy 19%, U.S.S.R. 17%, West Germany 15%, Other 20%

Commodity	1969 Imports	Source (1966-1969 Average)
Gold	5.6 million troy ounces	Canada 49%, Philippines 12%, Switzerland 12%, United Kingdom 9%, Other 18%
Graphite	59,000 tons	Mexico 75%, Malagasy Republic 8%, Other 17%
Gypsum	5,858,000 tons	Canada 80%, Mexico 15%, Other 5%
Ilmenite	317,000 tons	Canada 80%, Australia 20%
Iodine	5,705,000 lbs.	Japan 60%, Chile 40%
Iron Ore	40,758,000 long tons	Canada 53%, Venezuela 28%, Liberia 7%, Other 12%
Iron & Steel Products	14,019,000 tons	Europe 47%, Japan 39%, Canada 9%, Other 5%
Lead	389,000 tons	Peru 21%, Canada 21%, Australia 17%, Mexico 14%, Other 27%
Magnesium	3,515 tons	Canada 50%, Norway 28%, U.S.S.R. 13%, Other 9%
Manganese	1,962,000 tons	Gabon 31%, Brazil 26%, Rep. of South Africa 8%, India 8%, Other 27%
Mercury	30,848 flasks	Spain 31%, Italy 21%, Canada 19%, Mexico 16%, Other 13%
Mica (Natural) Sheet	3,390 tons	India 76%, Brazil 17%, Other 7%
Natural Gas	727 billion cubic feet	Canada 92%, Mexico 8%
Nickel	129,332 tons	Canada 90%, Norway 8%, Other 2%
Nitrogen Compounds	232,000 tons	Chile 100%
Petroleum (Crude)	514,000,000 barrels	Canada 35%, Venezuela 28%, Libya 7%, Saudi Arabia 6%, Other 24%
Platinum-Group Metals	1,225,700 troy ounces	United Kingdom 43%, U.S.S.R. 26%, Canada 11%, Netherlands 5%, Other 15%

Commodity	1969 Imports	Source (1966-1969 Average)
Potash	2,340,000 tons	Canada 89%, France 3%, Germany, West 5%, Other 3%
Pumice	384,000 tons	Greece 53%, Italy 47%
Quartz-Crystal Electronic Grade	237,000 lbs.	Brazil 90%, Other 10%
Rhenium	200 lbs. (estimate)	West Germany 49%, U.S.S.R. 19%, Sweden 19%, France 13%
Rutile	204,907 tons	Australia 92%, Sierra Leone 7%, Other 1%
Salt	3,302,000 tons	Canada 43%, Mexico 25%, Bahamas 15%, Tunisia 6%, Other 11%
Selenium	546,000 lbs.	Canada 91%, United Kingdom 7%, Other 2%
Silver	71.9 million troy ounces	Canada 50%, Peru 15%, Mexico 10%, Rep. of S. Africa 8%, Other 17%
Sodium Sulfate	286,000 tons	Belgium-Luxembourg 46%, Canada 38%, West Germany 10%, Other 6%
Strontium	12,595 tons	Mexico 60%, United Kingdom 28%, Spain 12%
Sulfur	1,795,000 long tons	Canada 55.7%, Mexico 44.1%, Other 0.2%
Tellurium	112,000 lbs.	Canada 57%, Peru 33%, Japan 10%
Thorium (Monazite)	252 tons	Australia 64%, Malaysia 31%, Other 5%
Tin (Metal)	54,950 long tons	Malaysia 66%, Thailand 27%, Other 7%
Titanium	6,332 tons	Japan 69%, U.S.S.R. 14%, United Kingdom 11%, Other 6%
Tungsten	1,503,000 lbs.	Canada 39%, Peru 19%, Portugal 12%, Australia 11%, Other 19%
Uranium	1,504 tons	Rep. of S. Africa 79%, Canada 17%, Other 4%
Zinc	931,000 tons	Canada 51%, Mexico 18%, Peru 12%, Other 19%
Zircon Concentrate	95,414 tons	Australia 99+%

Dr. OSBORN. You don't have it with you?

Mr. ZINNER. Not in exactly that form.

Mrs. HANSEN. What are your major imports and where do they come from?

Mr. ZINNER. We have one chart here. May I show this to you? This is a chart similar to the one we presented last year. It is updated 1 year in terms of quantity and dollars, and the difference between the production and demand are all imports.

Mrs. HANSEN. Do you want to elaborate on that statement for the record?

Mr. ZINNER. Yes.

Mrs. HANSEN. Also insert the chart in the record.

(The chart follows:)

BUREAU OF MINES

U.S. Primary Mineral Production and Demand in 1969

Commodity	Unit	A Primary Production	B Primary Demand	Content Ratio A/B	Price Units	Average Price, Dollars	Value - Million Dollars	
							Primary Production	Primary Demand
Aluminum	Thousand S.T.	500	5,100	0.098	lb	0.272	272.0	2,774.4
Antimony	S.T.	2,218	20,689	.107	lb	.5757	2.5	23.8
Arsenic	S.T.	(1)	(1)	.325	S.T.	168.00	(1)	(1)
Barium	Thousand S.T.	601	899	.671	S.T.	24.12	14.5	21.7
Beryllium	S.T.	(1)	(1)	.858	lb	60.00	(1)	(1)
Bismuth	Thousand lb	(1)	2,539	.388	lb	4.63	(1)	11.8
Boron	Thousand S.T.	171	86	1.988	S.T.	469.77	80.3	40.4
Bromine	Million lb	335	327	1.024	lb	.26	87.1	85.0
Cadmium	Thousand lb	4,650	14,432	.325	lb	1.27	15.2	46.8
Calcium	Thousand S.T.	89,190	89,190	1.000	S.T.	4.07	363.0	363.0
Cesium	lb	0	(1)	0	lb	.60	0	(1)
Chlorine	Thousand S.T.	9,422	9,419	1.000	S.T.	74.00	697.2	697.0
Chromium	Thousand S.T.	0	475	0	S.T.	145.00	0	68.9
Cobalt	Thousand lb	1,000	18,900	.053	lb	2.20	2.2	41.6
Columbium	Thousand lb	0	4,660	0	lb	1.70	0	7.9
Copper	Thousand S.T.	1,545	1,694	.911	lb	.479	1,480.1	1,624.8
Fluorine	Thousand S.T.	82	603	.136	S.T.	102.95	8.4	62.1
Gallium	Kg	(1)	(1)	1.764	g	.70	(1)	(1)
Germanium	Thousand lb	30	17	1.765	lb	84.00	2.5	1.4
Gold	Thousand T.oz	1,733	6,567	.264	T.oz	41.51	71.9	272.6
Hafnium	S.T.	0	(1)	0	lb	85.00	0	(1)
Indium	Thousand T.oz	(1)	(1)	.380	T.oz	2.50	(1)	(1)
Iodine	Thousand lb	(1)	4,902	.151	lb	1.24	(1)	6.1
Iron	Million S.T.	59	90	.656	S.T.	15.65	923.4	1,408.5
Lead	Thousand S.T.	509	873	.583	lb	.1493	152.0	260.7
Lithium	S.T.	(1)	(1)	1.043	lb	.91	(1)	(1)
Magnesium-Metal	Thousand S.T.	100	102	.980	lb	.3525	70.5	71.9
Magnesium-Nonmetal	Thousand S.T.	1,110	1,140	.974	S.T.	79.88	88.7	91.1
Manganese	Thousand S.T.	93	1,317	.071	S.T.	44.60	4.1	58.7
Mercury	Thousand Fl	29	69	.420	Flask	505.00	14.6	34.8
Molybdenum	Thousand lb	99,807	57,287	1.742	lb	1.72	171.7	98.5
Nickel	Thousand lb	31,200	299,200	.104	lb	1.28	39.9	383.0
Nitrogen-Compounds	Thousand S.T.	10,611	9,940	1.068	S.T.	60.00	636.7	596.4
Nitrogen-Gas & Liquid	Thousand S.T.	4,879	4,879	1.000	S.T.	20.05	97.8	97.8
Palladium	Thousand T.oz	10	531	.019	T.oz	42.00	.4	22.3
Phosphorus	Thousand S.T.	5,099	3,400	1.500	S.T.	38.24	195.0	130.0
Platinum	Thousand T.oz	11	389	.028	T.oz	125.00	1.4	48.6
Potassium	Thousand S.T.	2,327	3,901	.597	S.T.	31.62	73.6	123.3
Rare Earths	S.T.	(1)	11,000	1.331	lb	.35	(1)	7.7
Rhenium	lb	2,500	1,250	2.000	lb	665.00	1.7	.8
Rhodium	Thousand T.oz	0	38	0	T.oz	235.00	0	8.9
Rubidium	lb	0	(1)	0	lb	.37	0	0
Scandium	Kg	(1)	5	3.200	g	4.08	(1)	.02
Selenium	Thousand lb	1,199	1,428	.841	lb	7.00	8.4	10.0
Silicon	Thousand S.T.	471	477	.987	S.T.	272.00	128.1	129.7
Silver	Thousand T.oz	41,900	98,500	.425	T.oz	1.79	75.0	176.3
Sodium	Thousand S.T.	18,994	19,919	.954	S.T.	18.48	351.0	368.1
Strontium	S.T.	0	(1)	0	S.T.	47.24	0	(1)
Sulfur	Thousand L.T.	9,540	9,175	1.040	L.T.	23.00	238.5	229.4
Tantalum	Thousand lb	0	1,287	0	lb	9.13	0	19.8
Tellurium	Thousand lb	234	312	.750	lb	6.00	1.4	1.9
Thallium	lb	(1)	(1)	.949	lb	7.50	(1)	(1)
Thorium	S.T.	(1)	(1)	.775	lb	7.97	(1)	(1)

BUREAU OF MINES

U.S Primary Mineral Production and Demand in 1968

Commodity	Units	A Primary Production	B Primary Demand	Constant Ratio A/B	Price Units	Average Price, Dollars	Value - Million Dollars: Primary Production	Value - Million Dollars: Primary Demand
Tin	L.T.	(1)	58,015	.001	lb	1.64	(1)	213.1
Titanium-Metal	Thousand S.T.	0	27	0	lb	1.32	0	71.3
Titanium-Nonmetal	Thousand S.T.	302	508	.594	S.T.	960.00	289.9	487.7
Tungsten	Thousand lb	7,439	15,556	.478	lb	2.62	19.5	40.8
Vanadium	S.T.	5,900	8,000	.738	lb	3.15	37.2	50.4
Yttrium	S.T.	(1)	(1)	.353	lb	9.00	(1)	(1)
Zinc	Thousand S.T.	553	1,504	.368	lb	.1465	162.0	440.7
Zirconium-Metal	S.T.	0	(1)	0	lb	6.00	0	(1)
Zirconium-Nonmetal	Thousand S.T.	(1)	(1)	.526	S.T.	116.00	(1)	(1)
Total							6,943.7	11,939.5
Asbestos	Thousand S.T.	126	784	.161	S.T.	84.56	10.7	66.3
Clays	Million S.T.	59	57	1.035	S.T.	4.50	265.5	256.5
Corundum	S.T.	0	2,000	0	S.T.	21.23	0	.04
Diatomite	Thousand S.T.	667	491	1.358	S.T.	60.96	40.7	29.9
Feldspar	Thousand L.T.	674	708	.952	L.T.	13.16	8.9	9.3
Garnet	Thousand S.T.	20	17	1.176	S.T.	91.60	1.8	1.6
Graphite	Thousand S.T.	(1)	(1)	.049	S.T.	41.00	(1)	(1)
Gypsum	Thousand S.T.	9,881	15,818	.625	S.T.	3.88	38.3	61.4
Kyanite	Thousand S.T.	(1)	(1)	1.157	S.T.	91.00	(1)	(1)
Mica-Scrap & Flake	Thousand S.T.	133	134	.993	S.T.	24.05	3.2	3.2
Mica-Sheet	Thousand lb	(1)	6,584	.001	lb	.70	-	4.6
Perlite	Thousand S.T.	471	455	1.035	S.T.	10.82	5.1	4.9
Pumice	Thousand S.T.	3,609	3,992	.904	S.T.	1.11	4.0	4.4
Sand & Gravel	Million S.T.	937	936	1.001	S.T.	1.14	1,068.2	1,067.0
Stone-Crushed	Million S.T.	861	861	1.000	S.T.	1.54	1,325.9	1,325.9
Stone-Dimension	Thousand S.T.	1,873	1,873	1.000	S.T.	52.67	98.7	98.7
Talc	Thousand S.T.	1,029	941	1.094	S.T.	7.30	7.5	6.9
Vermiculite	Thousand S.T.	309	250	1.236	S.T.	21.95	6.8	5.5
Total							2,897.5	2,959.1
Anthracite	Thousand S.T.	10,473	8,809	1.189	S.T.	9.62	100.8	84.7
Bituminous Coal&Lignite	Million S.T.	561	507	1.107	S.T.	4.99	2,799.4	2,529.9
Natural Gas	Billion C.F.	20,700	20,400	1.015	Mcf	.167	3,456.9	3,406.8
Peat	Thousand S.T.	572	872	.656	S.T.	12.47	7.1	10.9
Petroleum	Million bbl	3,952	5,160	.766	bbl	3.09	12,211.7	15,944.4
Shale Oil	Million bbl	0	0	0	bbl	3.09	0	0
Uranium	S.T.	10,069	4,070	2.474	lb	6.90	138.8	56.2
Total							18,714.7	22,032.9
Argon	Thousand S.T.	148	148	1.000	S.T.	285.00	42.2	42.2
Helium	Million C.F.	760	759	1.001	Mcf	30.00	22.8	22.8
Hydrogen	Billion C.F.	2,163	2,163	1.000	Mcf	.245	529.9	529.9
Oxygen	Thousand S.T.	12,840	12,840	1.000	S.T.	11.75	150.9	150.9
Total							745.8	745.8
Grand Total							29,301.7	37,677.3

1/ Certain data are withheld because the manner in which the information became available to the Bureau of Mines does not permit general disclosure.

Mr. ZINNER. For example, starting with aluminum, in 1969 we produced in the United States 500,000 tons of aluminum that was contained in bauxite ores but we used over 5 million tons so, therefore, we produced from domestic sources something less than 1 percent.

Mrs. HANSEN. Where are your chief imports from?

Mr. ZINNER. They are from Jamaica and the Caribbean areas chiefly. That situation isn't likely to change. If anything, any reasonable projection of demand would suggest that an even larger percentage of our imports will come from abroad. This chart has similar data for all of the other commodities.

Mrs. HANSEN. Give us a couple of other examples of high use metals in this category.

Mr. ZINNER. All right. Let's take copper, which is a similar situation. We produced from domestic sources—this was in 1969, incidentally—about 1.5 million tons. This is just primary copper I am giving now. There is no secondary in here. Our demand for primary copper in the same year was close to 1.7 million, so we produced something over 90 percent of our demand for primary copper from domestic sources. Now, on that one, very definitely the ratio in the future is going to become a little different, and not in our favor.

Mrs. HANSEN. What countries are we importing copper from?

Mr. ZINNER. South America largely.

Mrs. HANSEN. Chile?

Mr. ZINNER. Correct.

Mrs. HANSEN. What will happen if the Chilean situation is such that they decide to ship to some other area in the world?

Mr. ZINNER. I think that is a very real possibility, and offhand I would suggest that the immediate impact will be a higher price for copper.

Mrs. HANSEN. Where else in the world could we possibly obtain that copper?

Mr. ZINNER. Well, there are some vast deposits being developed all over the world, in South America, in Australia, in Africa. In fact, these are fairly high grade deposits. All of these promise that the ratio that we are now enjoying is going to become more unfavorable. Iron is another one in which we produced 59 million short tons of iron contained in domestic ores. This is primary production again. We consumed 90 million short tons, so something like 65 percent is produced from domestic sources. This, too, over the years has shown a continuous decrease in our domestic capability.

Mrs. HANSEN. Where do we import this from?

Mr. ZINNER. From Canada and South America, largely.

Mrs. HANSEN. Which countries in South America?

Mr. ZINNER. Venezuela. On primary lead, we produced 509,000 short tons. We consumed 873,000 short tons, or something over 58 percent of our requirements were produced from domestic sources. In this case, of course, the outlook on demand growth is clouded somewhat by what the future use of lead in gasolines might be, so I am not sure just what the trend might be there.

Mrs. HANSEN. Where are we importing lead from?

Mr. ZINNER. Essentially from all over the world. This comes from a good many places, but Canada is one of the largest, I believe.

Mrs. HANSEN. What is our total dollar value of metal imports per year?

Mr. ZINNER. The value of all primary demand was, in 1969, more than $37 billion and we produced $29 billion in value. This includes everything, petroleum, coal, and everything else. So the difference between the two would be imports.

Mrs. HANSEN. So this is an $8-billion balance-of-trade loss?

Mr. ZINNER. Correct.

MINERAL IMPORTS FROM THE SOVIET UNION

Mrs. HANSEN. Are we importing anything from the Soviet Union in metals?

Mr. ZINNER. Yes.

Mrs. HANSEN. What?

Mr. ZINNER. I am not sure that I would want to put it in the record until I checked on it this time.

Mrs. HANSEN. What are we importing from the Soviet Union?

Mr. ZINNER. The reason I hesitate in this regard is that a good many of these materials are moving in world trade, moving through brokers, and other countries, and I would say in a commodity like chromium, for example, it is pretty difficult to state categorically what the source is.

Mrs. HANSEN. I understand.

Mr. ZINNER. But I would suggest that chromium might be one of these.

Mrs. HANSEN. What else?

Mr. ZINNER. I would say platinum, although I don't think that situation is likely to continue too long in light of the very large resources being discovered in South Africa. Maybe I shouldn't have said that, either.

Mrs. HANSEN. What else?

Mr. ZINNER. I don't know. What else comes from Russia?

Dr. HENRIE. Manganese.

Mr. DOLE. Antimony comes from Red China.

Mr. ZINNER. Manganese flows through a devious route, too, but there is a very large production in Russia.

Mrs. HANSEN. Please insert in the record the minerals imported from the U.S.S.R.

Mr. ZINNER. We would be happy to do this on selected commodities. You understand this is very difficult because of the forms in which they flow.

(The information follows:)

Mineral Imports From USSR, 1969-1970

	1969			1970		
	Gross weight	Content	Value	Gross weight	Content	Value
Aluminum waste & scrap (lb.)	-	-	-	1,752,657	-	$275,757
Ammonium compound (lb.)	441	-	$116,733	-	-	
Barium nitrate (lb.)	424,758	-	21,384	174,247	-	8,249
Cadmium unwrought, waste & scrap (lb.)	-	-	-	21,893	-	61,191
Chrome ore (l.t.)						
Not over 40% chrome oxide	16,621	6,474	331,223	50,489	19,882	837,095
Over 40% less than 46% chrome oxide	-	-	-	2,788	1,115	54,142
46% or more chrome oxide	266,698	146,847	7,475,769	365,312	200,783	12,800,160
Waste, scrap & unwrought (lb.)	-	-	-	463	-	368
Cryolite (s.t.)	-	-	-	329	-	115,038
Diamonds, unset, suitable for jewelry (carats)	43,115	-	6,628,033	43,995	-	6,825,986
Diamonds, industrial (carats)	-	-	-	759	-	14,119
Emeralds, unset for jewelry (carats)	433	-	23,000	17	-	1,449
Fuel oil (bbl.)	494,876	-	1,176,967	1,201,851	-	2,807,358
Germanium unwrought & waste & scrap (lb.)	3,063	-	181,669	9,057	-	768,705
Indium, unwrought, waste & scrap (lb.)	13,088	-	15,897	-	-	-
Iron or steel ingots (lb.)	-	-	-	16,077	-	3,747
Metal bearing residues not advanced & not over 2% copper, lead, or zinc (lb.)	12,963,048	-	566,600	8,344,411	-	491,411
Nickel, unwrought (lb.)	2,217,803	-	4,046,358	1,726,476	-	5,479,783
Nickel sulfate (lb.)	47,304	-	17,232	-	-	-
Palladium (troy ounces) (palladium content)	-	3,778	150,487	-	67,175	2,351,350

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Mineral Imports From USSR, 1969-1970

	1969			1970		
	Gross weight	Content	Value	Gross weight	Content	Value
Palladium bars, plates, etc. (troy ounces)	-	266,097	9,857,271	-	389,031	13,658,998
Phosphorous (lb.)	2	-	1,442	-	-	-
Platinum bars, plates, sheets, etc. (troy ounces)	-	10,206	1,969,713	-	30,524	5,311,967
Platinum grains & nuggets (troy ounces)	-	3,253	895,332	-	-	-
Platinum group metals in bars, etc. (content) (troy ounces)	-	978	161,412	-	-	-
Potassium ferricyanide (lb.)	22,046	-	5,421	44,092	-	11,446
Precious & semiprecious stones	-	-	-	-	-	124,417
Rhenium, unwrought, waste & scrap (lb.)	222	-	71,660	73	-	23,467
Rhodium (troy ounces) (rhodium content)	-	2,620	622,387	-	7,694	1,565,070
Rhodium bars, plates, etc. (troy ounces)	-	3,233	406,696	-	-	-
Semiprecious & precious stones	-	-	400	-	-	46,403
Sodium chromate & dichromate (lb.)	4,988,336	-	416,599	-	-	-
Stone, articles of	-	-	-	674	-	4,071
Titanium, unwrought, waste & scrap (lb.)	1,672,787	-	1,317,426	2,070,509	-	1,662,050
Toluene (gal.)	-	-	-	2,304,302	-	342,804
Xylene---do	-	-	-	343,142	-	56,001

With respect to other commodities that are imported in alloy or semi-finished form, it is difficult, if not impossible, to identify the source of the raw materials. Principal examples of these are the ferroalloys, such as ferrochromium and ferromanganese. These are imported from some countries who have no reported production of manganese or chromium. Hence, those raw materials may have originated in the USSR.

DEPENDENCE ON MINERAL IMPORTS

Dr. OSBORN. I think also an interesting figure is the trend of dependence on mineral products from outside, and I have a figure here somewhere but I can't find it.

Mrs. HANSEN. Please insert it in the record for 5 years the percent of primary metals demand met from domestic primary production.

Dr. OSBORN. Yes. I think we have gone from something like 13 percent of our mineral products imported to 22 percent this year, but I can't remember whether that is 5 years or 10.

Mr. ZINNER. You mean in value?

Dr. OSBORN. Yes.

Mr. ZINNER. I don't know offhand.

Dr. OSBORN. Well, we can get that, because this is going up all the time.

(The information follows:)

PERCENTAGE OF THE U.S. DEMAND FOR PRIMARY MINERALS MET FROM DOMESTIC PRIMARY PRODUCTION

[Based upon total values in constant 1969 dollars]

	1950	1967	1968	1969	2000 (forecast)
Metals only	70	57	61	58	20
Nonmetallic minerals only	93	100	97	97	59
Mineral fuels only	94	88	86	85	48
All primary minerals and fuels	87	80	79	78	39

MARINE MINERAL MINING PROGRAM

Mrs. HANSEN. Has the marine mineral mining been transferred to NOAA?

Mr. THOMSON. That is correct.

Mrs. HANSEN. What was your outlook on the marine mineral mining program before it was transferred? You remember, this committee funded it for the first time.

Dr. OSBORN. The Bureau of Mines was exploring the technology, whereas the Geological Survey was outlining the resource, and I think the feasibility of doing some deepwater mining was at least partly demonstrated by the work of the Bureau of Mines but we were just getting started off Oregon and off of Alaska.

Mrs. HANSEN. This committee has discussed with the Bureau of Mines repeatedly the general availability of mining engineers and research personnel.

Dr. OSBORN. Well, this is one of the principal roadblocks or handicaps in developing the country's mineral resources now, that is, this plus the technology.

SUPPLY OF MINING ENGINEERS

Mrs. HANSEN. How many graduating mining engineers do you have now compared to 20 years ago?

Dr. OSBORN. Last year 111 graduated in the whole country. The Bureau of Mines could have used about all of these itself and I think got none, they are in such demand by mining companies.

Mrs. HANSEN. Is there any improvement in the situation?

Dr. OSBORN. No, but there will be. I say that positively but I am sure there will be. I think we have hit the bottom with respect to the mining schools. In just a 5-year period, 1962 to 1967, we lost a third of our mining schools. The number of mining schools decreased from 26 to 17, and then we have lost two since then. The University of Minnesota and the University of Washington have abandoned their mining schools.

(Discussion off the record.)

Mrs. HANSEN. I am sure you are aware of the agreement made by 11 Western States on funding mining schools.

Dr. OSBORN. Yes, the WICHE program for cooperation among the States in the West.

Mrs. HANSEN. That is right.

SUPPORT FOR MINERAL ENGINEERING SCHOOL

Dr. OSBURN. There are five Departments of Mining left and, of course, mining isn't the only program that has been in trouble. Mineral engineering has been, whether extractive metallurgy, or ceramics, and so on. We have established within the Bureau of Mines an Office of University Relations. This was established in January. We have funds in the mine safety program for grants and contracts and some of this we are using for university work, particularly because we can get the type of work we want done there, that is, some of the longer range work, but partly to help build up these remaining mining departments. So our new office, then, is in contact with the universities and we will have teams going out to the schools in the next few months in order to learn more about their resources and what their needs are. The money that we do spend as contracts and grants to universities on this program we feel will be well spent, both from the standpoint of getting the research we want but also building these schools up and that is one of the reasons why I say I think we have hit the bottom.

The Nation needs strong mineral engineering schools and we can get a job we want done and at the same time build them up. The other reason why I think we are going to move ahead is the fact that two bills have been introduced, and a third one I understand will be introduced, to provide something like a Hatch Act for mineral resources. In other words, the original 1887 Hatch Act for agricultural resources established agriculture colleges and they have done such a wonderful job that we export agricultural technology now. In the case of mineral technology we have to import it.

We are finding in mine safety technology, for example, we go to Germany and find they are using a mining method and it looks safer, and so then we adopt it and modify it to our immediate needs. In the case of agriculture, we export it. We should be doing this with mineral technology.

I think one bill, for example, is S. 635 coming out of the Senate Interior Committee. Another is a bill in the Education Committee in the House that has come out, and a third may develop from the Interior Committee in the House. But with this type of continuing support to not more than one in a State and not in every State neces-

sarily, I am sure we can build something up, and the Bureau has to have it. We don't have a base.

Mrs. HANSEN. Here we are at a crisis time on energy and mineral knowledge, and yet you lack the skilled technicians.

Dr. OSBORN. Every other field you can think of has a strong base in the universities, whether it is agriculture, or chemical engineering, or civil engineering, but in mineral engineering we have just lost out, for reasons which we could go into, but nevertheless the fact is that these programs have been dying and they need resuscitating if the Bureau of Mines is to do its job.

Dr. SCOTT. If I may, I would like to interject I just spent 13 years in education circles at the University of Wisconsin and University of Missouri at Rolla, and I can only second everything Dr. Osborn has said. It is a serious problem. I spent most of last spring on recruitment efforts in the southern Illinois coalfield areas and in Missouri in the "new lead belt" area trying to entice young men to consider mineral careers, and it is a very serious problem. Now I find myself in the position in Government of trying to hire these people. They are just not available to us.

Mrs. HANSEN. The committee has been deeply concerned, as you are well aware, for the past 5 years about this lack of trained people.

Dr. SCOTT. If they would just appreciate our challenge I think this is something our young people could really get involved in.

COORDINATION OF RESEARCH ACTIVITIES

Mrs. HANSEN. Well, it is not a glamorous business.

Are you coordinating research activities with private industry and other Federal agencies. The committee has been disturbed because you did not have the research input to equate you with that of private industry.

Dr. OSBORN. Is your question mostly one of whether the Government's program is well coordinated?

Mrs. HANSEN. What are you doing to coordinate your research activities with those on-going programs in other Federal agencies? This is a time when you should be coordinating your research programs.

Dr. OSBORN. Let me start on this by saying that the observation in my 5 months in the Bureau with respect to coordination within the Department of the Interior is that the coordination is at the right level and being done very well because we have an Assistant Secretary for Mineral Resources who insures this.

Mrs. HANSEN. You have one of the ablest Secretaries you have ever had, Mr. Dole.

Dr. OSBORN. I agree with you, and I think maybe Secretary Dole would like to comment on this.

Mr. DOLE. Madam Chairman, this would be the problem, and I am sure all of you here on this committee are aware of the President's statement on reorganization of the excutive branch and we down in Interior are quite excited about this proposed establishment of the Department of Natural Resources which would move many of these elements from Interior as well as elements from other parts of Government into one agency, and we have a listing, and probably should sub-

mit it for the record, of the various areas that are covered by oil and gas here within the Government.

Mrs. HANSEN. Please do.

(The listing follows:)

GOVERNMENT AGENCIES CONCERNED WITH OIL AND GAS MATTERS

Executive Office of the President: Office of Management and Budget; National Security Council; Office of Emergency Preparedness; Office of Science and Technology; Council of Economic Advisers; Council on Environmental Quality.

Department of State: Office of Fuels and Energy; Agency for International Development.

Department of the Treasury.

Department of Defense:

Office of Assistant Secretary of Defense; Joint Chiefs of Staff: Defense Fuel Supply Center.

Department of the Army: U.S. Army Petroleum Center; Office of Deputy Chief of Staff for Logistics; Office of the Chief of Engineers; Office of Civil Defense.

Department of the Navy: Naval Petroleum and Oil Shale Reserves; U.S. Navy Fuel Supply Office; Headquarters, Naval Material Command; Office of Chief of Naval Operations.

Department of the Air Force: Headquarters, U.S. Air Force.

Department of Justice.

Department of the Interior: Office of Oil and Gas; Bureau of Mines; Oil Import Administration; U.S. Geological Survey; Bureau of Land Management; Bureau of Indian Affairs.

Department of Agriculture: Economic Research Service; Forest Service.

Department of Commerce: Bureau of the Census; Bureau of Domestic Commerce; Maritime Administration: National Oceanographic and Atmospheric Administration; Office of Foreign Direct Investments.

Department of Labor: Bureau of Labor Statistics.

Department of Transportation: Federal Aviation Administration; Federal Highway Administration, Bureau of Public Roads; National Transportation Safety Board.

Federal Communications Commission.

Federal Power Commission.

General Services Administration: Federal Supply Service.

Interstate Commerce Commission.

Securities and Exchange Commission.

Smithsonian Institution.

Central Intelligence Agency.

Environmental Protection Agency: National Air Pollution Control Administration; Federal Water Quality Control Administration.

EXECUTIVE OFFICE OF THE PRESIDENT

Office of Management and Budget

This Office is responsible for approval of oil and gas administrative and statistical forms and reporting and record-keeping requirements issued by Government agencies so as to maintain standards and to eliminate duplication and unnecessary burden on recipients.

National Security Council

The National Security Council advises the President with respect to domestic, foreign, and military policies relating to the national security. The National Security Council reviews studies showing the ability of this nation to obtain the necessary petroleum and gas required for any emergency. Numerous other domestic, foreign, and military policies relating to national security require that special consideration be given to the petroleum aspects of these policies.

Office of Emergency Preparedness

The Director of OEP is responsible for policy direction, coordination and surveillance of the oil import control program. He is advised by the Oil Policy Committee, which he chairs. He has the responsibilities to maintain surveillance of petroleum imports, and provides overall guidance, direction and coordination for the development of plans and programs designed to assure the development of an organization at all levels of Government capable of managing oil, gas and petrochemicals in an emergency, and the availability of adequate supplies of oil, gas and petrochemicals to meet the requirements of an emergency.

Office of Science and Technology

The Energy Policy Staff of this Office is charged with the responsibility to coordinate energy policy on a government-wide basis, oil and gas being an important part of the nation's energy supply.

Council of Economic Advisers

The Chairman of the Council chairs the Domestic Affairs Council's Subcommittee on the National Energy Situation, and is also a member of the Oil Policy Committee.

Council on Environmental Quality

This Council coordinates Federal activities as they relate to environmental quality to the extent that oil and gas matters affect the environment.

DEPARTMENT OF STATE

Office of Fuels and Energy

The Office of Fuels and Energy within the Bureau of Economic Affairs is responsible for the coordination of departmental policy and action in all foreign policy matters pertaining to petroleum and petroleum products.

Agency for International Development

A.I.D. works with less developed countries in preparing plans for development programs based on the use of the large and stable supply of relatively low cost fuels available in the free world.

DEPARTMENT OF THE TREASURY

As a member agency of the Oil Policy Committee, the Treasury participates in advising the Director of the Office of Emergency Preparedness on the policy direction of the oil import program.

DEPARTMENT OF DEFENSE

Office of Assistant Secretary of Defense

Special Assistant for Petroleum Matters, under the Assistant Secretary of Defense, Installations and Logistics, is the senior petroleum officer in the Department of Defense. He establishes and provides guidance on policies, programs, systems, and procedures and assures their implementation for sustained readiness and operation. Develops and provides policy guidance to the three military departments on the availability of petroleum products from industry under peacetime and wartime conditions. Represents the Department of Defense with other Government agencies and with foreign governments on petroleum matters.

Joint Chiefs of Staff

JCS furnish policy guidance and monitor the petroleum plans and operations of United States unified and specified commands, including the activities of the Joint Petroleum Offices.

Defense Supply Agency

Defense Fuel Supply Center procures bulk and packaged petroleum products for the military services and Federal civil agencies on a worldwide basis and coal for Federal activities in the U.S. Coordinates with the Military Services and the Military Sealift Command in the movement of bulk petroleum by tankers. Contracts for commercial petroleum services. Administers DOD oil import allocation.

Department of the Army

The U.S. Army Petroleum Center is responsible for the performance of those supply management functions necessary for the supply of petroleum products, petroleum containers and accessories, chemicals, petroleum and nonmedical laboratory items, solid fuels, and related material for the Army throughout the world.

Department of the Army (cont.)

Deputy Chief of Staff for Logistics provides broad general policy guidance relating to Department of the Army fuels and lubricants logistical functions, including international agreements. Establishes priorities for the allocation of fuels and lubricants, associated dispensing equipment, and supporting services, as appropriate.

Corps of Engineers is responsible for design and construction of petroleum storage, distribution and dispensing systems, and natural and liquefied petroleum gas storage and distribution systems. The Chief of Engineers has technical staff responsibility for the operation, maintenance and repair of the above systems at Department of the Army installations. Also responsible for the administration of contracts for the procurement of gas at Army installations.

Office of Civil Defense coordinates the development of national policies and administers programs to assist the industry in its civil defense preparations. Designated as the Federal claimant for resources, including petroleum products, that State and local governments might require to carry out civil defense activities.

Department of the Navy

Office of Naval Petroleum and Oil Shale Reserves -- has the mission to explore, prospect, conserve, develop, use, operate, and administer the Naval Petroleum and Oil Shale Reserves for the production of petroleum and shale oil when required for national defense.

Office of Chief of Naval Operations provides logistic guidance on all matters pertaining to petroleum fuel to insure the material readiness of the operating forces and the shore establishment; coordinates Navy participation in functions of interdepartmental interest pertaining to petroleum fuel matters; establishes levels of supply for prepositioned war reserve stocks of principal petroleum products.

Headquarters Naval Material Command

Naval Ship Systems Command establishes the specifications and inspection procedures necessary to insure the desired quality of fuel and lubricants for use in propulsion and auxiliary machinery and equipment in naval vessels.

Naval Supply Systems Command is responsible for the determination of worldwide requirements, CONUS distribution, and budgeting and accounting for bulk petroleum products. Responsibilities also include the quality control and quality surveillance of bulk fuel oil products in storage; loading and unloading cargo chips and tankers; procuring; operating and administering cargo terminal facilities including the procuring and assigning of stevedores; providing consulting services to NATO in the areas of petroleum storage and facility operation, quality assurance, and other technical matters.

Department of the Navy (cont.)

Headquarters Naval Material Command (cont.)

Naval Facilities Engineering Command is responsible for the design, planning, development, construction, alteration, cost estimates, and inspection at all naval shore facilities including those for petroleum; designs and constructs facilities including pipelines for the Air Force.

Naval Air Systems Command is responsible for the technical development and service application of aircraft engine fuels and lubricants for Navy and Marine Corps aircraft, including establishing specifications and preparing technical manuals for fuel handling and usage.

U.S. Navy Fuel Supply Office manages but does not maintain physical stocks of material; is responsible for assuring proper balance between the supply of and the demand for Bulk POL and administers the supply system for bulk petroleum fuels and related products. Determines material requirements, budgeting, distribution, storage, disposal, cataloging, quality control and quality surveillance of assigned products.

Department of the Air Force

Headquarters, USAF is responsible for developing plans and establishing policies to provide the Air Force with petroleum products, missile fuels and related items necessary to meet its worldwide operational requirements for peace and war and to insure that they are provided as necessary at the proper locations and at the time needed.

Headquarters Air Force Logistics Command is responsible for petroleum quantitative requirement computations, stock fund management and administration, operation of a responsive distribution system and testing laboratories and furnishing of technical information to all Air Force Commands.

Headquarters Air Force Systems Command is responsible for insuring qualitative superiority of the petroleum products used by the Air Force and to provide the necessary link between military requirements and the vast science-industry complex on which the U.S. Air Force relies to discover, develop and produce its weapons propulsion system of the future.

DEPARTMENT OF JUSTICE

The Department of Justice enforces various statutes designed to prevent restraints of trade including monopolies and cartels and handles all Government litigation including litigation with respect to petroleum and gas.

DEPARTMENT OF THE INTERIOR

Office of Oil and Gas is a staff agency reporting to the Assistant Secretary of the Interior for Mineral Resources. Was established May 6, 1946, at the request of President Truman for an office in the Interior Department that would serve as a focal point for leadership and information on petroleum matters in the Federal government, and to be a channel of communication between the Federal government and the petroleum industry and the oil producing states. The Office has also been delegated the oil and gas portions of the Secretary of the Interior's responsibilities for emergency preparedness: to provide the Secretary with a capability to respond effectively to emergencies which may affect the Nation's supply of oil and gas, and to assist the Secretary to discharge his policy responsibilities for oil and gas matters.

Bureau of Mines conducts investigations and performs research on petroleum and natural gas. Provides staff analyses and advice to the Secretariat on matters relevant to petroleum and natural gas resources. Collects, analyzes, interprets and publishes technical and economic material related to petroleum and natural gas production, trade, and consumption. Conducts basic research on oil shale. Produces helium from natural gas, and conducts research on synthetic fuels. Advises other Government agencies on fuel burning equipment, publishes information and statistics with reference to health and safety in the petroleum and gas industries and assists industry in safety programs.

Oil Import Administration in the interests of national security allocates imports into the United States and Puerto Rico of crude oil, unfinished petroleum oils and finished petroleum products (including residual oils) among qualified applicants and issues import licenses on the basis of such allocations.

Geological Survey collects, analyzes and distributes technical geological and geophysical information and data and conducts research on the mineral resources of the nation, including petroleum and gas. It classifies the public lands as mineral or non-mineral in character and supervises the operations of oil and gas leases on public lands, Indian lands, certain acquired lands, and the Continental Shelf.

Bureau of Land Management issues and administers oil, gas, and oil shale mineral leases on the public domain, acquired lands, and submerged lands under the Minerals Leasing Act, the Acquired Lands Act, and the Outer Continental Shelf Act. Also processes requests for rights-of-way of petroleum and gas pipelines over the public domain and the Outer Continental Shelf. Conducts supply and demand analyses to determine the location, size, and timing of offshore oil and gas sales. Prepares tentative Outer Continental Shelf leasing schedules. Considers environmental factors prior to each lease sale in accordance with the objectives of the National Environmental Policy Act of 1969.

Bureau of Indian Affairs administers oil and gas leasing matters, and the income derived from these sources, on Indian land held in restricted and trust status by the U.S., pursuant to the procedures established by Congressional statutes.

DEPARTMENT OF AGRICULTURE

Economic Research Service periodically collects data on farm consumption of petroleum products; makes annual estimates of farmer expenditures and quarterly estimates of prices paid by farmers for petroleum products, and annual sales to farmers and others, by cooperatives.

Forest Service - Mineral leases for oil and gas on lands under jurisdiction of the Department are handled by Interior - in some cases upon recommendation and in other cases by consent, of USDA (as outlined in Forest Service statement entitled "Disposal of Minerals on Lands Under the Jurisdiction of the Forest Service".)

DEPARTMENT OF COMMERCE

Bureau of Census collects and disseminates statistics relating to the activities of oil and gas field operators, petroleum refiners, wholesale dealers, service stations, fuel dealers, petroleum imports and exports, etc.

Bureau of Domestic Commerce provides a focal point in Government for consideration of business and industry interests in relation to Government interests, provides a variety of information services to business and to Government Agencies, and performs national defense and industrial mobilization functions. The Petroleum and Coal Division disseminates information to industry and other Government agencies and to private individuals relative to crude petroleum and natural gas, natural gas liquids, petroleum refining, lubricating oils and greases, anthracite mining, and bituminous coal and lignite mining. Provides staff assistance to the Deputy Assistant Secretary for Resources in the discharge of his duties as a member of the Oil Import Appeals Board.

Maritime Administration is responsible for the development and maintenance of a U.S.-flag merchant fleet, including tankers, adequate to meet national defense and commercial requirements.

National Oceanic and Atmospheric Administration is responsible for determination of seaward boundaries which are generally established with reference to the coastline as regards the petroleum industry's plans concerning future oil and gas matters in offshore areas revolving around le problems of jurisdiction. NOAA also maintains data centers for geodetic, geomagnetic, seismological, meteorological, aeronomic, and oceanographic information, providing a single source of readily available environmental data to specialized and general user groups. Also has the responsibilit for the analysis of climatological data. On a current basis, heating cooling degree day data are published for a selection of cities in the U. the historical record of temperatures is used to analyze local fuel requirements and indirectly to establish equitable rates. These data are al utilized to analyze conditions which produce critical shortages and to project total requirements when combined with appropriate population and industrial projections. NOAA is also concerned with the develo of marine mining and related technology, with emphasis on the asse of environmental impact of mining systems.

Office of Foreign Direct Investments -- Under the terms of E.O. 11387 and by delegation from the Secretary of Commerce, the Office administers and enforces regulations which apply to U.S. direct investors. These regulations apply to companies or individuals engaged in the production and/or distribution of petroleum and/or natural gas in the same way as they do to companies or individuals in other lines of activity.

DEPARTMENT OF LABOR

Bureau of Labor Statistics publishes employment and earnings specifically for the petroleum and natural gas industries, as well as wholesale prices of crude petroleum and petroleum products.

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration publishes statistics relating to aviation including annual utilization of petroleum products.

Federal Highway Administration compiles information on the numbers of motor vehicles registered in the U.S. each year, the amount of fuel they use, and the vehicle-miles they travel as guides in planning a national highway program.

National Transportation Safety Board may on its own motion conduct investigations of pipeline accidents, or rail, highway, or aviation accidents involving the transportation of petroleum or natural gas; participate in such investigations conducted by the DOT; undertake special studies involving pipeline safety or the transportation of petroleum or natural gas by other modes.

U.S. Coast Guard enforces the Oil Pollution Act of 1961.

FEDERAL COMMUNICATIONS COMMISSION

Federal Communications Commission authorizes the use of radio facilities by the petroleum and gas industries.

FEDERAL POWER COMMISSION

Federal Power Commission is charged with the administration and enforcement of the Natural Gas Act. Its activies are of a regulatory nature over the transportation and sale for resale of natural gas in interstate commerce, including the establishment of wholesale rates, the granting or denial of authority to construct, acquire, operate and abandon natural gas facilities, initiatie or discontinue natural gas service, and to import and export natural gas to and from the U.S. subject to favorable recommendations of the Secretaries of the Departments of State and Defense. Also has responsible to determine the proportionate volumes of gas that may be purchased or transported by pipelines in the Outer Continental Shelf. Conducts investigations relative to natural gas, cooperates with the States in the regulation of natural gas, and reports to Congress on gas compacts between the States dealing with conservation, production, transportation or distribution of natural gas.

GENERAL SERVICES ADMINISTRATION

Federal Supply Service enters into contracts, known as Federal Supply Schedules, to furnish civil agency requirements for propane and butane fuels.

INTERSTATE COMMERCE COMMISSION

The Interstate Commerce Commission regulates in the public interest common carriers subject to the Interstate Commerce Act which are engaged in interstate commerce, including oil pipelines.

SECURITIES AND EXCHANGE COMMISSION

The Securities and Exchange Commission's principal function is to insure that securities are offered in the manner prescribed by law and that no fraudulent sales are involved. The Division of Corporation Finance has an oil and gas unit to advise on oil and gas security issues involving fractional oil and gas rights, stocks, bonds, debentures, units of participation and limited partnership interests in drilling programs, and other securities. Also advises on merger proxies involving oil and gas companies.

SMITHSONIAN INSTITUTION

The Hall of Petroleum, located in the National Museum of History and Technology, gives a systematic account of the methods of finding, producing, and treating petroleum and natural gas.

CENTRAL INTELLIGENCE AGENCY

The Central Intelligence Agency collects, correlates, evaluates, and produces classified intelligence on foreign oil and gas activities which relate to the national security.

ENVIRONMENTAL PROTECTION AGENCY

National Air Pollution Control Administration utilizes information on fuels obtained from the Office of Oil and Gas and other government agencies, as well as industry, with respect to the availability of fuels, their quality and demand, to make estimates on the impact of fuel consumption on air quality and to provide guidance in research and development programs.

Federal Water Quality Control Administration is responsible for the protection and enhancement of the quality of the nation's inland, estuarine, and coastal waters. Whenever oil is or threatens to be discharged to water, during exploration, production, transport, storage or use, the FWQCA takes action to prevent and mitigate damage to the environment, recommends enforcement action against violators.

Mr. DOLE. And to bring those together I think is absolutely essential at this time to give us the type of coordination that we need to determine a sound domestic minerals and oil policy. I think that the passage of the Metal and Mineral Policy Act by the Congress of last year is also going to give us a vehicle where we can get away from a lot of these efforts at the Executive level that are at odds with one another and it will, hopefully, give to this proposed Department of Natural Resources a stronger input so that we can have a more efficiently run government.

COORDINATION AT PRIVATE RESEARCH

Mrs. HANSEN. What particular efforts are you exerting in coordinating private research with your research activities?

Mr. DOLE. On private research, Madam Chairman, as regards the mineral side—in other words, we are talking about the Bureau of Mines today, the mineral side of it.

Dr. OSBORN. It is one of the responsibilities of the various research centers of the Bureau of Mines to keep informed on where the efforts are being made in private research not only to keep out of that area but also to augment the studies that are being made in that area, and also to keep industry informed of any breakthroughs that we are making, and I am sure that Dr. Henrie, who has recently come to us from the directorship of the Reno Metallurgical Laboratory, could give you some details on how they go about keeping in touch with industry in that regard.

Mrs. HANSEN. Please do.

Dr. HENRIE. Madam Chairman, we have many visitors from industry visit our laboratories. We attend and very actively participate in the professional organizations and the mining-mineral industry and through these methods we determine our responsibility, of working in the public interest, in areas that perhaps are not too attractive to industry today but have great potential and in areas that would bring about a more economic and efficient use of our minerals. This is the type of research we try to seek out and do.

Mrs. HANSEN. When an exciting research discovery is made in other professional organizations is that available to you?

Dr. HENRIE. Yes, ma'am. Our scientists and engineers try to keep informed of individual research as much as possible, and when we make discoveries that we think could be of interest to industry, discoveries that they may develop into technology, we make contacts and advise them of the work that is going on. We make the data available generally as soon as we know of it and encourage industry to pick up this research development.

COAL PRODUCTION IN THE WESTERN STATES

Mrs. HANSEN. During the past year there has been a major increase in coal mining activity, especially in North Dakota. It has been stated that nine Western States—North and South Dakota, Montana, Colorado, Wyoming, Washington, Arizona, Utah, and New Mexico—hold 56 percent of the total U.S. coal reserves, but that these States still

account for only 4 percent of the country's whole output. The advent of adequate electric power and the cheap mining costs appear to be changing this situation. May we have your general comments in this connection with regard to the contribution to our coal supply from these States and any predictions you can make on continued or increasing interest in this potential additional source of supply? I would add one further note on this.

Most of this coal is being produced by strip mining. Many conservationists are concerned as to what effect this might have on the environment in these States.

For example, in Lewis County in the State of Washington they have just built a new powerplant based upon strip mining and yet there are bills before Congress to abolish strip mining. So what, if any, States have given clearance through their own environmental agencies, on approving this particular kind of strip mining project?

This is a highly controversial and a very serious problem all through the West?

Mr. DOLE. Madam Chairman, on this there are 22 States to date which have passed strip mining legislation of various degrees of competency. Unfortunately, the State of Washington has not as yet, but that particular powerplant that you have reference to I have reviewed with the company involved, reviewed their reclamation efforts, and it is my opinion that the surface of that land will be certainly as good if not in better condition——

Mrs. HANSEN. It couldn't be much worse.

Mr. DOLE (continuing). When they are through with it than at the present time.

Mrs. HANSEN. What do they propose to do, precisely?

Mr. DOLE. Inasmuch as this is strip mining, they propose to smooth off the overcast banks and to reforest it and, as you know, that soil in that area in the Bonneville rainfall makes this an ideal place for the growth of trees. In other words, this will be a tremendous use of the land and will be put back into further use for the future.

Mrs. HANSEN. As I understand, the State's environmental agency has approved the project. Is that correct?

Mr. DOLE. This is correct.

Mrs. HANSEN. I think the reason the State of Washington has not passed legislation on strip mining is because it was probably never envisioned that they would ever have strip mining because of the kind of deep coal deposits in the State.

Mr. DOLE. At the last session of the Washington Legislature they did consider a strip mining law, and this applied not only to the coal but principally to the sand and gravel mines that were present there. I understand that this year this bill has again been introduced.

EFFECTS OF PENDING LEGISLATION ON STRIP MINING

At the present time the administration has a bill in on mine land reclamation. Congressman Saylor has a bill in for mine land reclamation, and then there is the Land Use Act that would also be involved in mine land reclamation. These I am sure will be coming before the proper committees here in Congress and be considered in the very near

future. Also, while these are being considered it is my hope, anyway, that the States will pass more and even more stringent surface mine reclamation acts so that, hopefully, the principal responsibility will be at the State level.

Mrs. HANSEN. Isn't it the operators' responsibility at the present time?

Mr. DOLE. This is correct.

Mrs. HANSEN. What if they don't choose to make it their responsibility?

Mr. DOLE. Then as the present proposed acts are written, if a Federal Mine Land Reclamation Act does pass, then the Federal Government will step in and manage it and charge the operators for the cost of it.

Now, I should go further by saying that on leasable minerals on Federal lands, the leasable lands and the Indian lands, the Federal Government does require mine land reclamation. This speaks to the coal land down in the four corners area of Utah, Colorado, New Mexico, and Arizona.

Mrs. HANSEN. What will happen to coal supplies if strip mining is outlawed?

Mr. DOLE. I believe 35 percent of the coal supply of the Nation is furnished from strip mines, and there will be an ever-increasing amount, especially from the Western States because they are more adaptable to it than those here in the East.

Mrs. HANSEN. So if a bill to outlaw strip mining passes would you say that the majority of the coal production as known today would have to stop in the West?

Mr. DOLE. The bulk of the coal production in the West would come to a screaming halt if this bill passed, yes, ma'am.

Mrs. HANSEN. How many workers are involved in strip mining?

Mr. DOLE. The number of workers would not be as large as the production because the production per man in strip mining is much larger than that underground. I would also point out that it is safer also for strip mining than it is underground mining and more healthful.

Mrs. HANSEN. How many workers are involved?

Mr. DOLE. I think it is about 40,000 people, I am informed.

Mrs. HANSEN. 40,000 people would be out of work immediately?

Mr. DOLE. I think this would be a proper statement.

Mr. ZINNER. Much more like 20,000.

Mr. DOLE. Those would largely be in the Appalachian area.

Mrs. HANSEN. What about the Western States?

Mr. DOLE. Once again I point out that the number of people involved in strip mining of coal is not as large as those underground. I cannot give you a breakdown on the number.

Mrs. HANSEN. How many underground mines do you have operating in the West?

Mr. DOLE. Underground in the West? I imagine it would be 100 or less, something on that order.

Mrs. HANSEN. If the bill on a complete closure of all strip mining were to pass, do you think there would be a return to the deep mines?

Dr. OSBORN. I am sure there would. We need the coal.

Mrs. HANSEN. So you are going to have hazards either way?

Dr. OSBORN. That's right.

Mr. DOLE. Madam Chairman, on this, there are several things involved. Here we are in an energy crunch situation. This would have a great deal of impact upon our ability to meet our energy needs. Just prior to this discussion we were talking about the manpower requirements, not only engineers but the mining people. I doubt very much if we could in a very short period of time crank up enough people to operate underground to compensate for the loss of coal from strip mining.

Mrs. HANSEN. If this happened, what energy sources could compensate for the loss of coal from strip mining?

Dr. OSBORN. You would have to make it up from oil.

Mr. DOLE. Imports of oil.

Dr. OSBORN. Imported oil. Madam Chairman, it is partly a matter of timing.

Mrs. HANSEN. I understand.

Dr. OSBORN. If the stripping were phased out over, say, over 5 years perhaps we could get into secondary recovery of oil, for example, from domestic resources to help some, but if it were sudden it would be disastrous.

STRIP MINE RECLAMATION

Mrs. HANSEN. Is it possible to do strip mining in such a way that you can still protect the environment?

Dr. OSBORN. Yes.

Mrs. HANSEN. How?

Dr. OSBORN. Well, the Forest Service, Department of Agriculture, and State groups have experimented and are accelerating the experimention of what can be done by way of reclamation. One leading State, I believe, is my State of Pennsylvania in this respect, but there is also experimentation in West Virginia and Kentucky with different types of fast growing grasses, ways of neutralizing acid soil so that plants will grow rapidly on the most pleasing contours, and methods of making sure that acid mine-water doesn't get out so we don't have the streams contaminated afterwards, which is the case now in the strip areas where proper precautions are not taken. So that from the standpoint of acid-water pollution of streams this can be taken care of, the contours can be developed in a pleasing way, and the types of grasses and shrubs and trees are becoming known. In some areas the soil is not good enough to support good trees we tend to have scrub trees. We can actually improve the condition in some cases and get better forests.

There are some areas, for example, in the steep hilly country of Eastern Kentucky where it is very difficult to develop a contour that will please everybody.

Mrs. HANSEN. What would you do in an area like that?

Dr. OSBORN. As far as I am concerned, the job that is possible to do, as demonstrated, for example, by the Bethlehem Steel Company in their operations there, as far as I am concerned they are doing a good job, but, as I say, this isn't pleasing some people. However, in the flatter areas as, for example, in Ohio and Pennsylvania, an excellent

job of reclamation can be done. One of the problems from the standpoint of the public in driving through Pennsylvania are the areas that they see that have been stripped and where nothing was done in the past, but the modern mining now in Pennsylvania is doing a fine job.

Mrs. HANSEN. What is being done about these lands that have been abandoned?

Dr. OSBORN. Well, we in the Bureau are very much concerned about this, you know, and involved in it. The Bureau has carried on some demonstration restoration work. As Congressman McDade knows very well, the Bureau of Mines working with the State Department of Mines and mineral industries, and using I think in each case the Appalachia money along with State money, has done some useful demonstration work on restoration. But it does take a lot of money.

Mrs. HANSEN. This is what I think troubles many people. These lands were the responsibility of the operator. The operator moved off and now the State or the Federal Government is expected to repair the damage. This is what I think the United States has to make sure never happens again.

Dr. OSBORN. There needs to be reclamation instead of restoration. It needs to be done contemporaneously.

Mrs. HANSEN. The cost has to be borne by the operators.

Dr. OSBORN. Right. So, in other words, the price more nearly takes care of the cost.

Mrs. HANSEN. To take care of the complete cost of the restoration and reclamation of the lands.

Dr. OSBORN. This is the trend, and I am sure this is the way it should be.

Mrs. HANSEN. What can be done to assist a State? They find themselves with far more burdens than they can possibly take care of. What can be done to assist a State which has a lot of these old abandoned strip mines and nothing has been done?

Dr. OSBORN. Well, in the Appalachia region the Appalachian Region Development Act I think can help some in providing some funds for this, but the amount of money is very large compared to what seems available.

Mrs. HANSEN. An increased appropriation in this area would also increase employment?

Dr. OSBORN. Exactly. And this is part of the whole problem that Congressman McDade is so interested in that the Bureau has been working on in the anthracite region where in the first place the amount of money has been small as compared with that required to put out fires, and so on. Secondly, the Bureau has been handicapped somewhat by the provisions in the earlier bill, and we would like to commend you for the introduction of your bill, Congressman McDade, that will change this situation.

BUDGET HIGHLIGHT STATEMENT

Mrs. HANSEN. At this point we will insert pages 1 through 3 of the justifications in the record.

(The pages follow:)

DEPARTMENT OF THE INTERIOR

BUREAU OF MINES

Highlight and Summary Statement

The programs and plans of the Bureau of Mines reflect its responsibility to help assure the effective utilization of natural mineral and fuel resources in the best interests of the Nation's social, economic and security requirements. To this end, the Bureau's programs have not been static but rather have undergone change responding to national need and changing public values. Today, the mission of the Bureau of Mines is not only directed toward achieving enough minerals and fuels to meet present and future requirements at the lowest possible costs, but also, toward achieving these material needs without objectionable environmental, social, and occupational effects.

The 1972 Program

The principal emphasis in programs proposed for increase in fiscal year 1972 continues to be on providing for the health and safety of workers in the mineral industry--both for coal miners and for workers in metal and nonmetallic mines. Other programs proposed for increase include only those of impelling environmental or economic concern.

The fiscal year 1972 budget request for the Bureau of Mines, exclusive of the Helium program, totals $119,045,000. This amount includes net increases of $12,161,000.

The 1972 budget request is divided into the following Bureau appropriations:

	1971	1972	Net Change
Conservation and Development of Mineral Resources	$ 47,698,000	$ 46,094,000	$ -1,604,000
Health and Safety	57,305,000	71,075,000	+13,770,000
General Administrative Expenses.	1,881,000	1,876,000	-5,000
Total	106,884,000	119,045,000	+12,161,000

No provision has been made for Helium Fund borrowing authority in the 1972 Budget pending conclusion of negotiations which will determine the future of the Government's long-range helium conservation program. It is anticipated that an amendment to the 1971 budget for the Helium Fund will be transmitted to Congress later this fiscal year.

Program Increases

The budget increase of $12,161,000 consists of the following specific program changes:

Health and Safety Programs:	
Funding for the Interim Compliance Panel	$ 600,000
Increased research to reduce health hazards in coal mining	1,800,000
Increased research to reduce safety hazards in coal mining	4,685,000
Nonrecurring 1971 amount available for preliminary work on the Health and Safety training facility	-500,000

Health and Safety Programs: (cont.)	
Expansion of enforcement and education activities under the Federal Metal and Nonmetallic Mine Safety Act	$1,900,000
Increased research to provide better conditions of health and safety in metal and nonmetal mines	2,400,000
Mineral Availability:	
Supply and demand studies for National Materials Policy Study	400,000
Environmental Programs:	
Initiation of research to provide sound technology for underground injection of liquid wastes	300,000
Expansion of research on capturing mineral and energy values in urban refuse	500,000
Expansion of program to provide mineral surveys of wilderness areas	300,000
Other Budget Changes:	
Transfer of Missouri River Basin Funding from Bureau of Reclamation	220,000
Employee Compensation Payments	138,000
Transfer of Marine activities to NOAA	-295,000
Cost reduction program for public relations and paperwork management	-287,000
Total changes	12,161,000

Health and Safety--Coal Mining: The Bureau is requesting a net increase of $6,585,000 to carry out its responsibilities under Public Law 91-173, The Federal Coal Mine Health and Safety Act of 1969. An increase of $6,485,000 is proposed to expand research to reduce the health and safety hazards of coal mining. This increase will bring the funding for health and safety research under Public Law 91-173 to a total of $29,729,000 which approximates the $30 million authorized for fiscal year 1972 and thereafter in Section 501(e) of the Act. No additional funds are sought in 1972 for Bureau enforcement and education activities under the Act. The 1972 budget anticipates that the program and staff will be at the full level required to administer and enforce the coal mine health and safety standards promulgated under the Act. $600,000 is sought for funding the Interim Compliance Panel under Section 5(c) of the Act. The net increase includes a decrease of $500,000 which is a nonrecurring amount appropriated in 1971 for design and preliminary planning for the health and safety training facility.

Health and Safety--Metal and Nonmetal Mining: The Bureau proposes increases totalling $4,300,000 to carry out its responsibilities under Public Law 89-577, the Federal Metal and Nonmetallic Mine Safety Act. Of this amount, an increase of $1,900,000 is for enforcement and education, providing a total of $7,694,000 for these activites. A large portion of this increase is for full year costs of personnel to be provided by the $1,400,000 supplemental recently approved by the Congress. 1972 will be the first full year of operation under the mandatory standards of the Act.

An increase of $2,400,000 is requested for expansion of research on reducing the health and safety hazards involved in metal and nonmetal mining. Half of the increase is allocated to reduction of health hazards associated with respirable dust, toxic gases, and radon. The remainder will provide for intensified safety research on such problems as rock bursts, wall collapses, fire hazards, and hazardous equipment. The amount available for health and safety research into metal and nonmetal mining problems would total $2,905,000 with the proposed increase.

National Materials Policy Study: An increase of $400,000 is requested to finance Bureau support for the National Commission on Materials Policy authorized under Title II of the Resources Recovery Act of 1970. The study will provide a comprehensive evaluation of requirements for all critical industrial raw materials. Bureau input into the program will include supply and demand and policy implication analyses for all mineral raw materials.

Subsurface Waste Disposal: An increase of $300,000 is requested to provide technical support for the Department's Subsurface Waste Storage Program. Use of disposal wells for industrial wastes is growing rapidly but little is known of the effects of such disposal or of the technology required for environmentally safe disposal. Bureau investigations will rely heavily on knowledge gained in petroleum engineering research to better understand the problems and potentials of subsurface waste disposal.

Minerals and Metals from Urban Refuse: An increase of $500,000 is requested for expansion of urban refuse separation research and design of a facility to demonstrate the total waste systems management concept. It is estimated that household and commercial refuse alone contains 11 million tons of metals, 15 million tons of glass, and the energy equivalent of 60 million tons of coal which is totally wasted each year. The major goal of the urban refuse program is to develop the capability and technology to extract, process and reuse the metal, mineral, and energy values of all of the wastes generated by a large urban area. The increase would bring total program funding to $1,103,000.

Wilderness Area Surveys: An increase of $300,000 is requested for expansion of Wilderness program mining and mineral surveys to keep the program on schedule. The first phase of the program, examination of primitive areas, will be completed in fiscal year 1972. The increase will assist in implementing the second phase of the program--investigation of Wilderness and potential Wilderness Areas in National Forests. The total amount requested for this program in fiscal year 1972 is $875,000.

Other Changes

Research to reduce methane hazards in coal mining operations has previously been funded under both the mining research subactivity in Conservation and Development of Mineral Resources and under health and safety research in the Health and Safety appropriation. The 1972 budget proposes to transfer the full program to the Health and Safety appropriation. The amount so transferred is $3,010,000. In addition, the program of mineral surveys in the Missouri River Basin program, previously funded under "Construction and Rehabilitation," Bureau of Reclamation, is now included in the minerals subactivity under Conservation and Development. A $138,000 increase is provided for payment to the Employees Compensation Fund.

Marine activities previously funded under Bureau of Mines appropriations have been transferred to the National Oceanic and Atmospheric Administration. The net effect on the budget for 1972 is to reduce the Marine Mineral Mining activity by $290,000 and the General Administrative Expenses appropriation by $5,000. Additionally, the 1972 budget provides for a decrease of $287,000 related to the President's cost savings program for public relations and paperwork management.

Several changes have been made in presentation of the 1972 budget. First, subbreakdowns for the first five activities under Research, (Conservation and Development of Mineral Resources) have been restructured to identify the objectives of the research undertaken. In addition, examples of recent accomplishments for Resource Development under the same appropriation have been grouped at the end of that section since several of the items cut across subactivity lines.

Mrs. HANSEN. The committee stands adjourned until 1 p.m.

AFTERNOON SESSION

MINE RECLAMATION PROBLEMS IN THE ANTHRACITE AREA

Mrs. HANSEN. The committee will come to order. Mr. McDade.

Mr. MCDADE. Thank you, Madam Chairman.

Following the questions that were developed about environmental problems, I suppose no area would demonstrate the environmental hazards that can occur from unenlightened mining practices than the anthracite area of Pennsylvania. You are familiar with that I know.

Dr. OSBORN. Yes, sir.

Mr. MCDADE. There were brief discussions about some of the cost factors involved, and while there has been a large expenditure of money in that area, for purposes of completing the job we haven't even yet begun. Don't you agree with that?

Dr. OSBORN. Yes, sir, that is true. The anthracite coal industry was a very important one during the early industrialization of this country. I believe something like 5 billion tons of coal has been taken out of there, which was sold at a low price. Let us say, not meeting the cost because we didn't think of reclamation in those days.

But it may have been, on the other hand, very important for the development of the country that it be sold at a low price. But that means the real price had to be paid later. It is something like selling bonds and then you have to pay it off in the future years.

In other words, we produced the low priced energy with anthracite but we have a lot of costs yet to pay.

Mr. MCDADE. Enormous costs. On one river polluted by acid mine water in my area you have a cost figure ranging as high as $1 billion to reclaim that river. A billion dollars, one river.

I am delighted to see your statement talking about the focus of the Bureau of Mines on environmental problems. Since I have been a member of this committee and with the help of the other members of the committee it has been my purpose and our purpose to make the Bureau of Mines under your predecessors and now under you more cognizant of the environmental problems that do exist.

We have had working with your people some fine success. I alluded to one today, the Cedar Avenue mine fire which was and is a good example of how some of these problems can be attacked.

CARBONDALE MINE FIRE

You have another burning fire in Pennsylvania, the Carbondale mine fire. Can you give me a status report on that?

Dr. OSBORN. Let me say quickly I believe the total is about $3 million that will be spent on that project. We have it about a third done and it will take about another year. Let me corroborate that with Mr. Corgan.

Mr. CORGAN. That is correct. We are about a third of the way through and it will probably take another year or 18 months to complete it. We probably will have spent about $3 million on it at the time of completion. But it will be controlled and it will stop the fire from spreading down the valley toward Scranton.

Mr. McDADE. So we can look forward to a successful and happy conclusion to an unhappy event, is that right?

Mr. CORGAN. That is right.

DEMONSTRATION OF NEW METHOD FOR CONTROLLING SUBSIDENCE

Mr. McDADE. I note too, and I am, of course, interested in it, the new flushing method that has been developed and is planned to put to use outside of the city of Scranton.

Can you tell us about that method?

Dr. OSBORN. I happen to have with me a little article you are probably familiar with. It is from the Dowell Division, in which they picture the community of Rock Springs, Wyo., and the method of slurrying the sand down into the mine so that in one borehole a large amount of sand was put into the mine.

It is the feeling of the Bureau of Mines that this backfilling method might be feasible elsewhere. This work was done below the water table but it is the feeling of the Bureau of Mines that it may be possible even above the water table and possibly accomplished without such fine grinding of the fill material. This work used sand whereas most of the culm that we hope could be used for fill, of course, is coarser grain.

I would like to call on Mr. Corgan to tell you what the status is. But we feel if this works, it is a way of getting rid of at least part of the culm banks and at the same time effectively control subsidence.

Mr. CORGAN. The project at Rock Springs was completed successfully. We inserted 19,500 cubic yards of sand into one borehole. Our objective in Scranton, Pa., to be specific, is to use crushed mine refuse. Our intention is if possible to insert from 300,000 to 400,000 cubic yards of crushed mine refuse into one or possibly two boreholes.

Mr. McDADE. How many holes would you normally have to have?

Mr. CORGAN. We ordinarily would have to have a very large number of boreholes to do what we intend to do at Scranton with two boreholes. I would say 2,000 boreholes would be required under the old method backfilling.

The best thing about this method is that the material we intend to put underground will spread under all the buildings, all of the streets and hold up the entire area. Under the old method the material coned at the bottom of the borehole and as a result it would not go under houses and buildings.

We also intend in Scranton to put half of the material in a dry area, and the other half of approximately 150,000 cubic yards in an inundated area. The area to be protected will be approximately 1,200 feet in diameter, pretty close to the center of the city.

COST SAVINGS FROM NEW FLUSHING TECHNIQUE

Mr. McDADE. Can you tell us from a cost effectiveness standpoint how much more we can expect percentagewise or however you would like to define it.

Using this method if it is successful, will we be able to cut our costs substantially in the flushing project by eliminating the necessity of all of these boreholes?

Mr. CORGAN. Yes. We have figures on that which we can insert in the record. But I can say on a per cubic yard basis it is much less costly

using this new process than the old one if for no other reason than that the entire area is backfilled, whereas with the old method we couldn't flush under the building.

(The information follows:)

The Bureau has calculated that if we were to drill 1,600 boreholes into the mine voids in the project area and flush 130,000 cubic yards of crushed mine refuse into the voids under streets and yards through the boreholes the estimated cost would be $2,150,000. Under the two-borehole system we expect to flush a minimum of 300,000 cubic yards into the same voids at an estimated cost of $1,300,000. By using the old method only 43 percent of the voids would be filled whereas with the new procedures we expect to fill 100 percent of the voids including those under buildings at greatly reduced cost.

Mr. McDade. So you have a more effective and more efficient and more economical method of doing it?

Mr. Corgan. That is right.

Mr. McDade. All of which is to be applauded as a new technological advance, something that I have taken the Bureau to task for before, not developing enough new technology.

FUNDING FOR SYSTEMS ANALYSIS WORK ON MINE FIRES AND SUBSIDENCE

In that connection I am distressed to see that the budget for the Bureau does not reflect some of the increased emphasis I think you ought to be putting on new technological methods. We have a systems analysis contract proceeding to try to develop new methods of technology yet it is not funded in this budget. Isn't that correct? There is no money in the budget for it is there?

Mr. Corgan. What has happened, we were not sure of the new flushing process until some time in the early part of December.

Mr. McDade. That is the flushing process?

Mr. Corgan. That is right. As a result the money that we have in the budget is virtually all going to this particular job. It is a very high priority job. If we are successful in flushing the crushed mine refuse, it will be an outstanding achievement and very good, of course, for the city of Scranton and other areas throughout the United States that have been undermined.

Mr. McDade. I am very excited about it. The only trouble is I think that this technological breakthrough, potentially, is not being sufficiently well followed up by the Bureau in providing funds for the systems analysis study.

I can understand how the process you described occurred and this method was developed after you had actually gotten your budget together.

Would you supply to me for the record some estimate of what is needed to keep this system analysis study going?

Mr. Corgan. Yes, sir; Dr. Osborn, we can do that can we not?

Dr. Osborn. Yes.

(The information follows:)

Bureau of Mines—Anthracite (System Analysis Study)

The system analysis plan envision a survey of domestic and foreign refuse bank fire detection techniques, an extensive search and review of the literature in the field, and contacts with domestic and foreign agencies and organizations—all in the areas of research, development, and operations relating to fire starting mechanisms, detection, and location techniques, and components for fire control. It is estimated that this project or phase would cost $150,000.

On subsidence, a complete appraisal of this problem, i.e., the potential in the Lackawanna and Wyoming Basins in Pennsylvania would in our view cost about $200,000. Extensive use of the Bureau's mine folio map system on anthracite would be made in providing recommendations as to what areas should be backfilled first and what technique of control should be used, i.e., which system would provide the greatest structural assurance at the most economic cost level, etc. Data gathered in this work area would be processed to be adaptive to other known subsidence potential areas outside the anthracite region.

PROGRESS ON THE NATIONAL CULM BANK FIRE

Mr. McDade. I understand, too, that you are about ready to continue your demonstration work on the National Bank in extinguishing that culm bank fire. Can you update me about that and tell me what you are finding out?

Dr. Osborn. It is believed currently that the work can start in April and it will consume about $750,000.

Mr. McDade. I understand it will take $1.3 million. What is the project life?

Mr. Corgan. It will probably take 8 or 9 months to complete the national bank job. To make one addition, the funds for the national bank are coming out of present appropriations.

Mr. McDade. Fiscal year 1971 money?

Mr. Corgan. That is right. The 1.3 million is in the 1972 budget.

Mr. McDade. I think that is all at the present time. Thank you.

ACTIVITIES TRANSFERRED TO NOAA

Mrs. Hansen. Please summarize for the committee the activities of your Bureau which have been transferred either to the National Oceanographic and Atmospheric Administration or the Environmental Protection Administration.

Dr. Osborn. The marine resources was transferred. That is all.

Mrs. Hansen. Nothing was transferred to the Environmental Protection Administration?

Dr. Osborn. No.

Mrs. Hansen. Please insert in the record a tabulation listing these projects and indicating the amount of funding that was transferred in each instance.

(The information follows:)

Funds Transferred to National Oceanic and Atmospheric Administration and Environmental Protection Agency in Fiscal Year 1971

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION [1]

General administrative expenses	$16,000
Marine mineral mining:	
a. Characterization and monitoring of equipment and techniques	273,000
b. Development of marine mining systems	362,000
Total Transferred	651,000

[1] In addition, the 1972 estimate is reduced $5,000 for general administrative expenses and $290,000 for marine mineral mining reflecting the transfer of marine activities to NOAA in fiscal year 1971.

Environmental Protection Agency: No funds were transferred to this agency.

URBAN ORIENTED PROJECTS

Mrs. HANSEN. Describe in general terms the activities of your Bureau that are increasingly more urban-oriented.

Dr. OSBORN. I think the most significant of these is the urban waste part of the solid waste program, which is particularly appropriate for the Bureau of Mines because these are the fastest growing ore deposits. Ordinarily deposits take a few million years to develop and here we have them developing in just a few years as very important sources of metals and, of course, also glass.

The particular program that has received widespread attention is the one at College Park, Md.

Mrs. HANSEN. I saw that on the TV the other night.

Dr. OSBORN. This is a pilot plant operation. Our feeling is, on the basis of economic studies along with our other studies, that the plant can be operated at something like $2 a ton to bring in something like $12 or $15 a ton in revenue if the appropriate markets are in that region for the iron or the aluminum or the glass and so on.

Mrs. HANSEN. Please insert in the record the total amount of urban waste, for example, in our large cities of New York, Washington, Philadelphia, San Francisco, and Los Angeles.

Dr. OSBORN. We have those figures. We will put them in.

Mrs. HANSEN. Also insert in the record the potential markets if there were plants in each of these cities to dispose of this urban waste.

(The information follows:)

URBAN WASTE

The total urban solid wastes generated in the United States in 1970 was about 400 million tons. Only about half (200 million tons) of these wastes were collected and disposed of in a predetermined manner. Based on the collection figure the average per capita generation of urban refuse is about 6 pounds per day—about 1 ton per person per year.

A breakdown of urban refuse discarded by some of our larger cities in tons per day, is as follows: Los Angeles, 10,178; Baltimore, 2,400; New York City, 25,000; Atlanta, 1,900; Cincinnati, 1,200; Milwaukee, 2,400; New Orleans, 2,000; Chicago, 8,000; San Francisco, 1,800; Washington, D.C., 2,800; Seattle, 1,800.

Potential markets for the tin cans and ferrous products are the steel mills and foundries. National Steel and Bethlehem Steel Co.'s have made public commitments to buy all of the ferrous metals recovered from refuse. The three largest tin can manufacturing companies, Continental, American, and National Can, have recently initiated a program to buy back any type of discarded cans. The Glass Containers Manufacturers Institute which represents all of the glass container manufacturers in the country have a substantial reclamation program in over 100 cities to collect and re-use old bottles. They are ready to recycle 12 billion bottles annually in the manufacture of new bottles and will pay ½ cent per bottle returned to their collection centers. Similar programs have been undertaken by Reynolds, Kaiser, and Alcoa Aluminum Co.'s which pay ½ cent per each aluminum can returned to them.

Iron products, tin cans, glass, and nonferrous meals constitute 75 percent of incinerator residues. The market outelts for these materials look very encouraging based on the recent developments noted above.

Dr. OSBORN. Almost surely there are such markets in the cities you mentioned except possibly Los Angeles. But probably Los Angeles, too. There would be markets for each of these recoverable products. We have carried this development only to the pilot plant stage.

NEED FOR DEMONSTRATION PLANTS

If I could review with you briefly how technology of this type develops, there is first the laboratory or the bench work which is test tube or just a small-scale operation. From this there may be several types of processes that will look promising, and then one or two of those is selected for the pilot plant which is still a miniature of real full-scale production.

Then the process that looks promising, if one does in the pilot plant, needs to go to the next larger, which is called prototype or demonstration scale. This then is using large-scale equipment from which real good cost numbers can be obtained. In fact, multiples of those units can be used in production.

It is quite interesting that I come into the Bureau when we have three very important major developments which are just in the stage of needing to move from step 2 or step 3. One of them is urban waste. Another one is SO_2 from smelter gases and the third is gasification of coal.

We have pilot plants operating now on these three things.

In the case of the urban waste program, we need to move, and intend to move next year, into a larger scale operation where we can get the numbers. And more importantly, because we know this is feasible and will be successful—more importantly we will have a plant then that people, from communities who ought to be doing this with their solid waste instead of burying it somewhere, can come and see a plant in operation.

This we need. This is a demonstration plant that will provide convincing information and cost data to the city fathers who have to float a bond issue.

Mrs. HANSEN. After you have developed the demonstration plant, then you have to find the public agencies within the localities to buy the equipment.

Dr. OSBORN. And we have a lot of visitors now, but it is not on quite a large enough scale so they can go back and sell it to the city council.

Mrs. HANSEN. What would you guess, for a city the size of New York, it would cost to put into operation a plant handling this urban waste?

Dr. HENRIE. We would have to know exactly how many tons.

Mrs. HANSEN. Please insert the information in the record.

Dr. HENRIE. Yes, ma'am.

(The information follows:)

COST OF URBAN WASTE PLANTS

New York City generates 25,000 tons of refuse per day. If all of this were incinerated, the residues produced from burning of the refuse would amount to about 6,000 tons per day.

A reclamation plant which would process 1,000 tons of incinerator residues per day, based on data from the Bureau of Mines pilot plant at College Park, Md., would cost $2 million to design and construct. Six such plants, costing a total of $12 million, could process the entire output of incinerator residues from the city.

At the present time New York City incinerates about 50 percent of its refuse. If all of the refuse were incinerated this would require construction of additional facilities at a cost of about $15,000 per ton of rated capacity per day, or $180 million.

Similarly, the above cost figures would apply for construction of reclamation plants and incinerators in Philadelphia, Baltimore, and Washington, D.C.

Mrs. HANSEN. Mr. McDade.

SCOPE OF URBAN REFUSE RESEARCH

Mr. MCDADE. When you are talking about urban wastes, are you talking about a selective type of urban waste or about all of it?

Dr. OSBORN. We are talking about the whole thing, although the present experiments have been principally on incinerator residue. We use a local incinerator where all of the trash and garbage is going.

Mr. MCDADE. There is no pretreatment?

Dr. OSBORN. It is, of course, burned. They are throwing it in the incinerator and the combustibles are gone. We are taking what is left and separating the marketable products from the residue. We spent some of the money—your committee allowed—I think it was $77,000 this year—working on the matter of treating raw refuse instead of just taking the residue—taking the raw refuse and separating everything out, the plastics and paper on one hand and glass and metals on the other, and so on, because all of these have value.

OIL FROM URBAN WASTES

It is too bad we have to burn any of it and just waste the heat. At one of our laboratories some interesting work has been underway for a couple of years now on making oil from the combustible materials.

Mrs. HANSEN. I notice that in your justifications.

Dr. OSBORN. This is only on the laboratory scale. We haven't a pilot plant yet.

Mr. MCDADE. This is at Pittsburgh?

Dr. OSBORN. Yes. But it is particularly important to develop the techniques for taking all of the garbage and trash as it comes and automatically separating it into these fractions. We are working on that.

Mrs. HANSEN. What is the potential for oil?

Dr. OSBORN. I don't think we have any costs. We know we can do it now. Also, this has led us into agricultural waste too which is getting a little out of our field. But such wastes have the same general organic molecules, so by treating them with carbon monoxide and steam at fairly high pressure, we can make oil.

We would be able to use the tremendous accumulations of cow manure, for example, for making the oil. It is good oil and can be used for the same purposes as the mineral oils.

Dr. HENRIE. We make about two barrels of oil per ton of this type of refuse.

Mrs. HANSEN. Wouldn't you have to have a tremendous tonnage?

Dr. HENRIE. There are tremendous tonnages. It is all of the cellulose materials that is in urban and agricultural waste.

ACTIVITIES RELATED TO POLLUTION CONTROL AND ENVIRONMENTAL PROTECTION

Mrs. HANSEN. Please insert in the record a tabulation of your activities that are directly related to pollution control or environmental protection. This tabulation should indicate the location, type of activity, and the amount included in the 1972 budget estimate in each instance.

(The information follows:)

DEPARTMENT OF THE INTERIOR

BUREAU OF MINES

Activities in Pollution Abatement and Environmental Protection

(In thousands of dollars)

Description of project or activity	Location	Estimate F.Y. 1972
Processing of Auto and Appliance Scrap	Salt Lake City, Utah	350
Separation of Precious Metals From Electronic Scrap	" " " "	260
Leaching Mine and Mill Tailings and Silicate Ores	" " " "	400
Sulfur From Smelter Gas	" " " "	500
Stabilization of Mill Tailings	" " " "	200
Recovery of Metals and Minerals From Urban Refuse	College Park, Maryland	950
Refining of Molten Ferrous Scrap	" " "	200
Slime Flocculation and Flotation	Tuscaloosa, Alabama	150
Utilization of Glass Fraction in Municipal Refuse	" "	100
Induction Melting of Titanium Scrap	Albany, Oregon	150
Electroprocessing of Alloy Scrap and Wastes	Reno/Boulder City, Nevada	400
Alternate Processes to Smelting	" " " "	150
Processing of Metallurgical Solutions and Sludges	Rolla, Missouri	100
Processing of Furnace Dusts and Residues	" "	350
Recycling Ferrous Scrap	Minneapolis, Minnesota	400
Analysis of pollutants & contaminants in coal	Pittsburgh, Pennsylvania	400
Research on coal preparation	" "	80
Research on removal of SO_x and NO_x from stack gases	" "	350
Coal gasification - SYNTHANE	" "	770
Coal gasification - Hydrogasification	" "	305

Description of project of activity	Location	Estimate F.Y. 1972
Coal liquefaction by hydrogenation	Pittsburgh, Pennsylvania	600
Magnetohydrodynamic generation	" "	330
Combustion of pulberized coal and char	" "	100
Coal incineration and pyrolysis of solid wastes	" "	300
Dry pyrite removal from coal	Morgantown, West Virginia	220
Stack gas SO_2 removal	" " "	250
Analysis of mineral and sulfur modes in coal	" " "	300
Coal Gasification - low BTU gas	" " "	690
Magnetohydrodynamic generation	" " "	70
Use of solid wastes from coal combustion	" " "	100
Lignite research	Grand Forks, North Dakota	200
Coal gasification - SYNTHANE (contract)	Washington, D. C.	1,500
Solid Waste Problem Appraisals	Pittsburgh, Pennsylvania	100
Studies on availability of fuels which meet air pollution regulations	" "	250
Solid Waste Problem Appraisals	Denver, Colorado	100
Studies on availability of fuels which meet air pollution regulations	" "	200
Studies on availability of fuels which meet air pollution regulations	Juneau, Alaska	50
Stabilization and management of spent shale deposits	Laramie, Wyoming	40
In situ retorting to avoid spent shale problem, engineering-scale investigations	" "	1,060
In situ retorting, supporting research	" "	160
Characterization and treatment of waste waters from oil-shale retorting	" "	100

Description of project of activity	Location	Estimate F.Y. 1972
Fuel combustion research for air pollution abatement .	Bartlesville, Oklahoma	270
Research on diesel exhaust in underground mines to improve safety of operation	" "	170
Natural gas research to stimulate production from marginal deposits	" "	229
Properties of crude oils, brines, and products for determining sources of pollution	" "	387
Subsurface waste disposal	" "	200
Subsurface Waste Disposal	Morgantown, West Virginia	100
Borehole injection for back filling mine voids with crushed culm bank refuse	Scranton, Pennsylvania	1,300
Develop equipment and instruments for measuring, predicting and monitoring gases and dust	Pittsburgh, Pennsylvania	500
		16,441

Dr. OSBORN. I was going to comment because I do happen to have it with me, this amounts to about $17 million of our budget.

Mrs. HANSEN. What is your total research budget?

Dr. OSBORN. Our total research budget is about $40 million.

Mr. THOMSON. A little over $40 million.

Dr. OSBORN. And of that about $17 million is related to pollution abatement and environmental protection activities, excluding health and safety research. This is our regular mineral resource research program.

So almost half of it is directly related to pollution abatement and environmental protection. We have it listed both by laboratories and by fields.

CONSERVATION AND DEVELOPMENT OF MINERAL RESOURCES

Mrs. HANSEN. Insert pages 4 through 55 of the justifications at this point in the record.

(The information follows:)

DEPARTMENT OF THE INTERIOR

BUREAU OF MINES

Conservation and Development of Mineral Resources

Appropriation, 1970	$39,331,000	
Second supplemental appropriation, 1970	3,295,000	
Total appropriation, 1970		$42,626,000
Transferred from "Health and Safety," to cover pay costs		+674,000
Transferred to "Operating Expenses, Public Building Services," General Services Administration		-11,266
Total available, 1970		43,288,734
Appropriation, 1971	46,422,000	
Pay cost supplemental	1,911,000	
Total appropriation, 1971		48,333,000
Transferred to National Oceanic and Atmospheric Administration		-635,000
Total available, 1971		47,698,000

DEPARTMENT OF THE INTERIOR

BUREAU OF MINES

Summary of Increases and Decreases, 1972

	Base for 1972	Increase 1972	
Research:			
Petroleum			
To initiate studies on subsurface waste disposal	$ - -	$ +300,000	$ +300,000
Metallurgy			
To expand urban refuse research and design a demonstration facility	603,000	+500,000	
To reimburse the Employee Compensation Fund	221,000	+138,000	+638,000
Mining			
Methane control program consolidated with methane work under Health and Safety research	-3,010,000	-3,010,000	-3,010,000
Marine Mineral Mining			
Program transferred to National Oceanic and Atmospheric Administration	290,000	-290,000	-290,000
Resource Development:			
Minerals			
To expand Wilderness Area mineral surveys program	575,000	+300,000	
To provide analytical support to the National Commission on Materials Policy	400,000	+400,000	
Transfer of funding for Missouri River Basin program from Bureau of Reclamation	- -	+220,000	+920,000
Program savings for public relations and paperwork management	162,000	-162,000	-162,000
Net Decrease, 1972			-1,604,000
Budget Estimate, 1972			46,094,000

CONSERVATION AND DEVELOPMENT OF MINERAL RESOURCES

Analysis by Activities

Activity	F.Y. 1970 Amount Available	Fiscal Year 1971 Total Appropriation	Pay Cost Supplemental	Transfers 1/	Amount Available
1. Research					
(a) Coal	$ 7,113,045	$ 8,468,000	$ 337,000	- -	$ 8,805,000
(b) Petroleum	2,762,726	2,595,000	115,000	- -	2,710,000
(c) Oil shale	2,462,325	2,413,000	95,000	- -	2,508,000
(d) Metallurgy	12,455,730	12,385,000	574,000	- -	12,959,000
(e) Mining	6,496,405	7,691,000	249,000	- -	7,940,000
(f) Marine Mineral Mining	935,840	925,000	- -	$-635,000 1/	290,000
(g) Explosives	677,181	663,000	30,000	- -	693,000
2. Resource Development					
(a) Statistics	2,147,010	2,091,000	116,000	- -	2,207,000
(b) Economic Analysis	531,160	520,000	26,000	- -	546,000
(c) Bituminous Coal	954,308	934,000	41,000	- -	975,000
(d) Anthracite	703,532	1,746,000	42,000	- -	1,788,000
(e) Petroleum	850,605	839,000	41,000	- -	880,000
(f) Minerals	4,510,585	4,494,000	211,000	- -	4,705,000
(g) International Activities	668,434	658,000	34,000	- -	692,000
Unobligated Balance Lapsing	19,848	- -	- -	- -	- -
Total	43,288,734	46,422,000	1,911,000	-635,000 1/	47,698,000

1/ Transfer of Marine Mining program to National Oceanic and Atmospheric Administration.

CONSERVATION AND DEVELOPMENT OF MINERAL RESOURCES

Activity	F.Y. 1970 Amount Available	F.Y. 1971 Amount Available	F.Y. 1972 Estimate	F.Y. 1972 Increase (+) or Decrease (-)	Page Reference
1. Research					
(a) Coal	$ 7,113,045	$ 8,805,000	$ 8,770,000	$ -35,000	8
(b) Petroleum	2,762,726	2,710,000	3,000,000	+290,000	12
(c) Oil Shale	2,462,325	2,508,000	2,500,000	-8,000	17
(d) Metallurgy	12,455,730	12,959,000	13,550,000	+591,000	21
(e) Mining	6,496,405	7,940,000	4,900,000	-3,040,000	28
(f) Marine Mineral Mining	935,840	290,000	- -	-290,000	33
(g) Explosives	677,181	693,000	693,000	- -	34
2. Resource Development					
(a) Statistics	2,147,010	2,207,000	2,207,000	- -	37
(b) Economic Analysis	531,160	546,000	546,000	- -	38
(c) Bituminous Coal	954,308	975,000	975,000	- -	40
(d) Anthracite	703,532	1,788,000	1,788,000	- -	42
(e) Petroleum	850,605	880,000	880,000	- -	44
(f) Minerals	4,510,585	4,705,000	5,593,000	+888,000	46
(g) International Activities	668,434	692,000	692,000	- -	50
Unobligated Balance Lapsing	19,848	- -	- -	- -	
Total	43,288,734	47,698,000	46,094,000	-1,604,000	

1. Research

(a) Coal: Fiscal year 1971, $8,805,000; fiscal year 1972, $8,770,000; decrease, $35,000. The decrease consists of:

Increase (+) or Decrease (-) Amount	Positions	Total Program	Total Positions	Explanation
$-35,000	-2	- -	- -	Due to program savings in public relations and paperwork management.

PROGRAM STATEMENT

Energy and environment, rapidly becoming household words, will be major national concerns throughout the 1970's. Coal in vastly greater amounts will be required as an energy source for electricity production to sustain our expanding population and economy, and the solid fuel likely will be needed as a source of gas, liquid fuels, and chemicals to supplement the natural fluid fuels for which increasing consumption has resulted in a continuing reduction in reserves-to-production ratio. Environmental problems of air and water pollution, waste disposal, and land degradation from all sources, including coal production and utilization, must be solved if the quality of life is to be maintained.

Coal research projects of the Bureau of Mines are directed largely to advancing the technology of coal to meet increasing energy requirements and solving related environmental problems. Included are projects seeking to economically convert coal to fluid fuels, to develop devices to generate electricity more efficiently from all ranks of coal, and to devise coal preparation methods which will yield products capable of meeting pollution standards. Environmental protection, also, is being sought through research on stack gas purification, coal waste utilization, and mine-land restoration. Supplementing this work is a broad program of basic research on coal properties, chemistry, and analytical procedures.

Guarding Against Duplication of Work: Research proposals considered by the Department's Office of Coal Research (OCR) for funding are reviewed by the Bureau to avoid duplication of research effort. In addition, through an exchange of progress reports, the work of each group tends to complement that of the other. Accelerated progress is achieved in research in such fields as magnetohydrodynamic (MHD) power generation, boiler tube corrosion, fly ash utilization, synthetic fuels from coal, etc. By means of direct exchange of information between scientists, the Bureau, similarly, is able to coordinate its coal research with work underway in industrial and educational organizations. A substantial amount of the Bureau's research and development efforts in air pollution abatement is conducted in direct cooperation with the Air Pollution Control Office, Environmental Protection Agency. Exchange of reports, frequent conferences and service by Bureau officials on Air Pollution Control Office advisory committees eliminate any undue duplication of efforts.

PROGRAM OF WORK

Advancing Utilization Technology: $2,440,000 (decrease, $10,000)

In 1969, coal continued to be the dominant fuel for the generation of electricity; and the 310 million tons consumed for this purpose represented over 59 percent of the total amount of coal consumed. Electric power demands in 1980 are forecast to be over twice present production. It is reasonable to expect that coal's share of this increased market will be maintained or increased, provided problems associated with the use of coal can be solved.

To accomplish this, research is underway to develop more efficient utilization methods which will not only reduce power costs and extend the life of the resource, but reduce thermal pollution and maintain a balanced energy mix. Research projects designed to achieve these goals include (1) development of a unique magnetohydrodynamic (MHD) generator to reduce capital costs and lower ionizing agent (seed) requirements for the MHD system; (2) development of a combustor to reduce the particulate matter reaching the MHD generator and also facilitate greatly seed recovery; (3) development of an air preheater capable of heating the intake air to a coal-fired MHD unit to 2,200 to 3,000° F range (an air heater operating in this temperature range would increase greatly the efficiency of an MHD system); and (4) development of facilities and techniques for more efficiently burning coals and chars in power boilers (success in this project will improve materially the economic attractiveness of a number of processes currently under investigation for coal conversion and will reduce the cost of generating electric power).

Further chemical and physical studies of coal will be conducted to learn more about the nature of coal and how it will behave during various preparation and utilization processes. Spectroscopic, microscopic, X-ray, and other modern analytical techniques will be employed.

Although the United States reserves of coking coals are estimated to be more than adequate to meet our domestic and export requirements for many years, a worldwide shortage currently exists in supplies of coal for coke making. In particular, high-quality low- and medium-volatile coals are in demand for blending. Competition from electric utilities for supplies of low-sulfur coals to meet air quality requirements is adding to the supply problem. Bureau of Mines research on carbonization stresses the use of coals not presently used in making coke and the use of coals of marginal coking quality and Western coals in coke blends as a way to extend the Nation's reserves of metallurgical coals.

Research will be continued on new methods for transporting coal from the working face in the mine to coal preparation facilities on the surface.

Effective Pollution Abatement Through Conversion Processes: $4,345,000 (decrease, $20,000)

Demand for energy continues to rise at a rapid rate. In 1969 fossil fuels consumption reached a high of 66 quadrillion Btu's; and it is forecast that by the end of the decade, the demand will be 95 quadrillion. Indigenous supplies of oil and gas, now furnishing more than three-fourths of this total energy demand, are rapidly becoming inadequate. During the past 10 years, the reserve-to-production ratio has diminished for crude petroleum in spite of continuously increasing imports. Natural gas has recently been following the same trend. For the past two years, additions to gas reserves have been several trillion cubic feet less than the annual consumption. Coal has been the mainstay fuel for the electric utility industry but stringent limitations on sulfur emissions into the atmosphere now require that low-sulfur fuels be utilized. The result is that imported desulfurized fuel oils are supplanting coal in the utility market. If economic methods for the removal of the sulfur from coal or the sulfur oxides from stack gases are not quickly forthcoming, coal stands to lose much of this market and the Nation will become more and more dependent on foreign sources for energy fuels. The Bureau's program in conversion of coal to synthetic fuels is oriented toward supplementing not only natural gas and automotive fuels, but low-sulfur powerplant fuels, as well.

The program on gasification of coal, consequently, is directed chiefly to the development and demonstration in a prototype plant of a process to produce a synthetic gas suitable as a sulfur-free fuel for power generation or for catalytic upgrading into a pipeline gas. The process will be engineered and tested thoroughly in F.Y. 1971 and arrangements made for the preparation of detailed plant design and specifications. In fiscal year 1972, a contract will be let for the construction of the gasification portion of the plant. Demonstration of the feasibility

of the process for producing a powerplant fuel will be carried out. Development will continue on engineering and design data for subsequent construction of a methanation section to upgrade the gas to pipeline quality.

Development of a hydrogasification process to produce low-sulfur char, as well as pipeline gas, also will be accelerated and an integrated two-stage system constructed. The Bureau's fixed-bed pressure gasifier, using caking coals without pretreatment, will be operated with oxygen and oxygen-air mixtures for production of powerplant fuel and pipeline gas.

In the liquefaction of coal, emphasis will be placed on novel concepts to produce low-sulfur, ashless fuels for powerplants. A new process incorporating high-turbulence flow through beds of modern high-activity catalysts shows much promise for producing a mix of petroleum-type fuels and high yield of low-sulfur residues. This will be piloted to obtain engineering data required for an estimate of its economic feasibility. Novel processes by which coal can be converted into a liquid at ambient temperatures and pressures will be further advanced and new ideas sought. Through diligent search for entirely new techniques, it will be possible to lower continuously the cost of converting coal to sulfur-free fuels.

Managing Coal Wastes and Pollutants: $1,985,000 (decrease, $5,000)

Coal constitutes approximately 80 percent of our indigenous fossil fuel resources. While coal currently supplies almost 21 percent of our national energy fuel market, its use contributes heavily to environmental pollution, particularly affecting the quality of our air resources. For example, it is estimated that in 1968 coal combustion was responsible for the emission to the atmosphere of over 20 million tons of sulfur oxides, 4 million tons of nitrogen oxides, and 8 million tons of particulates. Moreover, the projected energy fuel demands to satisfy our expanding economy will require that the use of coal double in the next 30 years, thus placing an additional burden on the environment.

In recognition of these facts and the need to find means of minimizing damage to the environment, the Bureau of Mines is conducting a comprehensive program to identify and minimize the problems associated with coal utilization. The coal research program designed to achieve these goals includes: (1) A study of preparation and related techniques to improve the removal of ash, sulfur, and moisture from coal; (2) development of new or improved analytical tools and techniques for coal, and for identifying the components and properties of coal wastes and coal products; (3) development of effective and economic methods for removing noxious contaminants, both gaseous and solid, from stack gases before discharge to the atmosphere; (4) development of waste collectors, waste collection techniques, and uses for waste materials produced during the processing and utilization of coal; and (5) development and application of new knowledge on the mineral content and the physical and chemical properties of coals which in the combustion process cause deposition and corrosion of boiler heat-transfer surfaces resulting in costly shutdowns of power-generating units. In related research, coal technology is being applied to urban refuse and other solid waste problems. By way of example, the Bureau will pursue further development of a promising new concept, arising out of research on the liquefaction of coal, for the disposal of municipal refuse by treatment with carbon monoxide and steam at elevated temperatures and pressures to convert the organic content of refuse to low-sulfur oil.

EXAMPLES OF RECENT ACCOMPLISHMENTS

In order to meet the need for pipeline gas--a clean-burning energy fuel in critical supply--emphasis was placed on development of a suitable process for gasification of coal. Advanced laboratory pilot plant work was completed on process features of the Bureau's SYNTHANE Process. An evaluation of the technical feasibility was carried out by an engineering firm and proved to be very favorable. Requests for proposals for design and specifications for construction of a prototype plant are being issued so as to test commercial feasibility at the earliest possible time.

It is hoped that the process will prove economic in areas close to plentiful supplies of low-cost coal but short on natural gas. In some parts of the country recent supply shortages have compelled gas companies to refuse to accept new customers. A factor in these shortages is the increased demand for fuels which, like natural gas, cause less air pollution when burned.

Pilot-plant tests at the Bureau's Pittsburgh Energy Research Center show that the SYNTHANE Process yields more methane directly (the chief component of natural gas) than other coal gasification methods. It is anticipated that its efficiency can be improved by using larger-scale equipment in which heat loss can be better controlled. By using a patented built-in pretreatment step, the process is able to use any type of coal as gas-making raw material--including "caking" varieties generally avoided for gasification because heat makes them agglomerate causing gasification vessels to become plugged. After pretreatment, the finely ground coal enters a hot gas stream, where a reaction with oxygen and steam converts it to methane, hydrogen, and carbon monoxide. This gas mixture is purified and converted to pipeline-quality natural gas.

Gasification of coal to produce a sulfur- and ash-free fuel gas for power station use in generation of electricity has been tested in a large laboratory pilot unit. The tendency of bituminous coals to agglomerate when heated has hampered the use of coals from the Eastern United States. The Bureau has now successfully gasified strongly caking coal in a fixed-bed unit that uses a mechanical stirrer to break up coke agglomeration. Forcing pressurized air and steam through the coalbed at high temperatures generates a chemical reaction that gasifies the coal, leaving behind nothing but an incombustible ash. Continuous stirring keeps the semi-solid mass of fuel moving freely on the reactor bed, allowing air to flow easily and uniformily through the hot bed of coal for faster, more thorough gasification. A sustained run of the pilot unit was carried out charging 1,500 pounds of coal per hour with essentially complete gasification. Successful development of a fixed-bed pressurized gas producer could stimulate the use of Appalachia's extensive reserves of non-metallurgical caking coal as a source of clean, low cost energy. By "scrubbing" the gas to remove its sulfur content, it could be used in compliance with clean-air regulations that require low levels of sulfur-dioxide emission. The gas is rich in combustible carbon monoxide and hydrogen and is particularly suitable for burning in turbines to generate electricity.

In research on coal char as a source of low-sulfur fuel for powerplants, combustion tests were conducted on a char produced by flash carbonization. Combustion efficiencies of 98 percent were achieved, and combustion characteristics comparable to those of conventional solid fuels were observed. Encouraging progress was also made in developing a process for manufacture of a low-cost, low-sulfur liquid fuel by coal hydrogenation.

Research by the Bureau of Mines has shown that urban wastes, now buried or burned at considerable expense, could instead be converted to industrially valuable fuel oil. These results stem from technologic work the Bureau has done on the possibility of using a similar conversion process to make liquid fuels from lignite. By treating refuse from which glass and metals have been removed with carbon monoxide and steam at elevated temperatures and pressures, as much as two barrels of low-sulfur oil can be produced from a ton of dry waste. The process can also produce oil from wood by-products and from sewage sludge. In other research on urban wastes, preliminary investigations using coke-making technology show that urban refuse can be converted to useful products such as gas for heating, light oil, tar, and chemicals. Previous research had proven the feasibility of obtaining useful products from scrap auto tires using the same process.

Noteworthy accomplishments were also made in developing methods to decrease and control air pollution caused by combustion of coal. An improved sorbent and regeneration procedure was found for removal of sulfur oxides from stack gases. Also, a method was found to decrease nitrogen oxides by improved control of fuel-air mixtures.

(b) Petroleum: Fiscal year 1971, $2,710,000; fiscal year 1972, $3,000,000; increase, $290,000. The increase consists of:

	Increase (+) or Decrease (-) Amount	Positions	Total Program	Total Positions	Explanation
(1)	$+300,000	+12	$300,000	12	Initiate studies on subsurface waste disposal.
(2)	-10,000	-1	- -	- -	Due to program savings in public relations and paper work management.
	+290,000	+11			

COST FACTORS INVOLVED IN INCREASE

9 professional and 3 nonprofessional employees, $185,000; personnel benefits, $15,000; travel and transportation, $26,000; supplies, $28,000; equipment, $46,000.

NEED FOR INCREASE

These studies will provide technical support to the Department's Subsurface Waste Storage Program and will supplement the combined program of the Geological Survey and the Water Quality Office, Environmental Protection Agency. Problems of industrial waste disposal by injection are so diverse, widespread, and urgent that a coordinated Federal-State program is essential to solve them. The complex number of skills necessary for a full evaluation of tentative disposal programs is such that no one agency has all the qualified personnel and research facilities for a proper study. It is obvious that a program as important to the industrial growth of our nation and safety of our citizens cannot be based on opinion. In instances where the injection wells are located near state boundary lines, the task of monitoring and exercising surveillance falls into interstate jurisdiction and thereby becomes a concern for the Federal Government.

In many instances, not only are the decisions to approve a disposal program based on opinion, but the translation of decisions to practice is also based on limited information. This comes about by the fact that petroleum engineers have the most experience with underground fluid injection, but chemical engineers are the persons often charged with the responsibility to perform the design work and supervise the construction and operation of injection wells and treating facilities. This information gap has resulted in serious mistakes.

Many valuable and critically scarce or dangerous compounds are contained, either in solution or suspension, in waste solutions. Properly designed treating plants would not only condition the waste effluents for injecting quality wastes into deep geologic formations, but could also salvage the valuable minerals.

Review of the literature reveals a poverty of information about what happens to a waste solution once it is injected into the ground. Not only must the fluids being displaced be considered, but the chemical, bacterial, and physical reactions must be investigated before one can establish with certainty that a waste solution injected into an underground formation isn't trading one problem for another of even greater magnitude.

PROGRAM STATEMENT

The growing energy needs of the United States and the World have been well documented and thoroughly publicized in the past year. Future requirements for

energy also have been projected and widely circulated. It is evident that we are approaching a real crisis in regard to all forms of energy and their uses.

The demand for low-sulfur fuels to meet the need for clean air in our metropolitan centers exceeds current productive capacities for such fuels. A shortage of natural gas precludes changing to this fuel. The Nation is still losing ground in the battle against smog-forming automotive exhaust emissions. The disruption and curtailment of crude oil production in foreign countries add to the problems. The potential energy resources available in this country are great, but development time will be long. Oil and gas from the Arctic regions of Alaska and Canada will not be available for use in the United States for 5 years or more. Oil shale utilization of any appreciable scale is even further in the future. Conversion of coal into liquids or gas is in a like position. The disposal of industrial waste products is a growing problem of real concern to the future.

The Government will have to intensify its efforts to solve these problems. Petroleum research programs in the Bureau of Mines are directed to the solution of the pertinent problems and can continue to contribute to their alleviation. Such programs will inform the Government on technological development and will stimulate the private sector in the production of liquid and gaseous fuels and chemical raw materials in a manner that reduces waste and insures that products are used and disposed of without objectionable social and environmental costs.

PROGRAM OF WORK

Advancing petroleum and natural gas conservation technology to meet increasing energy needs: $1,800,000 (decrease, $10,000)

Consumption of crude oil now exceeds 5 billion barrels per year and natural gas use is more than 20 trillion cubic feet annually. Proved domestic reserves of crude oil are about 40 billion barrels, and of natural gas are somewhat less than 300 trillion cubic feet. There are known, presently unrecoverable resources of 250 billion barrels of oil and 300 trillion cubic feet of natural gas.

Technology, based on research, must be developed and applied more extensively to increase discoveries, to increase recoveries, to bring marginal resources into production, to allow increased efficiencies in processing and utilization, and to maintain economic price levels. In all cases, proper consideration must be given to maintaining the quality of the environment.

The Bureau's petroleum and natural gas program is directed to these considerations. Studies on increasing recoveries include surveys of the performance of waterfloods, the use of steam in place of water as a flooding medium, and the use of steam or hot organic diluents in allowing production of oil from tar sands or very viscous oil. Cooperation will continue with the Atomic Energy Commission in the Plowshare program on initiating commercial natural gas production from marginal reservoirs in the Rocky Mountain area by nuclear detonations. Results to date from the Project Rulison experiment indicate that nuclear detonations may be a feasible way to increase natural gas reserves in a significant manner. Chemical, or combined thermal-chemical, disaggregation of reservoir rocks will be field-tested as a means of increasing oil and gas recoveries and as a way of improving efficiencies of natural gas storage reservoirs.

Some 200 crude oils will be analyzed by the Bureau and the results made available for use. One or more improved methods for crude oil analysis will be developed. Analytical methods and instruments will be developed or applied to yield better information about the composition and characteristics of reservoir rocks, crude oil and natural gas, oilfield brines, petroleum products and fractions, and asphalts.

Computers will be used to analyze many of the data that will be developed during the course of these studies. Computer programs will be developed or improved to predict the performance of both oil and gas reservoirs, the effectiveness of changing parameters in reservoir performance, the flow of injected conservation helium in the Bureau's Bush Dome, Texas, helium storage field, and the effects of compressibility and solubility of trapped natural gas on waterflood recovery.

The composition and characteristics of asphalts will be correlated with the results of tests of selected asphalts in highway use. The interaction of asphalts and supporting rock aggregated will be investigated. Surveys of the characteristics of motor gasolines, aviation fuels, diesel fuels, and burner fuel oil marketed in United States will be published.

Low temperature flow properties of multipurpose distillate fuels will be determined for use by the Navy. The reactions of tetraethyl lead and cyclic olefin hydrocarbons will be determined as a possible reason for degradation of military motor gasolines in long time storage.

Effecting pollution abatement: $900,000

While it is true that smog-forming exhaust emissions have been lowered significantly in the newer automotive population, it is also true that most of our major metropolitan centers still suffer from too much pollution from the combined old and new population of over 100 million motor vehicles. Sulfur oxide emissions from the burning of fossil fuels in power plants and for the generation of electricity add to the automotive pollution in many cases. Low sulfur fuel oil and coal are in such short supply that some relaxation in fuel sulfur limitations may be necessary to ensure that many sections of the Eastern seaboard do not suffer from the lack of heat or electricity presently and in the near future.

The major effort of the petroleum work in the pollution field is in maintaining and operating the largest Federal research and test facility for studies related to engine fuels and their contributions to air pollution through combustion in gasoline, diesel, and turbine engines. The work is done in cooperation with the Air Pollution Control Office, Environmental Protection Agency, and with industry.

During the year, Bureau personnel will develop and apply improved methods for the analysis of exhaust gases from gasoline and diesel engines and from aircraft turbines. Representative models of the newest production automobiles will be tested in programmed operating cycles, using commercial gasolines as well as special fuels. A study will be completed on the effect of gasoline volatility on the characteristics of automotive engine exhaust emissions. The photochemical reactivity characteristics will be determined for types of gasolines considered for use in low-emission exhaust systems. The effect of additives other than tetraethyl lead in gasolines on the composition of engine exhaust gases will be studied. Tests will be conducted on the use of natural gas, propane, synthetic gas from coal, and other light hydrocarbons as fuel in gasoline engines.

Increased availability of natural gas would allow the substitution of this nonpolluting fuel for high sulfur fuel oil or coal. Part of the program is directed to increasing natural gas supplies. The results of the AEC Plowshare Project Rulison are being analyzed and may lead to commercial application of nuclear detonations for changing marginal gas resources into proven, producible reserves. Other projects of this type will be considered throughout the year. Laboratory development of analytical instrumentation for the monitoring of radioactivity in natural gas will be continued. Further study will be directed to the use of nuclear detonations to create gas storage caverns.

Field tests of the use of the detonation of chemical explosives in natural or induced fractures in low permeability oil and gas reservoirs will be conducted. Such tests also will be conducted in an eastern gas storage reservoir to determine

if the efficiency of operation of such storage reservoirs can be improved. Deliverability of gas from storage to satisfy peak winter demands is most important to pipeline operation and costs.

A survey and study of ground and subsurface pollution by oilfield brines and oil will be undertaken to assess the magnitude of the problem and the necessary remedies.

Subsurface waste disposal: $300,000 (new program)

More and more industrial firms are considering subsurface disposal of industrial wastes that cannot be dumped into rivers and lakes and that cannot be treated economically for surface disposal. Today there are more than 200 of these disposal wells, compared to only 30 in 1963.

The Bureau's studies will be complementary to the programs of the Water Quality Office and of the Geological Survey. All three programs will involve continuing coordination. All types of wastes proposed for subsurface disposal will be evaluated for suitability for injection. Studies will be conducted to determine the possibilities of pretreatment and byproduct recovery processes for the wastes. Trouble has been experienced in the past with injection well construction and operation. These problems will be investigated and improvements will be developed where needed. Evaluation will be made of the possible application of detonation of explosives in fractures, hydraulic fracturing, and acidizing techniques to the underground formations prior to the start of injection. Effort will be devoted to the problems and processes involved in actual waste transport. Finally, economic studies of the waste disposal alternatives will be undertaken.

EXAMPLES OF RECENT ACCOMPLISHMENTS

In the air pollution control studies cooperative work with aircraft operators and engine and air-frame manufacturers resulted in the successful measurement of aircraft turbine emissions. Hydrocarbon and aldehyde emissions were found to be significant during idling of the turbine engine. Nitrogen oxide was the only emission of any significance during all other types of turbine operation. The airlines have responded to the concern of the Federal Aviation Agency over particulate turbine emissions with a schedule for engine modification or replacement to effectively reduce particulate emissions.

In other studies of automotive exhaust emissions, it was determined experimentally that commonly used motor gasoline additives had no significant effect on emissions. Lead as a fuel additive was found to increase emissions in some engines and to have virtually no effect on emissions in other engines as service was accumulated using leaded fuel.

The properties and characteristics of the heavy ends of crude oil (the higher boiling portion) need to be known to allow the most efficient refinery processing. These fractions can be processed to remove sulfur before sale as fuel oil or can be cracked to produce lighter (lower boiling) products of higher value. An analytical scheme was developed to separate these heavy ends into types or groups of compounds. It was applied to high-molecular-weight fractions from four crude oils. The results showed major differences in the acid, base, neutral nitrogen, saturate, and aromatic portions of the four oils.

Project Gasbuggy was the first experiment in the Atomic Energy Commission's Plowshare program to test the feasibility of creating economic natural gas production from low-permeability reservoirs. The experiment was a cooperative endeavor of AEC, the Department of the Interior, and industry. Production tests at Project Gasbuggy in northwest New Mexico were completed in November. Estimated gas recovery from the chimney production well shows an increase of at least five times that from conventionally completed wells in this low-permeability area. Similarly, gas deliverability was increased by a factor of six or seven. The Gasbuggy experiment

proved the technical feasibility of nuclear stimulation; however, as expected, there was no commercial application possible for this reservoir. A second experiment, Project Rulison, involved a 40-kiloton nuclear explosive, which was detonated on September 10, 1969, in a moderately deep formation in Western Colorado. Initial production testing after reentry drilling indicated flow rates of more than 15 million cubic feet per day at flowing surface pressures of 1750 psi. Analyses of gas samples collected from the well indicated much lower levels of radioactivity than initially predicted. The potential for commercial use of this gas is favorable.

A method for increasing recovery from tight hydrocarbon reservoirs by injecting and detonating liquid chemical explosives in the formation to create additional flow channels was further developed by a field experiment. The first attempt to employ the explosive fracturing in an oil-producing formation was successfully performed in cooperation with Sun Oil Company. Although detonation of 1,500 quarts of desensitized nitroglycerin damaged the well casing, successful cleanout of the fractured formation was accomplished by using an air-foam technique previously developed by Bureau engineers. Stimulation evaluation is in progress.

(c) Oil shale: Fiscal year 1971, $2,508,000; fiscal year 1972, $2,500,000; decrease, $8,000. The decrease consists of:

Increase (+) or Decrease (-) Amount	Positions	Total Program	Total Positions	Explanation
$-8,000	-1	- -	- -	Due to program savings in public relations and paperwork management.

PROGRAM STATEMENT

Situation: The Department of the Interior, by virtue of its responsibilities in administering the public domain, is custodian of most of the world's largest known hydrocarbon resource--the untapped oil-shale deposits of Colorado, Utah, and Wyoming. Together, these represent 600 billion barrels of oil--about 20 times the amount of domestic proved petroleum reserves--in medium to high grade shales that are reasonably well defined in terms of location and depth. The total resource, although not as closely defined, is estimated to be at least several times this large. The Federal government, with control over 80 percent of this latent energy bank, is obligated to promote orderly, commercial development of oil shale at an early date, particularly in view of the general realization that the Nation is facing an unprecedented task in meeting its energy needs of the foreseeable future. Equally important obligations are to ensure an equitable return to the public in the case of deposits in the public domain and to take whatever steps are necessary in all cases to safeguard against unacceptable environmental damage. How well Government fulfills these obligations will depend to an important degree not only upon the current fund of technological information but also upon the adequacy and timeliness of updated information on a continuing basis as mutual guidance to both Government and industry in making the critical decisions and commitments that will be required to bring oil shale into the energy market in an acceptable manner.

For some years the evidence has been becoming increasingly clear that shale oil, as well as other supplemental liquid fuels, will be critically needed in increasing amounts after about 1980 to satisfy our rapidly growing needs. Without such supplements, one or both of two less desirable alternatives almost certainly must be accepted: Sharply increased reliance upon imported oils, with marked sacrifice in national security, and/or disregard for rapid acceleration in the real price of domestically produced petroleum. To illustrate, during only the past three years, proved domestic liquid petroleum reserves have declined by 2 billion barrels to a level at the start of 1970 of 37.8 billion. Over the same period, the real wholesale price of crude oil has increased on the average by about 7 percent as annual domestic production increased by only about 0.5 billion barrels. Over the next ten years, it is estimated that total petroleum liquids demand will increase from approximately 5.3 billion to 6.7 billion barrels per year and by 1985 will reach 8.0 billion barrels per year. In other terms, the expected cumulative demand over the next 15 years is about 105 billion barrels, approximately the total amount of domestic oil produced over the last century.

Even optimistically, our oil-shale resources alone cannot be expected to solve the Nation's future energy problems. However, they can provide an added measure of domestic self-sufficiency, can help to keep the future cost of energy at reasonable levels, can support an environmentally attractive domestic industry of considerable magnitude and national economic implication, and can even provide certain by-product values of major concern such as alumina. Continual technologic advancement is a key factor in reaping these benefits. The inevitable time lag between research and development and commercial realization clearly indicates the need to carry through with today's R and D phase as rapidly and effectively as possible if we are to meet the anticipated schedule of tomorrow's needs.

Objectives: The Bureau's oil-shale program is dedicated to the generation of reliable and timely scientific and engineering information concerning the resource itself and means of beneficially utilizing it. Two closely related objectives are served. The first is to provide the technical basis needed by Government in establishing policy and administering a sound program for development of the Nation's major oil-shale resources, with emphasis on safeguarding the public interest in the 80 percent held in trust. The second is to stimulate the start and subsequent growth of an efficient, technically-sound, oil-shale industry, meeting high environmental standards, to help provide the rapidly growing energy needs of the Nation at minimum cost and with maximum security.

Advancing Oil Shale Technology to Meet Increasing Energy Requirements: $545,000 (decrease, $1,000)

This element of the oil shale program includes both evaluation and modification of shale oils for energy purposes and for chemical utilization.

The objectives of the evaluation of shale oils are the development of adequate characterization techniques, the application of the techniques, the interpretation of the resulting data to relate shale oils to future needs in the United States for fuels and chemicals, and exploration of the possible environmental impact of shale-oil use. Present emphasis is on characterization of oils produced by retorts simulating in-situ retorting conditions to determine the effects of changing retorting parameters to optimize recovery, as well as evaluation of oils produced by actual in-situ retorting experiments in western Wyoming. Present indications are that oil quality can vary markedly depending on the retorting method used. Spectroscopic research aids in the development of control techniques for evaluating the quality of products. It also directly supports each of the other research projects on oil shale and shale oil by developing and providing the techniques for evaluating the product of a process or an experiment.

The objectives of shale-oil modification research are to develop methods for treating shale oil and its fractions to remove undesirable constituents such as sulfur and nitrogen, thereby rendering them more suitable for use; to alter the composition and shale-oil naphthas to make them more suitable for motor fuels without additives; and to evaluate treated and untreated shale oil fractions as suitable source materials for chemicals and other useful products.

Protecting the Public Oil Shale Interests: $501,000 (decrease, $1,000)

A major thrust of this element is to obtain reliable, timely, information concerning the in-place nature of the Nation's vast oil-shale resources, with emphasis on the Green River Formation of Colorado, Utah, and Wyoming. Working with representative samples from selected geographic and stratigraphic locations, characterization data are developed concerning both the mineral matter and the organic content of specific deposits. Concurrently, information concerning the physical characteristics of the in-place deposits is obtained by logging and other formation evaluation procedures and by detailed examination of core samples. Such data are interpreted and correlated to provide sound, widely applicable bases for Government in establishing oil-shale development policies and administering the lands held in public trust, and for both Government and industry in assessing the suitability of deposits for particular means of development and utilization such as in-situ processing versus aboveground retorting. On a broader scale, this research provides a basis for defining the inherent technologic and economic potential of oil shale as a timely source of energy to help supply the Nation's rapidly growing needs.

Work also will be conducted to define the extent to which dawsonite, nahcolite, and possibly other "sodium minerals" associated principally with certain oil-shale deposits of the public domain may favorably affect commercial development of such deposits. These minerals, although known only in recent years to occur in material concentrations in oil shale, are potential sources of large quantities of by-

product alumina and soda ash or closely related soda-type products. The Bureau's efforts are designed to investigate processing possibilities on a small experimental scale and to estimate the pertinent economics as a guide to Government in setting policy affecting use of the lands to assure a fair public return and to encourage industry to advance the technology to a viable stage.

Controlling Pollution and Managing Wastes in an Oil Shale Industry: $1,454,000 (decrease, $6,000)

Work will be continued on field, bench, and laboratory scales of in-situ retorting. In comparison with aboveground processing, in-situ retorting is inherently attractive from the standpoint of posing minimal problems of waste management as the need for control and disposal of large quantities of retorted shale is obviated. The in-situ approach also offers technical and economic promise, particularly in reference to much of the oil shale on Federally administered lands where a high proportion of the resource occurs in deposits that because of such factors as depth of burial or grade of shale are not amenable to economic development by presently known mining and retorting methods. However, in-situ processing technology is yet in its infancy. The Bureau's efforts are designed to help advance the technology to the stage that the pertinent environmental, technical, and economic factors can be adequately judged and in the ultimate interest of expediting development in an environmentally attractive manner of public and other oil-shale lands that are especially well suited to in-situ processing.

One concept of preparing a deeply buried oil shale deposit for in-situ processing involves underground detonation of nuclear devices to create a permeable mass of broken shale that would be amenable to retorting. Bureau work now underway and to be continued includes tests using two retorts holding 10 and 150 tons, respectively, of ungraded oil shale similar in size range to that which would be anticipated to occur in the rubble column of a nuclear chimney. The effects of retorting variables on quantity and quality of the oil products will be determined, and means of optimizing retorting of shale mixtures containing pieces weighing as much as 5 to 10 tons and on down to pebble size will be emphasized. If agreement is reached between Government and potential industry participants to conduct an experiment on the nuclear fracturing of oil shale, technical assistance will be provided by reprogramming to assist in planning and conducting the experiment.

A second approach to preparing a deposit for in-situ retorting involves fracturing by more conventional means such as application of hydraulic pressure and use of ordinary explosives. In this area, the Bureau will conduct field tests at depths as great as 500 feet to establish adequate fracturing techniques preparatory to actual retorting tests at such depths. Concurrently, results obtained in a relatively shallow retorting and recovery experiment being conducted during Fiscal Year 1971 will be evaluated, and techniques for optimizing resource recovery will be developed.

The in-situ engineering operations will be supported by research to determine the behavior of oil shale under simulated in-situ retorting conditions, to relate physical properties of shales to experience in actual field tests, to ascertain the mechanism of heat flow into shale and to study the decomposition of organic material and the movement of oil from shale through fracture channels simulating conditions in a nuclear or conventional in-situ process.

A closely related objective of this program is to anticipate, and to develop means to prevent, possible environmental problems from developing when oil shales are utilized for the production of energy. Initial objectives of this research are to: (1) Study methods for treating spent shale dumps resulting from above-ground retorting, to reduce wind and water erosion and to reduce their deleterious effects on environment and ecology; (2) determine the composition of waters resulting from the retorting of shales by above-ground techniques and by in-situ methods; (3) develop methods for removing or reducing to harmless levels major contaminants, both inorganic and organic, so that the retort and process waters

may be suitable for either reuse or environmentally acceptable disposal; (4) quantitatively determine the composition of above-ground retort gases to discover whether environmentally harmful levels of smog-forming pollutants such as NO_x or toxic gases such as SO_2 and CO are emitted; and (5) devise and demonstrate methods for restoring the relatively small amount of land surface degradation associated with in-situ processing to an environmentally attractive condition.

EXAMPLES OF RECENT ACCOMPLISHMENTS

Evaluation of Colorado's oil shale resources was greatly facilitated by publication of Report of Investigations 7357 in which the Bureau developed a geologic framework for interpreting data related to deposition of oil shale and other minerals, including nahcolite and dawsonite, in the Piceance Creek Basin. The report is based on detailed examination of samples from 16 cores. Distributions of nahcolite and halite zones are shown graphically along with oil yield plots and well logs along three cross sections transecting the basin. This report is based on many years of Bureau work in the Piceance Creek Basin and represents a major accomplishment of that research.

Noteworthy accomplishments in research directed toward prevention of environmental pollution by retort waste waters and spent shale included development of a procedure for selectively removing both mineral and organic contaminants from retort water. Waters from gas combustion retorting, aboveground batch retorting, and in situ retorting were used. Detailed analyses of the contaminants present were obtained. The same contaminants occur in all retort waters, but in varying amounts depending on the retorting method. Of particular interest, ammonia may be present in sufficient amounts to be recoverable as a valuable byproduct, concentrations being found equivalent to 25 to 54 tons-per-day from an oil shale plant processing 100,000 tons of shale per day, based on the Bureau's results with gas-combustion retorts.

Encouraging progress is being made in the Bureau's field-test project on in situ retorting of oil shale near Rock Springs, Wyoming. In a test starting in September of 1970, ignition was successfully accomplished at a depth of about 140 feet near the center of a site covering approximately 55,000 square feet as compared to a depth of only 70 feet and an area of 10,000 square feet in earlier work. Also differing importantly from the preliminary test, the current one involved only minimal fracturing of the formation as a preparatory step. Early results indicate that retorting can be sustained without material difficulty under the relatively severe physical conditions. However, efficiency of the test, which may extend for more than a year, can not yet be predicted.

Three runs have been completed with a 150-ton retort being used for studying the retorting characteristics of random-sized pieces of oil shale characteristic of in situ processing. It has now been demonstrated with certainty that massive chunks weighing more than 5 tons can be completely and readily retorted in mixtures containing pieces ranging from this size down to pebble size with overall yields in excess of 60 percent. Significantly, most earlier "paper studies" of the process have assumed 50 percent yield as a basis. Additional tests in a planned series of ten runs are expected to completely define the yield potential as a function of operating conditions, with a target based on earlier, smaller-scale work of at least 80 percent yield.

(d) Metallurgy: Fiscal year 1971, $12,959,000; fiscal year 1972, $13,550,000; increase, $591,000. The increase consists of:

Increase (+) or Decrease (-) Amount	Positions	Program	Positions	Explanation
(1) $+500,000	+17	$1,103,000	58	Expand urban refuse separation research and design a demonstration facility.
(2) +138,000	- -	359,000	- -	To reimburse the employee compensation fund for payments related to injury or death of employees.
(3) -47,000	-3	- -	- -	Due to program savings in public relations and paperwork management.
+591,000	+14			

COST FACTORS INVOLVED IN INCREASE

(1) 17 permanent positions, $225,000; travel and transportation, $4,000; rent, communications, and utilities, $6,000; other services, $230,000; supplies and materials, $8,000; equipment, $27,000.

NEED FOR INCREASE

(1) Minerals and Metals From Urban Wastes: The Bureau of Mines has been successful in pointing the way to improvements in urban waste treatment and disposal procedures. On a laboratory and small pilot plant scale, it has been shown that a number of valuable metal and mineral constituents can be recovered for return to the economy. The increase of $500,000 is requested to enable investigations of the higher level of effort that is necessary for completion of the research. Some of the separation techniques require additional refinement. The entire system must be convincingly demonstrated to industry and to state and local governments.

Major emphasis will be focused on recovery and utilization of substantially all of the component parts of raw refuse. In the program to date, chief attention has been given to scrap that has been incinerated and to household-generated scrap used as incinerator feed. For a broader scope, the work includes development of processing methods for refrigerators, stoves, and other large appliances. A closer examination will be made of the problems presented by trash from industrial and commercial operations such as small manufacturing plants and produce markets.

Vacuum distillation and special smelting techniques will be perfected for the mineral and metal materials recovered. Adaptations of metal purification methods are required to treat the mixed nonferrous produce to yield marketable aluminum, zinc, lead, tin, gold and silver components. Hydrogenation and controlled pyrolysis methods will be used to convert organic fractions of the feed into carbon and combustible oils. Designs will be initiated and preliminary plans will be laid for construction and operation of a model municipal reclamation complex for demonstration of the total waste systems management concept.

(2) Employee Compensation Payments: The increase of $138,000 is needed to provide funds to reimburse the employee compensation fund for payments made because of the injury or death of employees under the jurisdiction of the Bureau of Mines as required in Section 209 of Public Law 86-767.

PROGRAM STATEMENT

Throughout history, the development of civilization has been founded on the production and utilization of minerals. Buildings are taller, roads smoother, communications faster, agriculture more productive, labor lighter, and the future brighter because minerals and their products have been, and continue to be, adapted to man's use.

Maintaining an adequate supply of mineral raw materials to meet the world's burgeoning demands, however, entails inherent costs and problems. As world population expands, foremost among these problems are those pertaining to adverse sociological effects and degradation of the environment. Unfortunately, practical methods for solving all of the problems contributing to air, water, and land pollution have not been developed. For numerous reasons--lack of incentive, inability to obtain short-range returns on research investment, lack of research tradition--in the minerals industry, as in the agricultural industry, the amount of organized private research undertaken is inadequate. As a result, minerals technology has notably failed to keep pace with advances elsewhere in the economy.

Many governmental programs in the past have been directed only to assuring an adequate supply of mineral raw materials to satisfy the demands of the Nation. Often such programs have taken the form of direct assistance to industry through tariff barriers, tax incentives, and stockpile programs. Under present day circumstances the one alternative for Government action that offers solutions to the problems of accommodating material requirements without unacceptable social and environmental costs is vigorous promotion of technological advance. This role of Government has been recommended by all objective investigators of the long-range mineral supply situation, and has been heartily endorsed by Congress, the Director of the President's Office of Science and Technology, and the Secretary of the Interior.

In conformance with its charter from Congress, the Bureau of Mines conducts inquiries and investigations concerning mining and the preparation, treatment, and utilization of mineral substances. Included is a creative program of metallurgical research and development aimed at providing the scientific and technical information necessary to encourage and stimulate the nonfuel minerals production industry to make rapid advancements in technology.

PROGRAM OF WORK

Advancing Minerals Technology: $4,960,000 (decrease, $16,000)

In the broadest sense there are enough mineral raw materials available in the earth's crust to satisfy man's total needs. There is only a limited amount, however, that can be recovered at acceptable material and environmental costs by today's methods. Macroimprovements in technology must be effected to avoid stringent limitations of the standards of living of all nations within this century.

In the United States there is an urgent need for economic methods to recover minerals and metals from ore bodies of progressively lower grade. There is a need to create and demonstrate new and nonstandard methods of recovery--methods that will maximize efficiency and minimize pollution. There is a need to adapt for wider use mineral materials that are abundant and to devise substitutes for those minerals that are relatively scarce.

A major segment of the Bureau's metallurgy program is directed to meet these needs.

Investigations are diverse and far-ranging in scope. For example, included is work on the use of ferromagnetic fluids (with variable apparent specific gravities) that, if successful, will revolutionize the physical separation of minerals and help decrease water consumption in mineral processing. Also included is in-place leaching and the so-called chemical smelting of copper ores--hydrometallurgical treatment in a closed system--for a more efficient recovery without atmospheric contamination. Methods are being investigated to devise a highly efficient, low capital cost, steelmaking process and to reduce the electric energy requirements for producing aluminum. Investigations also focus on recovering, by physical or chemical means, various minerals or metals from low-grade domestic resources: silver, nickel, vanadium, copper, gold, titanium, magnesium, rare earths, and phosphate rock. Of particular note is work devoted to devising a method to make titanium chloride (a feedstock for both paint and titanium metal) from the mineral ilmenite, which is plentiful both in the United States and abroad. Titanium chloride is made only from rutile, a mineral with extremely limited world reserves.

Conservation of our mineral resources also includes making better use of them when they are exploited--making materials that do a better job and last longer. This phase of the program is directed, in part, toward overcoming the major losses that are inflicted on the public by corrosion--$14 billion a year at last count. Another part of the work is aimed at conserving supplies of alloying metals by devising stronger alloys that will allow the use of less metal for any given application.

Effecting Pollution Abatement and Waste Management: $3,611,000 (decrease, $12,000)

Mineral conservation, clean air and water, and the elimination of unsightly mineral waste dumps in this country are goals to which the Federal Government must continually strive if it is to fulfill its commitments to the public. The minerals industry is making notable progress in developing methods for controlling or avoiding pollution, but much remains to be done. The resources of industry alone are not sufficient to do the job. The combined efforts of industry and Government are needed to solve the myriad problems that face the Nation. For many years, the Bureau of Mines has actively sought ways to stem the increasing volume of pollutants originating in the minerals industry and, simultaneously, to conserve our Nation's mineral resources.

Current research in this area encompasses development of new or improved methods for removing identifiable pollutants from the off-gas streams and liquid effluents of mineral process plants. A secondary objective is to conserve the Nation's mineral resources by developing technology for efficiently recovering the valuable constituents in mineral processing wastes. Research is underway for finding an effective and economical method for removing the sulfur oxide emissions from smelter stack gases. Two processes are under investigation which produce elemental sulfur rather than sulfuric acid to allow easy shipment or storage. One process is based on liquid absorption and is well advanced. The other process employs catalytic gaseous reduction to remove the sulfur oxides. This technique has potential of being equally useful for removing from process gas streams additional undesirable gases such as the nitrogen oxides that produce photochemical smog.

Elimination of air pollution from the internal combustion engine and from the burning of fossil fuel may ultimately depend upon replacement based upon the development of efficient, low cost fuel cells for producing electrical energy. Present fuel cell systems are neither efficient nor economic because the catalytic agents required to make the performance of these systems competitive with conventional energy sources have not been developed. Rare earth metals and compounds are extremely versatile catalysts that may permit the successful development of these systems. Therefore, the Bureau of Mines is initiating a study to determine the potential of catalytic materials for emission-free energy uses.

Reclaiming valuable materials from mineral processing wastes has a two-fold advantage. It salvages useful minerals that otherwise would be lost; it partly offsets the cost of disposing of waste in a socially acceptable manner. A major effort is, therefore, directed to this goal. Of special note are studies to improve recovery of copper from mine overburden; to devise an economic method for use of nonmagnetic taconite ores in iron and steelmaking; to recover fluorine from phosphate fertilizer process streams; to reclaim alumina from papermaking waste.

As a contribution to the improvement of water quality, increased emphasis is being placed on the development of effective, fool-proof, methods for removing dissolved chemical compounds such as those of mercury, uranium, cadmium, and cyanide from industrial process water.

Protection of Public Interests: $1,226,000 (decrease, $4,000)

Government has a special responsibility to undertake programs which promise an assurance of broad social benefits or which promise improvements in public services --better quality, greater safety and reliability, or more efficient expenditure of the tax dollar. Consequently, one phase of the metallurgy program encompasses studies directed to development of construction materials for safe transportation of people, chemicals, and fuels.

The general public is becoming increasingly aware that the individual citizen's safety is not something over which he has sole control. Modern aircraft can carry more than 300 people, all dependent on pilot skill, efficient airways control, and sound aircraft construction for their safe transportation. The failure of any aircraft construction material, such as an airframe member, can have catastrophic effects. Public safety may also be endangered when pipelines or transport containers rupture and release noxious, poisonous, or explosive gases and dangerous chemicals. Dangers exist for persons near many mineral or chemical processing industries from explosion or accidental release of hazardous materials. Only through research will some of these problems be solved to the satisfaction and safety of the general public.

The Bureau of Mines is addressing its research capabilities to development of materials that will reduce the hazards in transportation and in the storage, shipment, and use of dangerous chemicals. One such investigation involves improvement of a high-strength titanium-base alloy which is an important component of jet aircraft. The production and refining of titanium before fabrication is a relatively new and sophisticated metallurgy. Unfortunately, for several years titanium ingots and products have contained localized defect regions that are not detectable by the known methods of inspection. The effects are rare by some standards, but their effect is super-critical as they may cause catastrophic failure. A single defect in a jet engine turbine blade has the potential for destroying the entire plane and its passengers. In past research the defects have been characterized as nonhomogeneous and their occurrence attributed to sponge-making and the subsequent melting practice. The objective of present work is to overcome this shortcoming in processing technology. Unless this goal is obtained, the advantages of using titanium will be restricted or the threat to public safety will continue to increase. In another transportation-related study, the Bureau will continue its development of safe, lightweight natural gas storage systems for gas powered, pollution-free automobiles. Conventional high-pressure storage cylinders constitute a distinct safety hazard because, in the event of an accident, release of the natural gas under pressure could turn the storage cylinders into dangerous projectiles, or, if ignited, produce explosive combustion. Results of preliminary study indicate the feasibility of using various naturally occurring minerals as absorbents for storing natural gas in low-pressure tanks.

As part of the Bureau of Mines' continuing role of assuring the safety and well-being of mineral industry workers and of the general public, research for finding safer alternate mineral processing technology will continue in 1972. For example, a process for recovering mercury from sulfide ores that eliminates the roasting

step of conventional processing will continue to receive attention. This process greatly reduces the dangers of mercury poisoning of workers in the roasting process and also eliminates the production of sulfur dioxide, an atmospheric contaminant.

Other studies, such as those involving beneficiation and processing of Western phosphates, beneficiation of potash (New Mexico), recovery of nickel from gabbro ores (Minnesota), leaching of soda from oil shales (Colorado), and processing brine to recover dissolved tungsten (California), yield information useful to the Government in fulfilling its role of overseer of mineral development on public lands.

Improving Mineral and Metal Recycling: $3,394,000 (Increase, $485,000)

Recent assessments of the future production of mineral resources to meet projected U. S. demands range from sobering to alarming. A way to meet part of the demand while effecting a reasonable degree of conservation is to increase the portion obtained by recycling minerals and metals. The scrap industry has already partially closed the metals loop. The contribution of scrap to major metal production is about 50 percent for iron, lead, and copper and nearly 20 percent for aluminum, with significant contributions of silver, gold, zinc, and tin.

With the objective of tightening the recycling loop more, the Bureau of Mines has mounted a two-pronged attack on increasing the proportion of mineral demand that is met by recycling. Investigations are aimed at (1) improving the technology necessary for efficient separation and utilization of secondary materials, and (2) recovering the valuable constituents from scrap sources now being discarded.

The first portion of the work includes development of efficient recovery of the ferrous and nonferrous components of scrap automobiles and appliances so that all of the metals can be effectively recycled. Nonmetallic and nonferrous rejects from automobile shredding operations are being generated at the rate of about one million tons annually. Aluminum, copper, zinc, and lead constitute about 30 percent of this reject. The Bureau is investigating techniques for recovering these valuable nonferrous metals that presently are being wasted. Other investigations are in progress to develop methods for converting low-grade steel scrap into pig iron and high quality steels; improve the electric furnace steelmaking technology to permit greater recycling of ferrous scrap; study effective means of recovering valuable precious metals in electronic scrap and solders; economically recover and reuse titanium, aluminum, magnesium, zinc, and other nonferrous metal scrap; and devise new procedures for returning steelmaking and foundry dusts back into the primary metal cycle.

In the second approach to recycling--untapped sources--the Bureau is developing methods for recovering mineral and metal materials from urban wastes. Each year municipalities across the United States collect and dispose of 200 million tons of household, commercial, municipal, and industrial solid wastes. Disguised as waste, the ordinary household and commercial refuse collected annually contains 10 million tons of glass. In addition, the energy value in these two wastes alone is equivalent to the heating value of 60 million tons of coal. All of these values are presently buried in landfills and lost.

Major goals of the proposed program are to develop capability and technology to extract, process, and reuse the metal, mineral, and energy values from all of the solid wastes generated by a large urban area. Work in this area includes sampling and characterization of incinerator residues and raw refuse from additional locations to develop standard procedures and to establish priority needs and objectives. Additionally, data are being obtained for complete materials and energy balances on which to base engineering designs of reclamation systems. Methods are being explored to improve the quality of concentrates and the recovery efficiency for separating metals and mineral materials from municipal incinerator residues and, especially, raw refuse. A significant effort is directed to refining and upgrading the metals and developing uses for the various components.

Employee Compensation Payments: $359,000 (Increase, $138,000)

The $359,000, an increase of $138,000 over 1971, is to provide funds as required by Section 209 of Public Law 86-767 to reimburse the employee compensation fund for payments made because of injury or death of employees under the jurisdiction of the Bureau of Mines.

EXAMPLES OF RECENT ACCOMPLISHMENTS

Research by the Bureau of Mines has led to the development of a process to remove sulfur dioxide from copper smelter stack gas emissions. An independent review, made by a major copper concern, of over 50 proposed techniques for removing this undesirable byproduct has resulted in the selection of the Bureau process for pilot plant testing and evaluation. The abatement of air pollution caused by base metal smelter emissions is of vital concern to Federal, state, and local authorities. The Bureau process, now being tested near Tucson, Arizona, utilizes a citric acid-sodium citrate solution to remove the sulfur dioxide. Elemental sulfur, a product easily stored and free from air pollution problems, is recovered from the processing solution by precipitation with hydrogen sulfide. Laboratory studies indicated that removal of over 95 percent of the sulfur in the initial waste gas could be expected.

Last year, the Bureau reported on the design, construction, and testing of a practical, smokeless junk car incinerator. During the past year, several thousand cars have been burned successfully in the facility which has been operated as an integral part of a commercial scrap processing yard. Interest in the development has been extremely high and hundreds of requests for detailed plans on the incinerator have been received. Several firms have started design and construction of incinerators based on Bureau plans and operating data. An interesting example of technology transfer is that one company has requested Bureau assistance to design an incinerator for burning old railroad cars.

An electrolytic process for extracting mercury from its ores was developed which permits elimination of the conventional high-temperature roasting of ore and the subsequent air pollution and health problems associated with furnace operation. The new laboratory electrooxidation process permits almost complete recovery of mercury from ore containing less than 2 pounds of mercury per ton. This low-grade ore can not be processed efficiently and economically by traditional methods. Successful commercial adaptation of the laboratory process, now pending by several firms, is estimated to make available an additional $230 million of mercury to the domestic supply.

During the past year the Bureau has successfully operated a continuous process for separating and recovering the mineral base materials such as tin cans, iron products, aluminum, copper and glass from municipal incinerator residues. The process, which treats incinerator residues in much the same manner that minerals are separated from their ores, has attracted wide interest from almost every segment of industry. Representatives of several large steel companies, nearly all of the primary aluminum and glass-producing companies in the United States, and numerous Federal, State, and municipal governments, have visited the Bureau-operated pilot plant. They have generally expressed the opinion that the process offers one solution to the urban refuse disposal problem. The Bureau also has under development a process to recover waste paper and plastics and metals from refuse without prior incineration.

Uranium contained in waste mill tailings, mine waters, and in low-grade ores remaining in mined-out areas can now be economically recovered as a result of a Bureau of Mines developed process. A counter current ion exchange resin process for extracting uranium from natural or manmade solutions has led to the recovery of thousands of pounds of additional uranium per month from sources which were pre-

viously considered to be waste, and were potential pollutants of local water supply systems. The technology has been adapted by several uranium firms with a net increase in their respective metal production.

An improved heap-leach cyanidation method to recover gold from low-grade ore has been developed in the laboratory and tested in the field. One gold mining company was able to increase its production rate by 700 ounces per month from a small leaching operation, recovering 60 to 70 percent of the gold content from ore which would have not been possible to process by standard technology. Adaptation of the technology to other gold mining operations is underway.

Recovery of valuable metals from electroplating waste solutions, while simultaneously making the solutions suitable for discard without pollution of water systems, was made possible by a new Bureau-developed process. Several waste solutions were selectively blended prior to disposal resulting in nearly total recovery of the valuable metals and cyanide compounds, and yielding a relatively harmless aqueous effluent that meets most water quality standards.

A low-cost method to make magnetic samarium-cobalt alloy materials from abundant rare-earth resources was developed. The rare earth-cobalt alloys are 50 to 150 percent stronger than other permanent magnet materials and have up to 5 times the capability of retaining the magnetic characteristics over extended periods. Such alloys will lead to development of electric motors only one-fourth the size and much lighter than present motors having the same horsepower capabilities.

The Bureau of Mines in recent years has made excellent progress in solving problems associated with solid mineral wastes. Surveys have identified many of the existing wastes and characterization studies have provided much information and data on their nature. Laboratory scale studies have indicated that many of them can be utilized to make commercially attractive structural materials. Efforts to stabilize copper and uranium mill tailings piles have been highly successful. Large acreage chemical and vegetative tests have shown that the Bureau-developed methods alleviate air and water pollution effects associated with such wastes. Six major base metal mining companies have requested Bureau advice and technical aid in stabilizing mill tailing wastes associated with their operations.

Industry has accepted a Bureau developed process for obtaining high-grade concentrates from Michigan nonmagnetic taconite ores. A major mining company is arranging financing for a 3½ million ton plant to make iron ore pellets suitable for steelmaking. The new plant technology includes a process developed by the Bureau of Mines under cooperative agreement with the concern. The anticipated plant will employ about 600 workers when in operation; a significant contribution to the economy of a low employment area in Michigan. Successful operation of the first plant could lead to construction of several others.

An improved flotation process has been developed in Bureau laboratories for recovering fertilizer products from high-clay potash deposits above current underground operations on Federal land near Carlsbad, New Mexico. Even though these deposits can not be commercially processed at present, they represent the major future source of potash for the United States as the high-grade, low-clay potash beds are rapidly being depleted. The Bureau-developed process will be tested by several potash producers in continuous pilot plant operations. Successful tests for these ores will lead to increased reserves by well over one-half billion tons, extend the life of the domestic operations, and maintain royalties to the Federal Government.

Taconite iron minerals suitable as feed for electric furnace steelmaking operations have been produced by a flotation-screening process developed by the Bureau. Previously taconite concentrates could only be fed to the blast furnace, but by reducing the silica content of the concentrates from 6 percent to less than 2 percent, the Bureau process extends the estimated potential for taconite ore an additional 6 million tons annually.

(e) Mining: Fiscal year 1971, $7,940,000; fiscal year 1972, $4,900,000; decrease, $3,040,000. The decrease consists of:

Increase (+) or Decrease (-) Amount	Positions	Total Program	Total Positions	Explanation
(1)$-3,010,000	-105	- -	- -	Methane control program consolidated with methane work under Health and Safety Research, Health and Safety Appropriation.
-30,000	-2	- -	- -	Due to program savings in public relations and paperwork management.
-3,040,000	-107			

PROGRAM STATEMENT

The Bureau has the responsibility of maintaining the knowledge and capabilities in mining technology needed to meet long-range as well as urgent immediate problems of national scope where the solution is beyond the capabilities or immediate interest of the industry. The long-range problems are directly related to the overriding concern with the vast quantities of minerals and metals that must be mined to meet the Nation's increasing demands. This must be accomplished in light of environmental constraints placed on the mining process. Immediate urgent problems frequently fall in the category of developing early solutions to avoid consequences of past and present practices as evidenced by acid mine water, uncontrolled and unplanned subsidence, and subsequent surface damage. These consequences have resulted from our past failure to consider environmental problems in the development of a mining technology. The Bureau must also maintain an adequate and continually improving base of research and development in mining to provide new technology as required, including the ability to meet the needs of a national emergency.

Much of the mining technology as now applied by the industry is predicated on the use of air, water, and land as "sinks" for the disposal of mineral wastes. With the constraints imposed by the need for pollution control and with continued depletion of the higher-grade, near-surface ores, the ability to supply our increasing mineral requirements from domestic sources with present technology is rapidly approaching its limit. If we are to maintain an adequate domestic source of minerals and fuels and the capability to mine without unduly disturbing or distorting the environment, new concepts and innovations in mining are essential. Protection of the environment through regulation alone would discourage private investment in mining and cause severe disruption to the Nation's future mineral supply.

Objectives: Basic objectives are to develop continually improving extractive systems through technological advancement of the total mining process. The health and safety of industry workers and the preservation of environmental values are integral parts of these objectives. The program is also designed to maintain a competence for conducting fundamental studies and for concentrating effort on special research and development that become essential in the light of immediate or anticipated national needs. This competence also provides the ability to properly program, monitor, evaluate, and correlate research that can be more expeditiously accomplished under contract with universities and those elements of industry that are suitably equipped.

PROGRAM OF WORK

The fiscal year 1972 program proposes efforts in areas for which research to date has indicated an urgent need, an opportunity for significant contribution to mining technology, and a high probability of success.

Improving Extraction Technology: $2,773,000 (decrease, $30,000)

A continuously improving mining technology is essential if the Nation's increasing demands for minerals are to be met from lower grade and less accessible resources at reasonable consumer prices, and in ways that provide maximum safety to miners and the public and assure environmental quality. The improving extraction technology program is aimed at achieving this objective in the essential elements of mining on which a total system is based.

Control, stabilization, and support of the ground around mine openings is fundamental to any mining operation and is critical in its influence on surface damage, environmental contamination, and total recovery of minerals as well as on safety and productivity. Research will continue to determine the optimum means of using mine wastes for underground fill, preventing collapse of mine workings, and providing design criteria for efficient, safe, and socially acceptable surface disposal of mine wastes. This process will serve the dual purpose of minimizing subsidence and lessening surface disposal and disturbance. Basic studies will continue to relate design of underground and surface excavations to geologic structures, rock deformation, and changes in stress associated with mining.

Breaking of rock is a basic step in any mining operation. The methods used influence potential damage to nearby surface and structures and directly affect choices and efficiency in other phases of the mining operation and in the extent of milling required. Research will be continued on methods to predict rock breakage mathematically, to relate blasting techniques to degree of fragmentation, and to determine seismic effects of underground blasting.

The loading and movement of materials associated with mining is a major factor in safety and efficiency. Efforts to relate properties of fragmented rocks to physical principles governing their handling represent a Bureau-pioneered research area in which work will be continued. Results from this research will contribute significantly to the design of safer and more efficient loading and haulage equipment.

Key elements in developing improved extraction systems are the capability to evaluate a mineral deposit accurately and design an extraction system on a sound engineering basis. Research will continue to develop improved techniques for determining values and properties of mineral deposits, improved methods of modeling deposits, and improved techniques for designing and evaluating mineral extractive systems. This will involve the application of operations research and advanced computer techniques.

Advancing Mining Technology For Marginal Resources: $1,927,000

Significant resources critical to our national needs exist within the Nation that can be termed marginal because of sociologic, environmental, or technologic, problems. The Bureau's mining research effort in this area will be directed toward identifying and solving these problems so that these marginal resources are elevated to the status of minable national reserves.

Marginal resources occur in nature in a variety of configurations and sometimes under conditions which make mining by so-called conventional techniques difficult, if not impossible. Configuration can vary from extremely large, low grade types at depths not amenable to surface mining techniques through numerous small, high grade type deposits which are not recovered because of technologic problems in

fragmentation, grade control or delineation, materials handling, ground control, waste disposal, or costly consequences of mining such as uncontrolled subsidence or pollution of surface and ground water.

Typical of such deposits where advancement of mining technology would convert a marginal resource to minable national reserves are the native coppers of upper Michigan, the deep seated silver deposits occurring in several western States, the deep porphyry coppers of the Southwest, the vast deposits of oil shale, and other large low-grade deposits of copper, lead, zinc, silver, and iron which occur in several areas of the Nation and which are too deep to be considered for recovery by surface techniques.

Although not a primary objective, technologic advances through research such that a mining industry is revived in many now economically depressed sections of the country would be extremely beneficial.

Emphasis in research during F.Y. 1972 will be directed toward the following:

New and improved methods of fragmentation, deposit delineation, and grade control which are the critical elements of any mining system applicable to the Michigan native copper deposits; and

Improvement of induced caving methods through better understanding and subsequent control of caving mechanisms. Completion of such research will result in better design to optimize the number of openings for maximum ore recovery from deep porphyry copper deposits.

Applicable to both areas is tne development of better ground support systems which are compatible with restrictions against environmental disturbances such as uncontrolled subsidence and/or excessive ground movement which would result in the loss of overlying minerals. Research has shown that new concepts in ground support such as utilizing the in-place rock as the basic media to create the required support offer significant potential for better and safer mining systems.

In selectively mining deep seated silver deposits, severe ground control, opening design, and materials handling problems exist. Some effort will be expended to define those problem areas most critical in terms of total impact on the mining systems.

Developing Advanced Mining Concepts: $200,000

Current mining practices are characterized by exploiting a mineral deposit until depletion and then moving to another deposit with maximum profit as the predominant motivation. This is acceptable from an individual company standpoint but considering public and long-range national interests, this general approach must and can be improved.

A small, effective program designed to specifically study, develop, and evaluate totally new mining concepts will be continued. The objective is to assure that the Nation's increasing mineral demands are met while assuring compatibility between current and potential technologic, economic, sociologic, and environmental constraints and the mining system.

New concepts will be evaluated on a feasibility basis in the light of applicable constraints whether legislative, implied by public feeling, or dictated by long-range consequences. Comprehensive studies will begin on other uses of mine openings (surface and underground) after mining which are of potential benefit to the nearby society. Technologic problems will be delineated which are serious roadblocks to the ultimate development of totally new and radically different mining systems. Results of feasibility as well as cost studies will be used as a guide for future research.

EXAMPLES OF RECENT ACCOMPLISHMENTS

Feasibility of draining methane gas from coal beds ahead of mining to reduce the possibility of explosions in coal mines appears practical. A series of tests have proven that a coal bed can be hydrofractured using "oilfield" technology in vertical holes that have been properly cased and cemented. By this treatment the flow of gas is substantially increased from low permeability coal beds. Prospects are bright that practical drainage techniques can be developed to remove methane from coal beds in advance of mining.

A capability was achieved for drilling methane drainage holes horizontally in coal beds using simple drilling equipment. Holes have been drilled to a record depth of more than 500 feet. Recently completed field tests show that the Pittsburgh coal bed can be infused with water at rates that warrant further testing of this technique as a means of controlling dust and methane ahead of coal extraction.

A background analysis of the methane-in-gob problem indicates that pneumatically stowed refuse may provide an effective economical method of emplacing explosion-proof barriers to seal off abandoned gob areas of coal mines as decreed by the 1969 Coal Mine Health and Safety Act. Testing and development of design criteria are underway. A feasibility study has been initiated also to determine the potential of sealing gob areas with rigid sodium silicate foam.

An infrared technique using a highly sensitive, direct viewing scanner has been successfully used to detect loose rock in roof or rib in noncoal mines at distances up to a hundred feet. Tests are continuing in both coal and noncoal mines to determine the practicality and reliability under varied operating conditions. Remote detection of loose roof and rib will contribute materially to reduction in accidents from falls of ground. The instrument can also be used for other purposes requiring the ability to differentiate small temperature differences.

A microseismic field study was successful in locating rock burst zones in underground mines weeks in advance of a burst. By controlled blasting in underground mines delineated potential rock burst zones can be de-stressed and yet allow the rock to retain sufficient integrity so that it can be mined by standard procedures. The technique had previously been successfully applied to delineate instability in an open pit slope wall. If a high degree of reliability can be established for this technique, its application can be a significant factor in reducing the danger and cost of both surface and underground mining. Serious rockburst problems exist in deep-seated silver deposits in the Coeur d'Alene mining district in Idaho and in many other mines and will increase with deeper mining. Many coal mines have problems with a similar phenomena and could benefit from development of this technique. A picture of the monitoring equipment is shown on the next page.

A practical and rapid technique was developed for testing the bearing capacity of roof and floor in bituminous coal mines. This information is an essential factor in the decision of whether a longwall mining system can be used and the type of support that will be required.

The experimental activities at the Badger Hill pit relating to the research effort to improve the economic viability of large low-grade heavy metal resources were completed. These experiments demonstrated that even with the best available technology these deposits are not economically exploitable if considered only from the standpoint of recovered gold values. However, a preliminary systems analysis indicates that an operation combining gold recovery, marketing of by-product sand and gravel, and utilization ofthe mine site for disposal of Bay Area garbage would have definite potential.

(f) Marine Mineral Mining: Fiscal year 1971, $290,000; fiscal year 1972, $0; Decrease, $290,000.

Increase (+) or Decrease (-) Amount	Positions	Total Program	Total Positions	Explanation
$-290,000	- -	- -	- -	Program transferred to National Oceanic and Atmospheric Administration in October, 1970.

The marine mineral mining research program has been transferred to the National Oceanic and Atmospheric Administration as prescribed in the President's Reorganization Plan Number 4 of 1970, dated July 9, 1970. In fiscal year 1971, $635,000 was transferred to NOAA to fund marine mining research in that agency after the effective date of the reorganization. 1972 plans appear with those of other bureaus in the Department of Commerce for the 1972 President's Budget.

(g) Explosives: Fiscal year 1971, $693,000; fiscal year 1972, $693,000; no change.

PROGRAM STATEMENT

The Bureau of Mines research efforts on explosives and explosions are directed toward preventing loss of life and natural resources through unwanted fires and explosions. Only through research is it possible to develop technologic data which characterize hazards inherent in production, handling, and use of explosives and other hazardous materials in dangerous environments. From these studies and explosive accident investigations, safeguards are designed to protect the industrial worker and general public. The specialized nature of the work requires unique test facilities and competent personnel knowledgeable in industry related explosives technology. These joint requirements are not generally available in industry or other government agencies.

Increasing needs for minerals and mineral fuels have doubled consumption of commercial explosives in the past 10 years to where usage is about 2 billion pounds annually. New blasting agents and handling systems are constantly being introduced. As the only Federal agency authorized by Congress to investigate commercial explosives, the Bureau provides governmental organizations and industry with authoritative information on the safe handling and use of these potentially hazardous materials.

The Bureau provides both liaison and cooperation with other Federal agencies, such as the Army, Navy, Air Force, NASA, AEC, and Coast Guard. At the request of such agencies of other governmental units, staff scientists participate in investigations of accidents involving explosives and explosive materials. When information required is not available, the Bureau performs cooperative research in accordance with the Economy Act to the extent that its facilities are available.

Objectives: The primary objectives of the explosives and explosions research program of the Bureau of Mines are to provide technologic information and guidance to Federal, state, and local governmental agencies having problems involving: the safe handling and use of commercial explosives and blasting agents; safety characteristics of explosives certified by the Bureau for use in underground bituminous coal mines; hazards of gas and vapor explosions from flammable liquids and/or gases; the hazards from dust and other potentially explosive materials and chemicals of commerce; and the means of controlling unwanted fires and explosions in minerals, mineral fuels and their products.

PROGRAM OF WORK

While the loss of life in underground coal mine disasters has been dramatically reduced over the years, such disasters still happen with disturbing frequency. Face ignitions often develop during blasting operations in underground coal mines, and all such occurrences are potential disasters. Present explosives approved by the Bureau of Mines are believed to be the safest in the history of American coal mining, but there is need for research to continue development of explosives having maximum safety under the most hazardous conditions known to exist. Research must be continued to identify and delineate all the factors contributing to the ignition of flammable gas at the face and the transition from a minor gas explosion to a large-scale gas or gas/coal dust explosion that can be disastrous. More definitive means for assessing the risks of initiating a disastrous mine explosion must be explored. An effort will be made to develop a high-strength, water-resistant permissible explosive which will provide greater safety than those presently available. Such explosives are required for rock work in underground coal mines.

Explosives already approved by the Bureau will continue to be monitored to determine that they are being manufactured to specifications originally approved by the Bureau, and thus continue to meet minimum safety standards.

Since prevention of explosions in a flammable atmosphere is tantamount to eliminating disasters from this cause, basic studies on ignition are being continued. Emphasis will be placed on mechanisms of initiation by high-intensity, short-duration flames coming in contact with a flammable gas/air mixture. Ignition of coal dust by the incipient gas explosion will also be studied.

Increasing consumption of blasting agents based on sensitized ammonium nitrate continues to present problems concerning their safe use in mining operations. Emphasis will be placed on investigating slurry-type explosives because their use is expanding.

Determining and reducing fire hazards in the mineral industries and in industries that produce, transport, and utilize minerals, mineral fuels, and their products is an important aspect of the Bureau's explosives program. Emphasis will be placed on development of more practical methods of inerting closed places which may be subject to an explosion hazard. Work will be continued on mathematical modeling of industrial gas, dust and gas-dust explosions. Fire suppression research will include studies on certain hazardous chemicals for which adequate safety information is not available.

Cooperating with other Government agencies and industries having problems involving explosives and explosion hazards will be continued. The broad experience of the scientific staff of the Bureau will be available as needed for consultation regarding potentially hazardous situations.

EXAMPLES OF RECENT ACCOMPLISHMENTS

Since 1957, the Bureau of Mines has had a program to upgrade safety of explosives used in underground bituminous coal mines. Extensive research on the problem resulted in a Bureau recommendation that all permissible explosive formulations contain approximately 10 percent sodium chloride in order to significantly improve their safety characteristics. During the last fiscal year, six more formulations of granular permissible explosives were converted to the new type explosives. This completes the Bureau program, with all granular permissibles now containing a minimum of approximately 10 percent salt.

Basic research on inhibiting gas/air explosions has shown that four halogenated hydrocarbons, Halon 2402, Halon 1202, Halon 1301, and Halon 1211, are effective in quenching the explosion process. As an example, the addition of only 0.5 percent of Halon 2402 to a hot nitrogen jet used as an ignition source increased the temperature required for ignition of the mixture by 440° F. While still in the developmental stage, the Bureau has high hopes that a halon quenching system that can stop the propagation of gas explosions at the working face in bituminous coal mines will prove commercially feasible. If successful, the technique would also be applicable to other types of gas explosions.

A new 2 ft. diameter, 163 ft. long, explosion testing tunnel was proven to give results comparable to those obtained in full-scale explosion tests in the Bureau's experimental coal mine. This tunnel has been instrumented for measurements of flame speed, pressure and temperature, wall vibration, air velocity and turbulence needed for large scale but low cost investigations of the aerodynamics of gas and dust explosions.

In work for other Government agencies, one project for the Army was to investigate means to decrease hazards encountered from accidental crashes of aircraft. This work has been correlated with work for the Federal Aviation Administration in the development of safer fuels for commercial aircraft. The nature and cause of explosions resulting from hard starts in attitude control engines has been determined for the National Aeronautic and Space Administration. It was shown that thin films of hydrazine/hydrazine nitrate solutions deposited on the walls of the Apollo engine were a principal contributory factor in these accidents. Assistance was provided to a military board in the investigation of a B-52 aircraft ground fire at the Loring Air Force Base, Limestone, Maine. Advice and assistance were provided to the R. R. Donnelly & Sons Company printing plant in Chicago, Illinois, following a paper starch dust explosion in which six persons were killed.

2. Resource Development

(a) Statistics: Fiscal year 1971, $2,207,000; fiscal year 1972, $2,207,000; no change.

PROGRAM STATEMENT

The statistical program of the Bureau of Mines is directed toward the development of a coordinated body of basic minerals data, essential for Government and industry planning and decision making. With the ever increasing complexity and expansion of worldwide economic activity, and a growing demand for minerals, an intensive and continuing appraisal of mineral production, usage, resources and reserves is required. The basic facts to conduct such appraisals come from the Bureau's statistical program. It is the single federal program directed to canvassing for such information. These statistical data to be of the greatest value and to meet the needs of legislators, industry, labor and the public must be accurate, timely, and relate to the broadest possible mineral base. The dissemination of this statistical information is made through the publication of a series of timely releases and special summaries for internal analyses.

PROGRAM OF WORK

The collection, assembly, analysis, and early presentation of data on domestic mineral production, consumption, and distribution will be continued within the levels of funding. Basic statistical data will be obtained through some 200 specially designed forms which are sent to mineral producers, processors, and consumers throughout the Nation. In selected areas, attempts will be made to introduce greater efficiency of operations and to improve the quality, utility, and timeliness of the statistical data. To achieve the goals of efficiency and timeliness, continued emphasis will be placed on the implementation of computer procedures to process additional commodity surveys. Wherever possible standardized processing systems will be utilized. This standard system is so designed as to handle a number of different surveys by a single process.

The standardization of survey forms requesting similar types of information for different mineral commodities also will be continued. Benefits to be derived from standardization include more comparable and comprehensive statistics, a reduced burden on respondents in supplying the desired data, and more timely release of the data.

To make the data collected more responsive to the needs of users, the coverage and detail of commodity data requested from respondents will continue to be evaluated. In achieving this end, the advice and recommendations of Government, industry, and other users will be sought.

Statistics on the minerals sector are often used in conjunction with other data from government sources and it is essential that there be compatibility between the data. To achieve this, discussions with the Office of Management and Budget, Bureau of Census, Tariff Commission, Federal Power Commission, industrial firms, and professional and industrial associations will continue.

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(b) Economic Analysis: Fiscal year 1971, $546,000; fiscal year 1972, $546,000; no change.

PROGRAM STATEMENT

Economic Analysis provides information, analysis and methodological guidance to the decision makers in the Bureau and in the Department. The subject areas covered are the impact of the minerals industries on the economy, the impact of overall economic activity on the country's minerals industries, the impact of international developments on the domestic minerals industries, and the environmental implications of minerals development, processing and consumption. The material prepared is of value to individuals and organizations, public and private, interested in the minerals industries.

PROGRAM OF WORK

The Program provides continuing assistance in mineral economic analysis and periodic advice on a scheduled basis, such as the early warning price memo for the Council of Economic Advisers, the weekly report to the Secretary, and the Review Chapter of the Minerals Yearbook. Other areas in which the Office will have projects are: forecasting, financial analysis and corporate structure, taxation, environmental impact, labor force, international and mineral industry impact analysis, both regional and national. Two forecasting projects are underway, both of them in the area of the demand for finished products which consume large quantities of mineral raw materials. There are several finished products involved and several mineral raw materials; the raw materials to some extent can be substituted for each other. An attempt is being made to give effect to technological development in the production processes of the finished products, to evaluate the effect this will have on demand for the minerals raw materials, and to assess the environmental and ecological effects of such shifts.

A study of the financial status of selected segments of the mineral industries will be undertaken. The initial focus will be on profitability, rate of return, cash flow and related indications of corporate vigor. The ultimate goal is an appraisal of the industries, ability to finance the investments that are needed to sustain the total level of effort in exploration development and production that is necessary to provide a continuous adequate supply of mineral raw materials.

A study will be continued to document and analyze the tax laws applicable to the mineral industries, both in the U.S. and the major producing countries. The goal of this study is the determination of the effect of differential tax laws on mineral development.

Incidental to the production, processing and consumption of mineral commodities, undesirable side effects such as pollution are sometimes generated. A study of the recycling of the junk automobile will be completed. The study includes both the scrap industry, the converting of junk to a valuable raw material, and the raw materials demand of the steel industry.

The quantity and quality of labor available for work in the minerals industries is a critical ingredient in the ability of the industry to produce an adequate supply at a reasonable cost while maintaining the quality of the environment. A case study of the labor force adequacy in one of the mineral industries will be undertaken.

A study will be made of the impact of policy and of standard of living on the competitiveness of U.S. minerals with foreign minerals. To disassociate the influence of geology, identical deposits will be discussed for the U.S. and for a foreign location. The overall influence of the cost of concessions, royalties, equipment, taxes, transportation, duties, wages, and capital and the influence of labor productivity will be determined at the domestic and the foreign location.

The Office has been actively involved in quantitative inter-industry sales and purchases analysis for two decades. The mineral industry sectors of the 1958 and 1963 national tables were prepared by the Office. The preparation of the 1967 table will start this year and the Office will again prepare the mineral industry sectors. The Office will also develop supplemental tables which provide information on the income and employment impact of the minerals industries.

A long-range project to develop the inter-industry structures of the eleven Western states with emphasis on the mineral industries will be undertaken.

(c) Bituminous Coal: Fiscal year 1971, $975,000; fiscal year 1972, $975,000; no change.

PROGRAM STATEMENT

The possibility of acute fuel shortages in the near term, serious problems of adequacy of supplies for the immediate future, and environmental restrictions on specific types of fuels emphasizes the need for improvements in energy policy decision making processes. Federal policy decisions relating to both domestic and international operations of the energy industries affect the climate in which the Nation's domestic energy supplies are developed, produced and utilized. Policies designed to meet specific objectives in areas other than energy in many instances have been made without regard to their impact on fuel supplies. New air quality standards have increased the demand for "clean" low sulfur fuels without knowledge that needed quantities are available. Policies that increased reliability on foreign sources for specific fuel supplies have not given adequate consideration to their impact on the development of domestic competing fuel supplies and to the uncertainties of international events. Policies that have maintained low prices for natural gas have resulted in shifts in demand for competing fuels and have not provided incentives needed to fill natural gas requirements. Results of these actions show that Federal policies must be made with a knowledge that their impact may transcend any one of the energy resources, and probably will encompass all energy resources because of the substitutability of competing fuels in various energy markets. Major concern is with industrial, commercial, and utility demand for fuels, primarily coal and fuel oil supplies. The utilization of both fuels is directly related to air quality regulations and import policy. Currently, stocks are low, the availability of future supplies to meet projected requirements questionable, and prices are increasing.

The planning needed to assure adequate energy supplies consistent with other national objectives regarding environmental and national security is dependent upon improvement in the collection of central data and in evaluations of the impact of proposed policy actions and regulations on the availability of fuel supplies. New decisions involving federal policy relating to all of the fossil fuel industries--coal, petroleum, and natural gas--particularly those relating to maintaining the environment, must be made if fuel supplies are to be available to meet projected requirements. If those decisions are not to be made on limited data the Bureau's program of data compilation, processing, and analysis must be expanded.

PROGRAM OF WORK

With current concern as to delays and increased costs of bringing nuclear power on stream, natural gas and petroleum availabilities, and limitations being placed on fuels by air pollution regulations, the need for better and more timely information on availability of all fuels is apparent. In recent years, coal production has been affected adversely by manpower shortages; labor unrest; and high cost of developing new mines; and uncertainties with respect to nuclear power developments, environmental controls, and, more recently health and safety legislation.

Accordingly, the Bureau's bituminous coal resource program will be modified to give emphasis to studies of the potentials for the development of productive capacities and of costs of mining of reserves of selected coals, particularly of those coals which will meet air pollution standards and of those in heavy demand in export markets.

The Bureau's bituminous coal resource program includes technical-economic studies patterned to aid the Government in evaluating and making policy decisions with respect to coal supply and demand, and to encourage improvement in coal recovery and utilization methods.

The following studies are included in the 1972 program:

The appraisal of coal reserves will be continued. Priority will be given to determinations of productive capacity potentials and mining costs of reserves of these coals for which demand is greatest. Included will be metallurgical-grade coals for domestic and foreign markets, and low-sulfur coals for electric power plant use. Also included will be other grades of coal occurring in sufficiently large contiguous blocks to support large-scale conventional or new synthetic fuel plants.

New methodology now being developed to determine coal reserves and mining costs in two important coal-producing areas will be used to make similar determinations in major coal-producing areas.

The program also includes several continuing functions, including surveillance of air pollution regulations as they affect coal, staff support to other governmental agencies, evaluation and publication of coal resource information, coal export programs, and technical assistance to the public, industry, and state and Federal governmental departments.

Data and information are obtained directly from industry, other government agencies, foreign sources, and from Bureau of Mines' liaison officers with State and local agencies.

(d) Anthracite: Fiscal year 1971, $1,788,000; fiscal year 1972, $1,788,000; no change.

PROGRAM STATEMENT

The primary goal of the Bureau of Mines Anthracite Program is the development of corrective measures for environmental problems that are remnants of past anthracite mining activity. Much has been done to cope with these problems in recent years, but much more needs to be done on the related problems of land reclamation, land subsidence, mine and culm bank fire control, and acid mine water drainage if a marked successful "visible" impact is to be achieved. A successful program in this area could serve three major purposes: (1) reclamation of presently unusable land for a variety of industrial, commercial, residential, and recreational uses, (2) creation of an environment conducive to economic growth and, (3) preservation of an important and substantial energy source. In working toward these objectives in 1972, the Bureau will provide technical, economic, and statistical data and appropriate technical demonstrations and/or research on mine related environmental programs for Federal, State, and local authorities and for the general public.

PROGRAM OF WORK

Surveillance and Impact Investigations: $488,000 (No increase)

Major emphasis in F.Y. 1972 will be placed on a Mine Fire Surveillance System to detect mine fires before a major threat develops and thereby minimize environmental control costs. The system will be based on new fire detection techniques, particularly in the field of airborne and satellite technology. In addition, studies will be made on the cost-benefit relationship of controlling or extinguishing present fires and methods of preventing future ignitions.

The Bureau will continue to administer, manage, direct, and monitor hydrological pool characteristics of abandoned mine workings to identify mine water discharges and conduct the associated grant program for the control and drainage of water in anthracite mines.

Major hazards (shafts, excavations, abandoned structures, etc.) will be identified and classified according to various geologic attitudes and their relationship to population centers. Reports on specific mining induced hazards in various fields will be published to aid the public and Government agencies interested in environmental protection work.

Work will be continued on compiling map folios showing the stratigraphic sequence of every mined bed, overlying rock structure and the surface. Completed folios are recorded or microfilmed to permanently preserve irreplaceable information now in danger of becoming lost. Microfilmed subsurface data are invaluable for future mining of sizable reserves, determining the stability of mined area lands affecting public and private properties and efforts to minimize subsidence, mine drainage, mine fires, and other environmental problems detrimental to the general public.

Although production and consumption of anthracite coal continue to decline, the Bureau is continually asked to supply information on the structure of the industry and the resource supply picture. Emphasis will be placed on the undertaking of a technological-economic study on the state of the anthracite industry, including production, employment, and kinds of operations, as it affects the productive capacity of the industry. The Bureau will continue to appraise the anthracite reserves and to prepare resource atlases.

Culm Bank Program: $1,300,000 (No increase)

The Bureau will continue its program for evaluating various techniques and their effectiveness and costs for extinguishing coal refuse bank fires. Basic research and atmospheric monitoring data will be obtained and evaluated with available

information to determine the success of reducing air pollutants and eliminating a general public hazard and nuisance resulting from burning coal refuse.

The Bureau will expand its ongoing program to determine the chemical and physical mechanisms and their interrelationships for causing spontaneous combustion in coal refuse. In addition, a comprehensive aerial survey of burning coal refuse banks will be conducted. Infrared imagery and aerial photographs will be used to supplement available information for establishing the precise number and location of bank fires and an extinguishment program based on priority of need.

Of major concern to the Bureau's culm bank program is the development of technology that will enable the establishment of criteria or operating guidelines for the proper disposal of coal refuse in abandoned surface and underground mines. Such an undertaking will provide a means of eliminating existing and future growth of refuse banks which present the possibility of spontaneous combustion, assisting in the prevention of mined-land subsidence, and eliminating unsightly scars on the landscape through revegetation.

Program Support Activities Funded by Transfer from Appalachian Commission

The Bureau of Mines pursuant to Section 205, P.L. 89-4, as amended, continues to engineer, manage, and administer projects approved by the Appalachian Regional Commission. The projects are designed to resolve environmental problems associated with mining and mineral processes. The Commission provides funds for contracts, grants to States, and related costs in order to control underground mine fires, reclaim surface mined lands, control subsidence by filling underground voids, remove burning and non-burning mine refuse banks, and seal abandoned oil well sites for water pollution control.

(e) Petroleum: Fiscal Year 1971, $880,000; Fiscal Year 1972, $880,000; no change.

PROGRAM STATEMENT

The complete picture of petroleum and natural gas production, trade and consumption, both national and international must be developed because these resources provide three fourths of the Nation's energy requirements and are at the same time contributors to a large portion of the Nation's environmental problems. Federal policies are increasingly directed at determining the resources that will be developed and the markets that will be served while maintaining the quality of the environment. The United States is no longer self-sufficient in petroleum. Although productive capacity exceeds production, without imports the productive capacity of crude oil and lease condensate and natural gas liquids in 1969 would have been short of total domestic demand by an estimated 1,100,000 barrels daily. The task of providing future petroleum needs will be enormous because trends indicate that domestic demand during 1970-85 will be a minimum of 103 billion barrels. Problems of availability of supply are compounded by the fact that environmental regulations affect all petroleum activities from exploration to product utilization. In depth studies of the availability of petroleum and natural gas supplies from different sources as well as a determination of changes in the energy mix and the pollution implications are a continuing part of the petroleum program. A wide range of technical, economic, and engineering activities relating to the production, processing, transportation, and utilization of clean fuels, including petroleum, natural gas, natural gas liquids, petro-chemicals, and the development of synthetic fuels are involved in these evaluations.

PROGRAM OF WORK

This program is a continuing effort to fulfill Bureau responsibilities with regard to the development and utilization of petroleum and natural gas resources, while maintaining the quality of the environment. This includes the following:

The preparation and publication of periodic reports providing significant information relating to supply-demand, international trade, and the environmental impacts of activites in petroleum, natural gas, natural gas liquids, and carbon black.

Monthly forecasts of crude oil demand are provided State regulatory agencies. Quarterly forecasts of supply and demand for petroleum products are prepared and published in the Monthly Petroleum Statement and annual forecasts are made for the Oil Import Administrator.

Basic information and fact gathering and evaluations required to fill requests from other governmental agencies and the public for information and technical assistance.

Surveillance of petroleum and natural gas developments in petroleum and natural gas producing states, collection of oil and gas samples and pertinent data concerning new producing areas and special investigations made to provide information for planning and policy decisions, with particular emphasis on fuels supply demand under environmental maintenance control programs.

Providing staff support concerning petroleum and natural gas resources, reserves, and supply to departmental agencies.

The 1972 program also includes the following special studies:

Studies directed toward the development of supply-price schedules and functions will be continued. Engineering cost models, based on actual operating experiences are being constructed for major petroleum producing areas. By using assumptions

as to producing rates and decline rates, the models will be used to provide information of supply functions that cannot be obtained from other sources.

Evaluations of domestic petroleum reserves and production in terms of sulfur content by producing area will be made in cooperation with HEW. The work will provide basic data for forecasting volumes of petroleum production by various sulfur ranges in future years. The information will complement similar studies of coal reserves and is fundamental to a determination of the availability of future low sulfur fuel supplies.

Data and information are obtained directly from industry, other government agencies, foreign sources, and from Bureau of Mines' liaison officers with State and local agencies.

(f) Minerals: Fiscal year 1971, $4,705,000; fiscal year 1972, $5,593,000; increase $888,000.

	Increase (+) or Decrease (-) Amount	Positions	Total Program	Total Positions	Explanation
(1)	$+300,000	+16	$875,000	40	Wilderness Mineral Surveys--New work in national forest study areas.
(2)	+400,000	+20	825,000	40	To support the National Materials Policy Act of 1970.
(3)	+220,000	+17	220,000	18	Missouri River Basin Studies (Transfer of funds).
(4)	-32,000	-3	- -	- -	Due to program savings in public relations and paperwork management.
	+888,000	+50			

COST FACTORS INVOLVED IN INCREASE

(1) Wilderness Mineral Surveys: Six professional and 10 nonprofessional employees, $150,000; personnel benefits, $10,000; travel and transport, $100,000; supplies and equipment, $25,000, and other expenses, $15,000.

(2) National Materials Policy Act of 1970: Fifteen professional and 5 nonprofessional employees, $260,000; personnel benefits, $20,000; travel and transportation, $30,000; supplies and equipment, $35,000; and other services, $55,000.

(3) Missouri River Basin Studies: Personal services for professional and nonprofessional employees, $192,000; personal benefits, $16,000; and other expenses, $12,000.

NEED FOR INCREASE

(1) The $300,000 increase will enable the Bureau to implement the second phase of the program under the Wilderness Act (P.L. 88-577) for completing mineral surveys in wilderness areas and for surveying other Department of Agriculture lands which may be recommended for inclusion in the national wilderness preservation system. The cost of wilderness investigations will be appreciably greater than in previous years because of the increase in project sites from 34 in primitive areas to 54 in wilderness areas, and the higher cost of helicopter transport and analytical services supporting the program. Also additional study areas of the national forests that have wilderness value but are not defined in the Wilderness Act are being designated for consideration for inclusion into the wilderness system. Field evaluations are more difficult in wildernesses because of the rugged topography, remoteness of areas, and evidence of mineral values.

(2) The $400,000 increase will enable the Bureau of Mines to provide support for the anticipated requirements of the National Commission on Materials Policy in carrying out its responsibilities under Title II of the Resource Recovery Act of 1970, P.L. 91-512. Bureau of Mines input to the program is estimated to be the equivalent of an additional 20 man years of effort. The National Commission on Materials Policy is required to report to the President and Congress its recommendations on the supply, use, recovery, and disposal of materials no later than June 30, 1973.

(3) The $220,000 will be applied to continued mineral resource studies in the Missouri River Basin. These studies, conducted previously through transfer of funds from the Bureau of Reclamation, henceforth will be funded directly from appropriations for Conservation and Development of Mineral Resources.

PROGRAM STATEMENT

The persistent and serious problems of mineral supply-demand imbalance within the United States are compounded by the rapid growth in worldwide consumption of minerals and by a world supply situation of increasing complication, including the maintenance of the quality of the environment. Mineral consumption in the United States consistently exceeds domestic production by a substantial amount. Thus, the United States is forced into vigorous competition with other developed countries for the mineral raw materials that are available in world markets. Furthermore, the competition for these mineral raw materials is rapidly being intensified by the national aspirations of underdeveloped nations to process the mineral raw materials that they produce in order to gain maximum economic benefits from those resources. These circumstances have been recognized in recent Congressional hearings, and the imperative need for appropriately directed action has been cited. The first essential to such action is the accumulation and analysis of basic and timely information on the mineral commodity situation throughout the world. This is a primary objective of the program.

In order to maintain its position in the worldwide competition for minerals, the United States must make optimum use of domestic mineral resources. This involves orderly development of our mineral reserves and resources with due consideration to environmental effects. Such development can only be accomplished from a base of comprehensive and organized information on the domestic and worldwide situation for each commodity. The program is designed to meet this need.

In providing support to the National Materials Policy Study the Bureau will undertake an inventory of domestic and world resources of industrial materials; identify materials location and problems relating to sources; analyze government and business policy implications; evaluate current and projected shortages as they relate to national objectives. In addition, current information on the worldwide supply-demand situation will be analyzed and evaluated to provide sound support for the development and maintenance of mineral supplies adequate for domestic needs.

The availability and requirements for minerals under existing technological and economic circumstances that affect production, distribution, and end use will receive detailed consideration. Possibilities for development of major new production capacity at advantageous prices to the consumer will be closely examined. Studies will be directed toward eliminating detrimental effects on the environment resulting from extraction, recovery, and use of minerals. The program will also provide for special attention to mineral resource potential in wilderness and primitive areas and to the advantages or disadvantages of developing such potential.

The Wilderness Act requires that the primitive areas be completed within 10 years after the signing of the Act (September 3, 1964) and the wilderness areas within the following 10 years. The program is on schedule. In FY 1972, the primitive area program will be virtually completed. Ongoing and scheduled wilderness projects will be continued with total acreage scheduled for appraisal in FY 1972 approximately double that scheduled in previous years. The Forest Service has designated approximately 2.4 million acres of other National Forest lands for new wilderness studies by 1974.

Under the River Basin program the Bureau will make new mineral resource studies during fiscal year 1972 in the Missouri River Basin to aid in developing a water and related land resources plan to meet current and future needs. These studies,

conducted previously through transfer of funds from the Bureau of Reclamation, henceforth will be funded directly from appropriations for Conservation and Development of Mineral Resources.

PROGRAM OF WORK

Mineral Resource Development: $4,498,000 (increase $368,000)

Assembling, analyzing, and disseminating information on the mineral industry both in the United States and rest of the world make up a major part of the intensified effort under this element. Data and information for basic studies are obtained directly from industry, other government agencies, foreign sources, and from Bureau of Mines liaison officers. The knowledge so developed provides a basis for assessing the domestic and world mineral resource situation and for following the international flow of mineral raw materials and products. Thorough analysis of the information serves as an indispensable planning guide to the Bureau's research organization and is an important input to the Bureau's and Department's policy-making procedure.

Through various publication series the results of data-gathering and analysis efforts are made available to the public. Periodic publications include the Minerals Yearbook, Mineral Facts and Problems, and Mineral Industry Surveys. In addition, information Circulars, special reports, and advisory services also serve to keep the Government, industry, and the public currently informed as to trends and problems in all phases of the mineral industry including environmental problems.

Authoritative mine maps will continue to be gathered and made part of the recently established map repository which includes data on past and current mining operations. Borrowed maps will be copied on microfilm and a systematic indexing-data retrieval system is being developed to ensure the maximum utility of the repository. Initial emphasis will continue to be on maps of mines where adverse environmental impacts are present or anticipated. In addition to maps the repository will include microfilms of reports and statistical information relevant to mines and the mining industry.

Studies will be made of the larger, more significant deposits to determine the quantity of the mineral which would become economically available at various price levels. In addition, other factors which influence the reserve availability will be part of the study. Those include byproduct-coproduct relationships, environmental restraints, transportation problems, the availability of secondary materials, and the competitive impact of other minerals.

As public concern mounts for improving the environment and minimizing pollution the Bureau's efforts in this area will be expanded.

Environmental restraints will have different impacts on different parts of the mineral industry. For example, fumes from zinc smelters may contain cadmium, those from copper smelters may contain arsenic, and both operations generate sulfur dioxide. Studies of solid waste problems will be accelerated to determine the technology for eliminating such pollutants and recovering them for use.

Pollution abatement is likely to result in over supplies of some minerals. The current problem of excess sulfur supplies will be further aggravated as a result of the availability of byproduct sulfur resulting from elimination of sulfur from smelter fumes and powerplant fumes. Environmental concern may also result in sharply curtailed demand for lead, bromine, mercury, and phosphate compounds. Investigations will be initiated to determine the magnitude of the problem and to develop alternative approaches to lessen social and industrial dislocations resulting from such changes in supply-demand relationships.

Depending upon the approach selected by the automotive industry to eliminate air pollution by cars, buses, and trucks, a serious shortage of platinum for catalysts could develop. As the automotive industry develops a solution to the problem of air pollution by internal combustion engines, the resulting potential demand for platinum will be evaluated. At the same time studies will be initiated to determine if reserves and mine capacity are likely to be sufficient to meet the projected demand.

Wilderness Mineral Surveys: $875,000 (increase $300,000)

It is planned to start on new wilderness studies on National Forest lands in FY 1972. In accordance with the requirements of the schedule set forth in the Wilderness Act, the Bureau of Mines will continue to search mining claim records, and appraise mineral deposit development and resource potential in the following primitive and wilderness areas during FY 1972: Chiricahua, Arizona; West Elk, Colorado; Gila, White Mountain, and San Pedro Parks, New Mexico; North Absaroka, and Cloud Peak, Wyoming; High Sierra, Trinity Alps, and South Warner, California; Idaho, Salmon River Breaks, and the White Cloud Mountains, Idaho; Absaroka, Beartooth, and Bob Marshall, Montana; Eagle Cap and the Minam River Basin, Oregon; and Enchantment, Alpine Lakes and Mt. Aix, Washington.

Missouri River Basin Studies: $220,000 (increase $220,000)

During fiscal year 1972 mineral examinations will continue to be made of proposed reservoir sites for construction agencies, particularly the Bureau of Reclamation, Corp of Engineers, and Soil Conservation Service, to determine if the proposed construction projects would have an adverse effect on mineral resources. Requests for 50 such onsite examinations are expected during the year.

Work units programmed in support of the Missouri River Basin Project for fiscal year 1972 are (a) Red River Basin Type II study (continuing), (b) Water-related mineral resource studies in basins and subbasins (continuing).--Mineral resource evaluation and development studies will be completed in Musselshell Basin, Montana, the Knife and Heart Basins of North Dakota, and Niobrara Basin, Nebraska, (c) Studies of petroleum and natural gas (continuing)--Water requirements studies for secondary recovery of petroleum by waterflooding in eastern Montana, (d) Studies of coal and lignite--Coal and industrial water requirements in the Upper Missouri Basin.

(g) International Activities: Fiscal year 1971, $692,000; fiscal year 1972, $692,000; no change.

PROGRAM STATEMENT

The government's concern with international activities in the minerals area is related to providing for present and future domestic requirements of mineral resources at reasonable cost consistent with other national objectives. This includes assuring the long-term availability of foreign sources of minerals for which domestic supplies are scarce or high cost to the United States, and the determination of potential foreign markets for domestic mineral resources that are abundant and low cost. The Federal Government's international mineral involvement and participation in carrying out these objectives includes contacts and relationships with foreign government agencies and international organizations concerned with world minerals supply, demand and trade.

It is essential that the U.S. Government and industry be accurately informed at all times on world mineral developments--resources, investments, production, consumption, trade, government policies, anticipated problems and crises. This must be a continuing government program of information and analysis because of the dynamic nature of the global mineral industry. The program will enable the United States to compete in world mineral markets as importer and exporter; assist domestic industry in identifying potential mineral resources abroad; evaluate investment opportunities in foreign resources; and maximize benefits from worldwide research in the mineral industries.

PROGRAM OF WORK

Worldwide surveillance of mineral developments and evaluation of their implications on the United States economy and the domestic mineral industries will continue at the current level of funding. This includes: worldwide collection, evaluation, analysis and compilation of scientific, technical, and economic mineral information; maintenance of a broad-world mineral information system; publication of special reports and of established periodic mineral reports such as the Volume IV International Yearbook chapters, Mineral Industry Surveys, Materials Surveys and Mineral Trade Notes, relating to foreign minerals; provision of special reports, tabulations, and consulting services for the Department and other Government agencies.

Additional special activities in fiscal year 1972 will be:

To fulfill United States obligations in relation to United Nations Regional Organizations (ECE, ECAFE, UNCTAD, UNIDO, etc.), and the Organization for Economic Cooperation and Development (OECD) where the activities of these organizations are in the mineral area;

To coordinate, manage and develop U.S. bilateral technical cooperation agreements such as those with Australia, Canada, Brazil, France, the Federal Republic of Germany, and Japan;

To assist the Department of State in selection of personnel and functions of mineral and petroleum attachés, and to maintain continuous and direct contacts between Bureau geographical specialists and the mineral attachés abroad.

EXAMPLES OF RECENT RESOURCE DEVELOPMENT ACCOMPLISHMENTS

A new technique for backfilling of abandoned flooded mine voids was successfully demonstrated at Rock Springs, Wyoming. Subsidence occurrences during recent years had caused considerable damage to houses, commercial buildings, and streets in the community. In the backfilling operation, sand was transferred from the surface to several acres of mine voids through a single borehole. Conventional backfilling methods require drilling scores of closely spaced holes. The system's potential for preventing mine subsidence in other undermined urban areas and reducing the formation of acid mine water is being tested further.

A monitoring system has been initiated for measuring the fluctuation in the elevations of mine water pools throughout the anthracite region of Pennsylvania. These data will be used for predicting flood damage in low lying surface areas so that pertinent action can be taken to protect homes, business establishments, underground utilities, and streets. The information will also be used to avoid flooding of coal reserves and for preventing subsidence.

A demonstration project to evaluate a unique method called the "Rice-Paddy" technique for extinguishing a burning coal refuse bank adjacent to the city of Scranton, Pennsylvania, was completed. This method which involved the use of 6 individual ponds was selected because it minimizes gases, dust, and possible explosions resulting from the extinguishment process. This technique was technically successful and local residents were not subjected to any discomfort or hazards. A picture of the project area is included which shows the size of the area affected, the paddy technique, and the proximity of a residential area of Scranton.

Pursuant to Section 205 of Public Law 89-4, as amended, and in cooperation with the Appalachian Regional Commission, the Bureau of Mines continued to engineer, manage and administer a number of work action programs aimed at the resolution of environmental problems associated with the mining of anthracite and other minerals. Since the implementation of this Act, the Bureau of Mines has completed 20 mine fire control projects, 6 subsidence control projects, 6 surface mine reclamation projects, and 3 oil well sealing projects.

In dealing with fossil fuel resources, several significant studies have been completed in the past fiscal year. One, of importance in the Nation's efforts toward improved air quality, provides extensive information on the availability of bituminous coal by sulfur content, in the Appalachian region. This can be of assistance to major coal buyers in obtaining coal supplies of suitable quality to meet local regulations.

Another completed study identifies large blocks of U.S. strippable coal reserves for potential development and use in supplying large-scale electric power generation plants or gasification plants of the future. Other fossil fuel activities include: (1) Preparation of a special coking coal study, "The Changing Trends in Iron-Steel Making Technology and Their Effect Upon Coking Coal Requirements in the U.S. and Other Countries"; (2) an updated U.S.-Canadian Energy Study which serves as a basis for reviewing energy trade patterns and is useful in the negotiating of agreements for the exchange of energy; and (3) preparation of a number of technical-economic studies patterned to aid the U.S. Government in evaluating and making policy decisions with respect to fuel supply and demand and to encourage improvement in methods of recovery and utilization.

Junk automobiles, a mineral resource, were the subject of study. Work on the two major phases of the junk auto cycle was completed. The cost structure of various size auto shredders was analyzed, and the impact of the price of shredded scrap on the collection radius of the individual junk auto operation was assessed. A process analysis of the steel industry was undertaken, with an evaluation of the technical possibility and economic feasibility of substituting shred for iron ore or prereduced iron ore pellets.

Refuse bank fire extinguishment using the "Rice-Paddy" technique to cool the hot material. Note adjacent residential area of Scranton, Pennsylvania. The fire had been burning at an estimated 2,500 degrees and as near as two feet from the surface in some areas. (See reference on previous page.)

The series of mineral availability studies useful both to Government policymakers and to industry was continued. These studies assess the economic conditions under which known resources of a given mineral would become marketable. During the past year, the Bureau's published output of such studies included sulfur, molybdenum, chromium and nickel.

Once again the Bureau published its encyclopedic work entitled "Mineral Facts and Problems". This reference work is published at five-year intervals; the 1970 edition became available for public distribution in the third quarter of the fiscal year. Early in that same quarter, the annual four-volume "Minerals Yearbook"--1969 edition--became available.

Continuing effort has been made to improve the Bureau's public service through earlier release of regularly-scheduled statistical reports. The earliest practicable release dates are sought in accordance with Circular A-91 of the Office of Management and Budget. To improve release times, procedures were instituted to streamline and speed up processing, including estimating in those cases where there is not an early response from industrial firms. By the end of the year, virtually all monthly and quarterly statistical releases were being issued within 60 days of the end of the reporting period, with the exception of some large surveys which depend on data from a number of diverse sources.

Six investigation reports were published as a result of work under the Wilderness program. Reports of mineral surveys were published for Jack Creek Basin, Montana, and five Primitive Areas: Aqua Tibia, Calif.; Black Range, New Mexico; Emigrant Basin, Calif.; Gore Range-Eagles Nest, Colo. and Sawtooth, Idaho. Field study was under way, and completed in some cases, for the following: Idaho Primitive Area, Idaho; North Cascades Primitive Area, Wash.; Salmon River Breaks Primitive Area, Idaho; Lincoln Back Country, Montana; Beartooth Primitive Area, Montana; Absaroka Primitive Area, Montana; Salmon-Trinity Alps Primitive Area, Calif.; High Sierra Primitive Area, Calif; Gila Primitive Area and Wilderness, N.M.; Cloud Peak Primitive Area, Wyo.; North Absaroka Wilderness, Wyo.; and Popo Agie Primitive Area, Wyo.

With the goal of improved public service, the Mineral Supply activity of the Bureau of Mines--formerly titled Mineral Resource Evaluation--has undergone extensive reorganization during the fiscal year. A major change in organizational structure has led to the establishment of new commodity divisions in the Washington headquarters, a centralization of statistical work, a strengthening of four newly-designated Field Operation Centers at Pittsburgh, Denver, Spokane, and Juneau, and a wholly new emphasis on local service through Liaison Offices in a number of States. Thirty-three Liaison Offices have been opened, one to a State, with several more being planned. These are generally located in the capital of the State in order to cooperate closely with those agencies of State government most involved in the investigation and development of mineral resources. To the fullest extent possible, the Liaison Officers are expected to represent the Bureau of Mines in the conduct of as much of the Bureau's business as can be performed at the State and local level.

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ITEMIZATION OF ESTIMATE

Department of the Interior
Appropriation Title: Conservation and Development of Mineral Resources — Bureau of Mines

	Actual 1970	Estimate 1971	Estimate 1972	Increase (+) or Decrease (-)
Program and Financing				
Total Obligations	$43,268,886	$47,698,000	$46,094,000	$-1,604,000
Unobligated balance lapsing	19,848	- -	- -	- -
Budget authority	43,288,734	47,698,000	46,094,000	-1,604,000
Budget authority				
Appropriation	42,495,000	46,422,000	46,094,000	-328,000
Pay increase (Public Law 91-305)	131,000	- -	- -	- -
Transferred to other accounts	-11,266	-635,000 1/	- -	+635,000
Transferred from other accounts	674,000	- -	- -	- -
Appropriation (adjusted)	43,288,734	45,787,000	46,094,000	307,000
Proposed Supplemental for pay act increases	- -	1,911,000	- -	-1,911,000

1/ This represents the part year transfer to NOAA; full year effect, $925,000.

	Actual 1970	Estimate 1971	Estimate 1972	Increase (+) or Decrease (-)
Obligations by Objects				
11 Personnel compensation	$31,359,000	$34,160,000	$33,875,000	$ -285,000
12 Personnel benefits	2,490,000	2,765,000	2,744,000	-21,000
13 Benefits for former personnel	37,000	- -	- -	- -
21 Travel and transportation of persons	911,000	1,077,000	1,090,000	+13,000
22 Transportation of things	169,000	195,000	195,000	- -
23 Rent, communications, and utilities	1,255,000	1,280,000	1,300,000	+20,000
24 Printing and reproduction	371,000	380,000	380,000	- -
25 Other services	1,898,000	2,831,000	2,100,000	-731,000
26 Supplies and materials	1,957,000	2,034,000	1,950,000	-84,000
31 Equipment	2,285,000	2,396,000	1,920,000	-476,000
32 Lands and structures	18,000	90,000	90,000	- -
41 Grants, subsidies and contributions	386,000	260,000	250,000	-10,000
42 Insurance claims and indemnities	133,000	230,000	200,000	-30,000
Adjustment for rounding	-114	- -	- -	- -
Total obligations	43,268,886	47,698,000	46,094,000	-1,604,000

Personnel Summary

Personnel Summary	Actual 1970	Estimate 1971	Estimate 1972
Total number of permanent positions	2,595	2,564	2,529
Full-time equivalent of other positions	144	146	146
Average number of all employees	2,665	2,684	2,629
Average GS grade	9.2	9.3	9.3
Average GS salary	$12,856	$12,952	$13,058
Average salary of ungraded positions	$8,467	$9,166	$9,922

COAL UTILIZATION TECHNOLOGY

Mrs. HANSEN. $2,440,000 is requested for advancing utilization technology for coal. Please insert in the record a tabulation of the locations where this work is performed, indicating the amount of funding at each location.

Dr. OSBORN. We will be glad to do that.

(The information follows:)

Advancing utilization technology

	Funding, $1,000's
Pittsburgh Energy Research Center:	
Combustion improvement	310
Magnetohydrodynamics (MHD)	400
Carbonization	197
Coal science research	450
Total	1,357
Morgantown Energy Research Center:	
Combustion improvement	229
Pneumatic transport of coal	356
Total	585
Grand Forks Energy Research Laboratory:	
Combustion improvement	384
Carbonization	114
Total	498
Grand total	2,440

Mrs. HANSEN. You say in your justifications, "Although the U.S. reserves of coking coals are estimated to be more than adequate to meet our domestic and export requirements for many years." How long is many years?

Dr. OSBORN. Decades.

Mrs. HANSEN. Will this supply the world needs as well as our own?

Dr. OSBORN. I would say our needs can be met and we can also extend our exports.

Mrs. HANSEN. Where is the greatest reserve located?

Dr. OSBORN. East of the Mississippi I think.

Dr. HENRIE. That is right. At least the State of Oklahoma and east.

Mrs. HANSEN. Are these deep coal mines?

Dr. OSBORN. Both; some of the metallurgical coal is being stripped where by accident, it is at the surface.

STRIP MINING PROBLEMS

Mrs. HANSEN. You mentioned just before leaving at noon some problems involved in strip mining. Would you please elaborate on your previous comments.

Dr. OSBORN. Where the coal is near the surface, within just a few tens of feet, say, it can't be safely mined underground.

Mrs. HANSEN. Why?

Dr. OSBORN. Because of roof support problems and water problems principally. For example, the metallurgical coal Bethlehem Steel is mining in eastern Kentucky, that I have visited, is stripped near the surface as far into a hillside as it can be economically. Then for a short distance further into the hillside it is mined by augers from the outside. Still further in it is mined underground. So it is a combination of stripping and underground mining. Underground mining can't come very close to the surface.

So if it were not mined by strip mining methods, it would not be mined by present technology.

Mrs. HANSEN. How much of the coal reserves are in this category?

Dr. OSBORN. Can we insert a figure on that later?

Mrs. HANSEN. Please do.

(The information follows:)

It is estimated that as of January 1, 1970, there were 128 billion tons of recoverable coal resources that were too close to the surface to be mined underground and must be stripped.

MINE FATALITIES

Mr. MCDADE. For the record how many men are killed in underground mining each year? Do you know that figure?

Dr. OSBORN. Sure.

Mr. MCDADE. What is it?

Dr. OSBORN. It is a little over 200 in underground coal mining.

Mr. MCDADE. In coal mining alone?

Mr. WHEELER. It was 255 last year.

Dr. OSBORN. Some in strip or all underground?

Mr. SCOTT. That includes strip mining.

Mr. WHEELER. That is just coal. We will get that figure separated out, but the total is about 250 last year in coal, not the other mines.

Mr. MCDADE. Could we have the figure broken down so we show the fatalities and the injuries in coal mines and other types of mines and separating strip and underground?

Mr. WHEELER. Yes.

(The information follows:)

FATAL AND NONFATAL MINE ACCIDENT DATA

	Coal mines[1]		Noncoal mines[1]	
	1970 fatalities	1969[2] nonfatalities	1970[3] fatalities	1969[4] nonfatalities
Underground	216	8,130	59	3,115
Surface mines[5]	33	1,155	67	4,320
Mills	6	515	28	3,975

[1] All nonfatal injuries are preliminary.
[2] Breakdown of nonfatal injuries for 1970 for coal by underground mines, surface mines, and mills not available. Total number of nonfatal injuries at coal mines from January through October 1970 was 8,675.
[3] Reported as of Mar. 12 1971.
[4] 1970 data not available
[5] Surface mines in coal include strip, auger, culm banks, and dredges. Culm banks and dredges apply to anthracite coal only.

COAL UTILIZATION PROGRAM

Mrs. HANSEN. Please give us your general comments on the type of work that is being performed under your advancing utilization technology of coal activities.

Dr. OSBORN. One of the major programs is the gassification of coal, and I think I can speak objectively since I am not responsible for the work—one of the finest jobs the Bureau of Mines has done is the development of the synthane process for producing gas from coal.

The impetus for this comes from two directions: one, to make available energy from coal without the sulfur problem because in gassifying you have the means to get rid of the sulfur. The other is that we are surely going to run short of natural gas as far as not being able to meet demand is concerned.

Mrs. HANSEN. At what time will you be in short supply of natural gas?

Dr. OSBORN. During the last few years the increase in demand for gas has been about 7 percent per year as compared with an overall increase of about 5 percent per year for energy. Within a few years, and before 1980, we estimate that this increase in use of gas per year will be down to about 2½ percent per year because of the supply.

In other words, it will be supply limited. Perhaps this year we are in our peak production of gas from the standpoint of rate of increase of use, and the rate of increase of use will drop off probably from now on.

MHD RESEARCH

There is a second matter we are working on, the one actually which I see is to your point under this paragraph. I refer now to the magnetohydrodynamic system.

Mrs. HANSEN. That is right.

Dr. OSBORN. There is a tremendous potential advantage here over any of the other methods for producing energy since it promises to be more efficient than the other methods. However, the system is just in the laboratory stage, and the Bureau's contribution is limited to some of the incremental specialized technology of the system.

We feel that this is one of the several important things we are doing, but it is not near the demonstration stage yet.

Mrs. HANSEN. How far are you from the demonstration stage?

Dr. HENRIE. This will be several years because of major engineering problems. We are operating at very high temperatures with this type of machine, and a lot of these structural materials haven't been developed.

There are some demonstration models that have operated using a clean fuel for several hours, but to have a real system that would operate for a year—this is way down the road.

Mrs. HANSEN. Where have those models been located?

Dr. HENRIE. We have one small unit at our laboratory in Pittsburgh. AVCO Co. has a unit that they have operated. There are several agencies and organizations working on the overall problems of these sys-

tems. The Bureau of Mines is mainly looking at it as a method in which coal could be used as an energy source.

Dr. OSBORN. Wouldn't you say, Doctor, this is still really in the laboratory stage?

Dr. HENRIE. That is right, because, among other things, we need to develop the materials to operate at these temperatures.

COAL UTILIZATION PROJECTS

Mrs. HANSEN. What are the other related costs?

Dr. HENRIE. The physical and chemical studies are about $344,000, and the working with the coking coal is nearly $400,000, and transporting of coals from the working face is $356,000.

Mrs. HANSEN. Insert in the record a tabulation indicating the locations where this work is performed and the amount of funding provided for each location in 1972.

(The information follows:)

EFFECTIVE POLLUTION ABATEMENT THROUGH CONVERSION PROCESSES

[Funding in thousands of dollars]

Pittsburgh Energy Research Center:	
Non-polluting oil from coal	725
Pipeline gas from coal	2,480
Total	3,205
Morgantown Energy Research Center:	
Non-polluting oil from coal	330
Low B.t.u. gas from coal	670
Hydrogen from coal	140
Total	1,140
Grand Total	4,345

RESEARCH ON MANAGING COAL WASTES AND POLLUTANTS

Mrs. HANSEN. $1,985,000 is requested for managing coal waste and pollutants. Can you give me one or two specific examples of your accomplishments in this connection during the past 2 years?

Dr. HENRIE. One of our major efforts on pollutants has been with sulfur dioxide, and the nitrous oxide problems from the combustion of coal. This has been a problem that has been worked on for many years.

We have developed within the Bureau of Mines a technique for removing SO_2 from smelter gases which is a higher concentration of SO_2. We believe that this technique would also remove the nitrous oxide material.

We also know that this process can be used on dilute gases such as stack gases. However, this would be much more expensive and I am not so sure we know the economics of this process for powerplants.

As far as evaluating many of these procedures, we also believe that the absorption of SO_2 by copper oxide or iron oxide on an alumina base could be quite effective in reducing sulfur dioxide pollution.

Mrs. HANSEN. Please insert in the record a similar tabulation indicating the locations and type of activity involved for this program.

Dr. HENRIE. Yes, ma'am.

(The information follows:)

RESEARCH FOR REMOVAL OF SULFUR OXIDES FROM SMELTER GASES AND POWERPLANT STACK GASES

Salt Lake City, Utah, $500,000—Citrate adsorption process. Small continuous scale testing plant in cooperation with Magma Copper Co., Tucson, Ariz. (smelter gases).

Twin Cities, Minn., $40,000—Catalytic reduction of sulfur oxides. Bench-scale (smelter gases).

Pittsburgh, Pa., $250,000—Absorption of both SO_x and NO_x from powerplants using a regenerative system.

Morgantown, W. Va., $230,000—Ammonia injection process for removal of SO_x from powerplants. Revised process to provide total systems approach and include recovery of sulfur as a byproduct.

BUREAU ACTIVITIES ROTATED TO THE RESOURCES RECOVERY ACT

Mrs. HANSEN. On October 26, 1970, Public Law 91–512 was enacted and is known as the "Resource Recovery Act of 1970." Define in some detail for the committee just how your activities tie in with the provision of this legislation.

Dr. OSBORN. This is the "Resources Recovery Act" under which the Environmental Protection Agency has as its major role, the development of standards and enforcement of regulations having to do with pollution of all types, and where we have been given some specific authority in regard to the solid waste problem.

We are concerned entirely with the technology and not with actual establishment of standards or regulations.

So our work, which is quite extensive on such matters as separating out the valuable materials from urban and other wastes and on air pollution in connection with the SO_2 problem in smelters and so on, is entirely consonant with that law and we will work with the EPA wherever we have mutual concerns.

We have already had conferences with them about our various roles.

PETROLEUM RESEARCH CONTRACTS

Mrs. HANSEN. $3 million is requested for petroleum research. Insert in the record a listing of all contracts you issued in fiscal year 1970 for petroleum research. This information should include the name of the company, a description of the research project, and the cost thereof.

(The information follows:)

There were no research contracts let in fiscal year 1970 for petroleum research.

SUBSURFACE WASTE DISPOSAL

Mrs. HANSEN. Please give us the details of your request for an increase of $300,000 and 12 positions to initiate studies on the subsurface waste disposal.

Dr. OSBORN. This is to expand exploratory work, that has been done, into a more significant investigation of this very serious problem of

pollution of the underground. With stricter regulations with respect to pollution of our water and air environments, those who must get rid of liquid wastes are turning toward putting them underground.

So the number of underground wells, especially deep injection wells, is increasing regularly.

Disposal wells that we know about, for example, numbered 32 in 1967, and increased 3 years later to 150.

The regulations concerning these waste injection wells are all local, there has been no Federal regulations connected with them whatsoever. The State or local governments' regulations vary considerably and in some areas there are not any.

So we anticipate conducting one part of a three-part program. One of the parts is the U.S. Geological Survey, which is budgeting I think $700,000 next year for the program, and their work is scientific studies of aquifers, their characteristics, regional problems in connection with the underground and so on.

The second agency is EPA which must set the standards and do any regulation.

Our role will be principally one of doing research on means of cleaning up the typical type of solution people want to push underground; on developing technology for safe pumping of the material underground, getting it where it ought to be gotten; and in looking into the means of transportation above ground of these liquids to the point where they will be injected, and possible standards and regulations which we can recommend to the EPA.

Mrs. HANSEN. You have a problem, which this committee encountered in some of our other hearings, of the United States and the rest of the world hunting for new sources of water. There is a great deal of discussion of new sources of underground water. What do you know about the effect waste solutions will have on underground water?

Dr. OSBORN. This is what we need to find out, and the work will be done in cooperation with the Geological Survey which has studies going on at the moment.

Mrs. HANSEN. You say in your justifications, "Review of the literature reveals a poverty of information about what happens to a waste solution once it is injected into the ground."

Why is that?

Dr. OSBORN. It is because it hasn't been studied. But one of the main problems is the rocks are not the same in every instance as we go from one town to the next or one State to the next. So it isn't a matter of our working out the problem in one area and then saying we can use these pressures and these depths and so on any other place.

As you know this isn't true at all. What may be practicable in Florida may not be suitable in Oregon or any particular part of Oregon. We need a comprehensive, nationwide look at the underground situation.

UNDERGROUND STORAGE OF ATOMIC WASTES

Mrs. HANSEN. Are you involved in the storage of atomic wastes in Kansas salt mines?

Dr. OSBORN. Only indirectly as advisers. The problem of disposal of radioactive waste is really one of the very serious problems that we

have in connection with nuclear energy. We have out in your State, as you know, some disposal tanks, where the solutions are boiling at 200 or 300 degrees centigrade in concrete tanks in the ground, and the solution will be doing this for another 200 or 300 years, but the tanks may be good for 50 years. Sooner or later we have to do something about these problems.

Mrs. HANSEN. This is the difficulty.

Dr. OSBORN. These salt mines are dry so that there is little chance of the material getting into the aquifers, into the underground water system. Also the salt is very plastic so if there is any ground movement or any earthquake, the fractures won't stay open. We can't think of a better place to put this stuff at the moment.

But there ought to be better ways of using it. With all of the heat and so on, we ought to be able to use this stuff.

Mrs. HANSEN. How much is stored in the State of Washington?

Dr. OSBORN. I don't know. I might be able to find out. It is very hard to get the information from the Atomic Energy Commission.

Mrs. HANSEN. I know. Where is it stored?

Dr. OSBORN. Up near Hanford.

Mrs. HANSEN. There has been some discussion of waste also being in lead containers in the river? Is that correct?

Dr. OSBORN. Maybe, there are lots of ways.

I might say, particularly since Congressman McDade is on this committee, that the Pennsylvania Department of Commerce in Harrisburg 3 or 4 years ago was anxious to have a site specified for disposal of radioactive waste in Pennsylvania so that Pennsylvania might attract industries which use nuclear materials knowing that they would not have high shipping costs in order to get rid of the waste. Perhaps they considered they could have a nice burial place in Scranton, maybe in one of the mines.

Mr. MCDADE. You might have to bury a few other things besides the radioactive waste if you try.

Dr. OSBORN. The minerals industry people at Penn State were asked to look into the matter. They surveyed the State land in the State and came up with the conclusion there was no place in Pennsylvania you could safely bury this stuff.

Mrs. HANSEN. Why did you decide to bury it in the State of Washington?

Dr. OSBORN. We didn't decide that. I have hopes that the worst phase of this might be taken care of by advancing technology. I think we are going to get at some of these problems like how to take care of radioactive waste.

For example, the Bureau of Mines has an incipient idea at the moment, but I think we will be getting into it, involving studies of means of extracting radium from some of the western mining wastes now radioactive and also dangerous. The more uranium ores we process, the greater this waste problem will become.

We think, even though it may raise the cost of producing uranium, it may be practical to remove much of the radioactive material from the wastes before they are discarded. I think if we stay with these problems, they won't get worse. That is my feeling. I think they will get better.

Mrs. HANSEN. At the same time you have to be developing technology to take care of the waste that is going to outlive the tanks. Isn't that correct?

Dr. OSBORN. I suppose they can put down new tanks 50 years from now and push it in. Do that every 50 years.

Mr. WYATT. Will the Chairman yield?

Mrs. HANSEN. Yes.

Mr. WYATT. Doctor, do you know how many Federal Government agencies are studying the problem of radiation waste disposal at the present time?

Dr. OSBORN. The Atomic Energy Commission, of course, is. The Bureau of Mines is not. The U.S. Geological Survey is simply an advisor. The National Academy of Sciences is not a Government agency, but has a committee which is advising on it.

Mr. WYATT. Do you know if they are doing any active research or if any is being done under their auspices?

Dr. OSBORN. AEC?

Mr. WYATT. Yes.

Dr. OSBORN. Yes, they are but how extensive their research is I don't know.

Mr. WYATT. I asked that question simply because I am from the State of Oregon immediately to the south of the State of Washington. There is some talk about transporting the waste from Washington to Kansas and it might have to go through the State of Oregon. The administration may have taken care of the problem in connection with the reactor at Hanford.

Dr. OSBORN. The Atomic Energy Commission, of course, takes this very seriously, and it has had many research contracts with university groups and with others, for example, on methods of growing crystal materials which contains these radioactive atoms, particularly insoluble crystals, so they can be reduced to a smaller volume and be safer than the solution. So there is continuing work on this.

From my knowledge of it, the salt mines are by far the best idea we have come up with. There are just too many unknowns.

Mr. WYATT. You no doubt know the environmentalists already are concerned about the problems involved in transporting it from the State of Washington to the ultimate destination because of some dangers.

Dr. OSBORN. Yes. I appreciate the problem.

Mrs. HANSEN. Mr. Wyatt, like myself, is in that part of the country where the question of energy is of vital concern to us because the locations for hydroelectric power development are at an end relatively speaking. You can increase a certain number of generators but beyond a certain point it will become saturated.

People are now turning to thermonuclear energy but nobody has developed very good answers at this time on what this will do to the environment. You have the problem of what warmer water will do to the fish in the river.

On the other hand the other day when the Bureau of Sport Fisheries and Wildlife apeared before us, they testified that certain waters benefitted by the additional warmth. The public as a whole are frightened by thermonuclear energy development. Isn't this correct, Mr. Wyatt?

Mr. WYATT. It is certainly correct.

Dr. OSBORN. May I mention a study just underway now? I think it will be helpful.

POWERPLANT SITES

There was a meeting lasting for 4 or 5 days last week at the National Academy of Engineering, the subject was powerplant siting. I was able to attend 1 day of that meeting. The input there is from the power companies, the conservationists, and the Atomic Energy Commission, the Bureau of Mines. I made a presentation.

After the general presentations they were to have 3 days of workshop and they will be coming out with a report very soon, in the matter of a couple of months I think, which may give the best balanced picture of what you are talking about that has ever been developed.

Mrs. HANSEN. I think people have to have this balanced report, because at the present time there aren't any answers to satisfy the general public.

Dr. OSBORN. That is right.

Mrs. HANSEN. Yet the power crisis is on us. Let's examine the structure of almost any area. At the present time tankers bring in the oil that is used in the Northwest. Tankers must come into Puget Sound or the Columbia River and there is a great question about oil spills.

As I understand, at the present time pleasure motorboats are spilling more oil than have been spilled in any other way. So you could look forward perhaps to a time when all pleasure craft using gasoline will be banned.

It was significant to see how the domestic consumption of energy has increased basically by automobile and home consumption.

You might have to develop a policy to limit the number of vehicles within a city or convince a housewife that she has to limit her use of energy. Isn't this going to be true if you don't develop other energy sources?

Dr. HENRIE. We are running into a conflict here, Madam Chairman. I am sure that technology can meet this challenge and a compromise can be made whereby we can enjoy our affluence as well as live in a cleaner world. It seems to me this crisis has come to us in a sudden way.

Mrs. HANSEN. It has been coming for a long time, and that is what bothers me. I have been on this committee 8 years, and this problem has been with us 8 years. The budgets have been rather restrictive in this field of research.

You are limited by the number of people going into research at the present time and by the number of people entering the mining engineering field.

Dr. HENRIE. That is true. It seems to me that technology can develop. I don't know just when it will be, but I am sure we can solve these problems.

USE OF GEOTHERMAL STEAM

Mr. WYATT. Madam Chairman, illustrative of what you are saying, we recently had some outsiders come into our State to say we don't need nuclear power because we can use geothermal steam; and yet I am certain that anybody that has studied this knows it is one of the most corrosive substances that there is and there is going to have to be a great deal of technology developed to harness geothermal steam. It can't be used tomorrow or the next day.

Dr. OSBORN. Let me suggest that in this regard we are talking about

very small amounts of energy really. I have visited the geothermal energy centers both in Italy and New Zealand in the past few years, and the largest powerplant in one of those high energy areas is just peanuts compared to what we are building as coal-steam or nuclear power.

They are talking maybe of say 100 megawatts as being a big plant whereas this is a small one in our outlook.

Mr. WYATT. We had an expert ask the State legislature to pass a ban or nuclear power in our State for a period of some years, and we could make up this energy deficiency with geothermal steam.

I am sure the expert didn't know any more about geothermal steam than he did about nuclear power. This is illustrative of what our chairman has been saying.

I can remember when the fish interests on the Columbia River used to oppose the building of dams because of the effect it would have on fish and wildlife. They were saying the reason we should not build the dams is because nuclear power was right around the corner.

Now nuclear power is here and some people are against it based upon the fact that geothermal steam is right around the corner. The minute we start developing geothermal steam there will be all kinds of objections raised.

I think it is very important, as you say, that these decisions be based upon very careful scientific analysis and not upon emotions of the moment and ignorance and fear.

Dr. HENRIE. I would like to say I believe we have a lot of experts in the country, but maybe not enough expertise.

Mrs. HANSEN. I think this is probably right. For example, everybody talks politely about the need for more housing, but for every house you build, you have to supply energy. Isn't that correct?

Dr. HENRIE. Yes, ma'am.

Mrs. HANSEN. So if we don't have the sources of energy, we are not very secure with our housing program.

ENERGY SOURCES AND EQUIVALENTS

Dr. HENRIE. We have about 14 horsepower of energy in every person's hands in this country today. This is about equivalent to 112 slave people working for us. I think we have reached a great level of technology.

Mrs. HANSEN. What is that the equivalent of in oil and coal?

Dr. HENRIE. A person working is one-eighth horsepower. In each man's hands we have this large amount of energy available with petroleum furnishing the greatest amount, coal and natural gas lesser amounts.

Mrs. HANSEN. How would one-eighth horsepower compare to barrels of oil?

Dr. HENRIE. Whatever the total B.t.u's are.

Dr. OSBORN. It would be about an eighth of a barrel of oil a day.

Mrs. HANSEN. An eighth of a barrel of oil per day per person?

Dr. OSBORN. About right. Because we would use the equivalent of about 25 million barrels of oil a day and 200 million people that would be about an eighth of a barrel of oil a day.

In other words, if all of our energy were converted to oil, we would use about 25 million barrels a day.

Mrs. HANSEN. Convert this figure to coal.

Dr. OSBORN. If you want it in tons of coal, it would be about a fortieth of a ton of coal a day.

Dr. HENRIE. We will get that number for you exactly.

Mrs. HANSEN. Please do.

(The information follows:)

Total energy consumed in 1968 by the United States was 62.4 quadrillions of B.t.u. This energy is equivalent to about 14 horsepower working continuously for every man, woman, and child in our country or 0.14 barrels of oil or 67 pounds of coal consumed by each person each day.

Dr. OSBORN. May I at this time, Madam Chairman, mention the title of a paper which I think is the most authoritative paper that has ever been written on "Energy Resources for Power Production." This is by Dr. M. K. Hubbart of the U.S. Geological Survey presented at the International Atomic Energy Agency meeting in a symposium on environmental aspects of nuclear power stations.

The interesting things about this are the graphs which so clearly show that we are not just repeating history, we are using up nonrenewable resources at a terrific rate and the curve of exhaustion of coal and oil or any resource is a curve like this.

You finally get to maximum production and then you begin to fall off. In the case of oil and gas it is right near its peak as far as the United States is concerned. You might find this illuminating.

Mrs. HANSEN. The committee would appreciate having a copy of it.

Dr. OSBORN. Very well.

AIR POLLUTION FROM AIRCRAFT

Mrs. HANSEN. Please insert in the record for us the amount of air pollution that is spewed per day from National Airport and Kennedy Airport.

Dr. OSBORN. The amount of material that is put in the air from each airport?

Mrs. HANSEN. That is right.

Dr. OSBORN. All right.

(The information follows:)

Northern Research Laboratory of Cambridge, Mass., under contract to the Environmental Protection Agency, made a survey of aircraft emissions in the Washington, D.C., metropolitan area 2 years ago.

EMISSIONS IN THOUSAND POUNDS PER DAY FOR 1967

	Carbon monoxide	Unburned fuel	Nitrogen oxides	Particulates
National Airport:				
Turbine aircraft	6.1	1.7	1.2	0.6
All aircraft	71.0	10.3	1.3	0.7
Entire Metropolitan Area, D.C.:				
Turbine aircraft	36.9	7.4	3.1	1.0
All aircraft	162.0	24.0	3.3	1.2
Kennedy Airport:				
All aircraft [1]	8.75	11.1	4.3	2.9
Los Angeles International: [2]				
All aircraft [3]	72.6	27.9	4.8	1.5

[1] Kennedy is mostly turbine aircraft.
[2] Data were not available for O'Hare so Los Angeles was substituted.
[3] Los Angeles has a high volume of piston aircraft.

To place these numbers in perspective, an estimate made by the Bureau of Mines in 1967 for all automotive emission in the D.C. metropolitan area showed the following in thousand pounds per day.

Carbon monoxide	5,500
Unburned fuel	630
Nitrogen oxides	250
Particulates	21

COST AND ACCOMPLISHMENTS OF PROJECT GASBUGGY

Mrs. HANSEN. What was the cost of project Gasbuggy and what has been accomplished?

Dr. HENRIE. This, of course, was not a project of the Bureau of Mines. We participated in it. I suppose we would have to go outside the Bureau to find the exact amount but I believe we can do this for you.

(The information follows:)

Gasbuggy was conducted in the San Juan Basin near Farmington, N. Mex., on December 10, 1967. The 29-kiloton (kt.) detonation created a chimney of broken rock about 333 feet high and a void volume of about 2 million cubic feet, 3,900 feet below the surface. It was the first Government-industry Plowshare experiment. Production tests of the Gasbuggy chimney well so far have resulted in a cumulative production of 280 million cubic feet of gas, all of which was burned at the wellhead. If the well were in production over a 20-year period, it might be estimated to produce nearly 900 million cubic feet of gas which is at least five times better than the average production of a conventional well in the same area. During 1970, field activity on Gasbuggy consisted of periodic monitoring for radioactivity in feeder lines from nearby wells. No radioactivity attributable to Gasbuggy was found. The reentry wells at Gasbuggy remained sealed to allow pressure to build up before additional production testing in 1971.

[In millions]

Cost:	
El Paso National Gas Company	$2.2
Atomic Eenergy Commission	3.4
Total	5.6

Mrs. HANSEN. What have been the accomplishments?

Dr. HENRIE. Well, I believe that this project demonstrated that the recovery of gas could be increased considerably. Also, Rulison which followed after, demonstrated that not only was our recovery increased considerably but the radioactivity of the gas was much less than expected and it could be commercial gas.

OIL SHALE RESEARCH

Mrs. HANSEN. $2.5 million is requested for oil shale research. Give us a detailed description or just what your activity has been in this connection during the past year.

Dr. HENRIE. Our work this past year has been studying the property of shale oil. We have projects on the development of in situ retorting of oil shale. These are our major projects and major thrust areas in oil shale.

We are also working to find the extent to which Dawsonite, which is an alumina resource, and Nacholite, which is a soda resource, can be recovered, and we have also been studying the purification of retorting waters, that is, the water that comes from retorting during the

formation of shale oil, and water that is in oil shale. These waters contain soluble inorganic and organic salts that must be removed to protect the environment.

Now, as far as our expenditures are concerned, through 1971 we have spent $41.7 million.

Mrs. HANSEN. Over how many years?

Dr. HENRIE. That would be starting back in 1916; $.4 million of this was spent between 1916 and 1930, $22 million had been spent during the period 1944 to 1955—under the Synthetic Fuels Act, $16.8 million of these dollars went into the Rifle plant. The balance of $19.3 million has been spent since 1955 under the authority of the Organic Act of the Bureau of Mines.

Mrs. HANSEN. Have you programed any funds for such a plant in this budget?

Dr. HENRIE. On oil shale?

Mrs. HANSEN. Yes.

Dr. HENRIE. Our oil shale program we think should be quite constant for the next few years and directed toward demonstrating the feasibility of in situ retorting of oil shale. Added to this we will continue to study shale oil and its properties and develop resource information. We have demonstrated quite well the feasibility of surface retorting in mining for oil shale.

Mrs. HANSEN. What is your next step?

Dr. HENRIE. Our major effort will be toward in situ retorting.

Dr. OSBORN. But this is still in the stage we might call pilot plant. I mean it is not the large demonstration or prototype.

Mrs. HANSEN. That is what I am asking. Are you ready for the demonstration prototype?

Dr. OSBORN. No; unless it is speeded up, in other words, unless it were more a crash type program, the present program will take until about 1975 in the pilot plant stage.

Mrs. HANSEN. On the crash type program are you ready with the environmental answers?

Dr. OSBORN. We are, as far as the underground retorting is concerned that we are working on, but the environmental aspects that we are working on are those that have to do with the conventional mining and above-surface retorting that the companies will be getting into on these leases if the leases go through in 1972.

We are developing methods of stabilization of this waste rock, of dealing with the waste liquids and gases. I will stand corrected by Dr. Henrie if he believes differently, but I believe it is true that until these prototype plants by industry are actually operating we really won't know the extent to which there is an environmental problem. In other words, they can use the knowledge we have gotten but until we get to this large scale——

INDUSTRY OIL SHALE PROTOTYPE PLANTS

Mrs. HANSEN. Why is industry building the prototype plants rather than the Federal Government?

Dr. OSBORN. Well, Mrs. Hansen, the question is usually the other way, why is the Government doing anything.

Mrs. HANSEN. Who asked that question?

Dr. OSBORN. Almost everybody but you.

Mrs. HANSEN. Why shouldn't the Government be doing it?

Dr. OSBORN. Well, of course, we think that the Government should carry it to a stage where it can and will be picked up by industry. That is the way we feel in the mineral resources field. Of course, in the power field the Government went right through to TVA. Maybe in mineral resources the Government should, too, but at least we think we ought to go through generally the third stage and get it up to prototype.

However, in the case of shale oil the prototype we are talking about, the demonstration plant, is about a 50,000-barrel-a-day operation costing maybe $175 million to build.

Mrs. HANSEN. Would that enable you in any way to do better leasing?

Dr. OSBORN. I think if the Government were to do it at this scale this would be quite a departure, as far as I know of, from all previous practice. I think that a great deal is going to be learned from that scale plant. You have touched on a very important question, should this be government or should it be industry. The feeling in Interior has been that this scale of an operation should be undertaken by industry.

Does anybody disagree? Would you say that, Paul?

Mr. ZINNER. I think that is correct.

Mrs. HANSEN. Why do you think this operation should be undertaken by industry?

Dr. OSBORN. Well, I am a newcomer. Do you want to answer this, Paul?

Mr. ZINNER. One of the reasons that several Secretaries of the Interior have had quite a time trying to find a suitable way to advance oil shale development is the very question that you are asking. There has been considerable thought given to the fact that, first, here is a resource that is very largely in the public domain and therefore anything you do is almost certain to be opposed by someone.

Mrs. HANSEN. That is why I am asking the questions.

Mr. ZINNER. These are the kinds of questions that have bothered the Interior Department. Therefore, anything you propose to do that follows the normal process of the free enterprise system appears to some to be a giveaway of these valuable resources. Interior has been accused on occasion of toying with that type of an idea and they are anxious to avoid this and find an acceptable and, at the same time, an effective way of doing it.

I think one of the thoughts that probably is still being considered is that perhaps the initial involvement in demonstration might very well be a Government-financed operation, but that decision has certainly not been made.

Mrs. HANSEN. I think you have to know what procedures are needed to protect the Federal Government's resource of the oil shale and to provide the best information that you can to the Federal Government on its leasing policy so that you obtain the royalties that are due.

Mr. ZINNER. That is correct.

Mrs. HANSEN. As I understand, this is a backup resource that we

have available. It would seem to me that you need to develop the technology to provide for the best possible leasing know-how to the Department. Is this correct?

Mr. ZINNER. I think that is correct, except as time goes on oil shale becomes less and less of a backup subject and more and more a real and necessary increment in the energy picture.

Mrs. HANSEN. I agree. Do you have sufficient time to develop your technology to the state that will give you the best return for the Federal Government, and allow you to protect the Government's lands, so they are not damaged for all eternity?

Mr. ZINNER. Right now we wish that the technology was a little more advanced than it really is.

Mrs. HANSEN. You do not now have the technology?

Mr. ZINNER. No.

Dr. OSBORN. No; it is rather clear where we are, and that is just at the pilot plant stage. This is the same story with our urban refuse problem. We have to get to the next stage in order to know. Although I would say, in the urban waste problem we are way ahead of the oil shale as far as knowing, but it is more or less analogous and until we get these large-scale prototype or demonstration plants we just don't know all the problems we are going to have with oil shale.

DEFINITION OF OIL SHALE

Mr. WYATT. Madam Chairman, I think it would be appropriate at this time to have a definition for the record of just what oil shale is.

Mrs. HANSEN. Please.

Dr. OSBORN. What oil shale is?

Mr. WYATT. For the record.

Dr. OSBORN. Well, this is a sedimentary rock—let's call it a shale—that underlies large areas in the three States of Colorado, Wyoming, and Utah. The high grade oil shale occurs under about 17,000 square miles where it is at least 10 feet thick but may be many hundreds of feet thick in some parts. It is thinner in other places and lower grade. Generally, we are referring to the high-grade material that we think can be profitably mined ultimately. By "high grade" we also mean that it contains more than 15 gallons per ton. In other words, let's say about a third of a 42 gallon barrel per ton. The depth to which it occurs will vary all the way from zero down to several thousand feet underground. There are three principal basins, one in Colorado, one in Wyoming, one in Utah.

Mr. WYATT. It is a rock-like substance that contains oil and your problem is how to get the oil out economically and without damage to the environment?

Dr. OSBORN. That is right, just a good firm rock. When you pick up a chunk of it, your fingers won't get wet. It is solid hydrocarbon material and the early Indians in that part of the country actually used it for heat. In other words, it is a very high-ash coal-type material.

Dr. HENRIE. It is about 6 percent by weight of the material we call the burnable material kerogen and when you heat kerogen it evaporates from the rock and condenses in the cooler areas as a petroleum-like oil.

Mr. WYATT. Thank you.

COMPARISON OF SHALE OIL WITH PETROLEUM

Mr. GALIFIANAKIS. How does the quality of that oil compare with the oil that comes out of a well?

Dr. HENRIE. This oil from oil shale contains a little more nitrogen than our average petroleum, and probably just a little less sulphur, but a lot of its characteristics are quite similar.

Mr. GALIFIANAKIS. Have the two been evaluated from an environmental impact aspect?

Dr. HENRIE. It is not too difficult to take this product and get a gasoline quite comparable to the gasoline you get from petroleum. It does contain a little more nitrogen, and these are ring-like molecules and they are quite aromatic in nature but they can be removed and your products are quite similar to petroleum.

Mr. ZINNER. We have operated automobiles out there when we had the plant going at Rifle. We operated the automobiles with gasoline made from the shale oil and you wouldn't——

Mr. GALIFIANAKIS. There is no fundamental difference?

Mr. ZINNER. No fundamental difference.

Dr. OSBORN. I might say also that it is relatively low in sulphur. The oil from oil shale is about .5 percent sulphur.

OIL SHALE LEASES

Mr. MCDADE. Is it correct that you have no intention of entering any leases until such time as this plant demonstrates to you on an operating basis the——

Dr. OSBORN. According to present statutes the largest lease can be 5,120 acres, and the present suggestion of the Department, and this is now open for criticism and so on from the outside, is that there be a maximum of six of these leases, not to exceed 5,120 acres each, on each of which there would be a demonstration plant. Even though this sounds big and it is a big plant, 50,000 barrels a day, still this is just a demonstration plant. In order to produce the type of oil we are talking about we have to get up to about 1 million barrels a day. So the Department of the Interior will recommend for consideration by anyone who wants to comment on it that leases be made for a certain period of years, like 10 years, on these tracts of the size I just mentioned specifically for demonstration scale operations.

Mr. MCDADE. If that were done I assume you have access to all of the information that would be developed.

Dr. OSBORN. Yes, sir; it would be done with that in mind.

Mr. MCDADE. And for purposes of future decisions with respect to the oil shale reserve or whatever one might want to call it, this is a way of approaching that in a way that will be sound both economically and environmentally; is that right?

Dr. OSBORN. That is right.

Mr. MCDADE. Is that your reason for hitting at the 5,000-acre figure and six possible leases?

Dr. OSBORN. The 5,120 acre figure goes back to some earlier law I think. I don't have it here, but there was some much earlier regulation that has to do with leasing on public lands. I think it goes back to the thirties.

Mr. McDade. We wouldn't end up with 30,000 spoiled acres, would we?

Dr. Osborn. No; each lease will have to come in with its detailed plan on how it intends to proceed, including all the measures to be taken to provide for environmental protection, and so on. This would all be a package before they would get a lease.

Mr. McDade. Thank you, Madam Chairman.

Dr. Osborn. It is such a sensitive issue you can be sure there will be tight controls.

Mr. McDade. Yes, I would hope so.

Mrs. Hansen. It is a highly sensitive issue because when you don't issue leases you are accused of waiting to award them to certain oil companies and if you do issue leases the environmentalists are concerned.

Dr. Osborn. Right; but Congressman McDade's question, I think, meant when would there be really large-scale leasing, and all we can say is we don't know. There would be necessarily relatively small leases first.

Mr. McDade. And certainly no large scale until you know where you are going?

Dr. Osborn. We don't even predict when that will be.

Mrs. Hansen. How interested are private companies in development of Federal oil shale resources in the near future?

Dr. Henrie. There are some private companies, the Oil Shale Corp., Standard Oil of Ohio, and others who are working on developing techniques for extracting shale oil from these materials.

Mrs. Hansen. Is there any other alternative for providing oil companies participation? If not, why not?

Dr. Henrie. I think the Bureau of Mines has worked with these oil companies too, and we and they have evaluated the processes. The basic procedure that they are studying is not the same as the Bureau of Mines technique. However, they are doing some in situ work too.

Dr. Osborn. I think your question is whether other companies than oil companies might become involved?

Mrs. Hansen. That is right.

Dr. Osborn. Certainly there is no Federal restriction or even preference that they should be oil companies.

Mrs. Hansen. Is there any evidence of interest from anybody, other than oil companies at the present time?

Dr. Henrie. I don't know whether the Cleveland Cliffs Iron Co. is strictly an oil company or not.

Dr. Osborn. No; it is not.

Dr. Scott. Cleveland Cliffs was involved in it as the mining partner in the original Tosco venture. They handled the mining, and the oil companies handled the retorting.

ORIGIN OF OIL SHALE RESEARCH

Mr. Galifianakis. Did the research in trying to extract oil from the shale originate with the Bureau of Mines or was it a private enterprise pursuit?

Dr. Henrie. I think it was first back in 1916, and this would be the Bureau of Mines.

Mr. GALIFIANAKIS. And you have been doing the principal research since that time?

Dr. HENRIE. We have been doing research nearly continually since that time to develop the techniques that was tried at Rifle.

Mr. GALIFIANAKIS. What is your overall appraisal of that research that has been pursued since 1916? How would you characterize that endeavor? That is about 60 years.

Dr. HENRIE. When I look at the enthusiasm of the Laramie Laboratory, all I can say is that these people are very capable and very knowledgeable of the overall oil shale program; and it would seem to me, not being directly associated with them, that they have accomplished a great deal of work over the years and have a great reputation of doing a good job in this area.

Mr. GALIFIANAKIS. What do you envision the practical consequence is going to be?

Dr. HENRIE. Well, I believe in a few years we will be tapping this great resource. It is a great energy source. There are about 600 billion barrels of oil, which I guess are a trillion tons—that contains 25 gallons of oil per ton—that will be available to us as an energy source.

Mr. GALIFIANAKIS. Is this within the decade of the seventies, would you say?

Dr. HENRIE. I think that we will start then.

Mrs. HANSEN. How many years' use would this add at the current rate of use?

Dr. OSBORN. At our current rate?

Mrs. HANSEN. Yes.

Dr. OSBORN. Well, if it were to substitute just for the petroleum we use now, it would be 120 years.

Mrs. HANSEN. 120 years?

Dr. OSBORN. If all the oil came from there.

Mr. GALIFIANAKIS. It is beyond our lifetime.

Mr. WYATT. Current expectancy.

OIL SHALE IN OTHER NATIONS

Mrs. HANSEN. How many other nations in the world have oil shale?

Dr. OSBORN. We will have to get that for you.

(The information follows:)

Oil shale deposits are known to occur throughout the world. Our records indicate that there are deposits in at least 37 countries including the United States.

Mr. ZINNER. I think you will find oil shale almost everywhere. The reason great attention gets focused on these three States is because this happens to be very rich, very thick beds, but there is oil shale under most of the United States in one form or another. There are certainly large bodies all through Asia. There have been oil shale operations in Spain, Russia, Scotland, and many other countries, so I would say that oil shale occurs almost anywhere in the world, but probably not in this rich concentration that occurs in the three-State area.

DEPARTMENT OF THE INTERIOR RESPONSIBILITIES FOR OIL SHALE

Mrs. HANSEN. At this point in the record I will insert the Department responsibilities in connection with oil shale.

(The information follows:)

DEPARTMENT RESPONSIBILITIES IN CONNECTION WITH OIL SHALE PROGRAM

Appropriation and activity	1971	1972
Bureau of Land Management: Management of lands and resources:		
Realty and mineral leasing services	$100,000	$100,000
Resource management, conservation, and protection	325,000	325,000
Cadastral survey	50,000	50,000

DESCRIPTION OF PROGRAM

The Bureau of Land Management has the responsibility to clear title on Federal oil shale lands in Colorado, Utah, and Wyoming. This involves the identification of mining claims located on oil shale lands by abstraction from county records; field reconnaissance examinations to obtain data on geology, mineralization, topography, exploratory and actual mining activities, and access; and land office processing to clear title by adjudicative action. Actual title clearance includes determination of the validity of each individual mining claim and may also include preparation of complaints in contest actions against the claims, service of complaints, hearings, decisions, and appeals. Land office work is included under the "Realty and mineral leasing service" activity, and field examination is under the "Resource management, conservation, and protection" activity, Cadastral surveys are also required to identify some claims.

Bureau of Mines: Conservation and development of mineral resources: Research, oil shale	$2,508,000	$2,500,000

DESCRIPTION OF PROGRAM

The Bureau's oil shale research program is designed to provide scientific and engineering information needed by Government for planning and policy purposes in reference to oil shale development and to expedite commercialization of oil shale in an efficient, environmentally acceptable manner. The program includes investigations to establish the quantity and quality of the Nation's oil-shale resources; to develop and evaluate new retorting concepts, particularly in situ techniques that will minimize disturbance of the environment; to assess the environmental problems that will attend an oil-shale industry and devise means of coping with them; to conduct studies on effective means of refining shale oil into products comparable to those obtained from petroleum; to determine the by-product potential of oil shale operations, including possible recovery of valuable minerals; and to determine the composition and properties of oil shale, shale oil, and their products as related to source and/or processing history.

Geological Survey: Surveys, investigations, and research: (Part of) Geologic and mineral resource surveys	$476,000	$470,000

DESCRIPTION OF PROGRAM

Oil shale resource appraisal studies are carried on in Colorado, Wyoming, and Utah to provide data necessary for the management of these Government-owned resources. General studies also are underway using techniques of geology, geochemistry, geophysics, and mineralogy to gain an understanding of the nature and distribution of oil shale and the associated sodium and aluminum minerals.

OIL DEPOSITS IN VIETNAM

Mrs. HANSEN. What is the truth in the statement that there are rich oil deposits off the coast of Vietnam?

Dr. OSBORN. Unfortunately, I only know what I read in the papers.

Mrs. HANSEN. That is what I am quoting from.

Dr. OSBORN. But there is no reason why there shouldn't be. The geology is all right.

Mrs. HANSEN. Are any American companies in Vietnam exploring this possibility?

Dr. OSBORN. I don't know.

Dr. SCOTT. There is some off Indonesia, quite a few oil discoveries there, but I don't know what is being done.

Mrs. HANSEN. Are any American companies in Indonesia exploring for oil?

Dr. SCOTT. Off Indonesia, yes; and you are really not talking about a different geologic setting than, say, Vietnam, so whether or not they just moved up the line would be up to them.

URBAN REFUSE SEPARATION RESEARCH

Mrs. HANSEN. You are requesting an increase of $500,000 and 17 positions to expand urban refuse separation research and design a demonstration facility. You have discussed this earlier, and if you want to add anything more at this point, please do.

Dr. OSBORN. I think all I might add is that we have in mind using that money partly to increase our laboratory pilot plant program——

Mrs. HANSEN. At what location?

Dr. OSBORN. At College Park. But also we want to use part of that money to design a 250- to 500-ton-a-day plant which probably will be located in the Washington area, the precise site has not been selected for this demonstration scale.

Mrs. HANSEN. Why will it be located in the Washington area?

Dr. OSBORN. Well, this is where our pilot plant is, so our experts are here, so this is the logical place to do it. It is as good as any.

Mrs. HANSEN. Have you given any advice on the land fill that is going on between the District of Columbia and Prince Georges County?

Dr. OSBORN. Has anybody?

Dr. SCOTT. No.

Dr. OSBORN. We are just developing technology. We are not really land-use people; that would be the EPA group, I suppose.

Mrs. HANSEN. It is National Park Service land.

Dr. OSBORN. I would just like to say that it is an outrage that we bury these valuable materials and I think it will be only a few years from now that we might be thinking of remining and processing these dumps by methods developed by the Bureau of Mines or others, or combinations. This landfill practice has to be a temporary solution. It is just wasting valuable materials.

Mrs. HANSEN. What is going to be the principal use of this glass?

Dr. OSBORN. It will be used by glass plants. We are separating glass very neatly, and if you have a chance to go to the plant you will see, the colored glass separated from the colorless glass. A little machine has been introduced that separates the recovered glass by colors. The colorless glass is more valuable because it is made from pure ingre-

dients in the first place, almost zero iron oxide, for example. It will bring a little higher price and can be used for anything that you use colorless glass for. In other words, it can go into colorless bottles or can be used for cullet, going into glass fiber or window glass or anything that is colorless. The colored glass would be for cullet for making beer bottles and so on.

Mrs. HANSEN. Do you also take paper and recycle it?

Dr. OSBORN. Yes; the paper and plastic have two main possibilities. One is just for combustion, just burn them in a way that permits using the contained energy. The long-range possibility that we are working on is converting it into oil, long-range, because we are only at the laboratory stage now.

METALLURGY RESEARCH

Mrs. HANSEN. Your total request for metallurgy research is $13,550,000. Please insert in the record a breakdown of the locations where this work is performed, indicating the type of work at each location and the funding provided in the 1972 budget in each instance.

(The information follows:)

DISTRIBUTION OF METALLURGY RESEARCH

Albany (Oregon) Metallurgy Research Center—$2,800,000. Major effort: Continuous electric furnace steelmaking; recovery of titania from ilmenite; defect-free titanium; concentration and processing phosphate; recovery of nickel from Western deposits; electrothermic smelting of copper; concentration and chlorination of base metal ores; alloy development.

Boulder City (Nevada) Metallurgy Research Laboratory—$750,000. Major effort: Recovery of aluminum from aluminum-silicon alloys and scraps; development of electrolytic method for production of zirconium.

College Park (Maryland) Metallurgy Research Center—$1,950,000. Major effort: Recovery of mineral materials and energy from urban refuse; removal of copper from molten iron; electrodeposition of hard materials on steel; corrosion research; economic appraisal of metallurgical processes.

Reno (Nevada) Metallurgy Research Center—$1,300,000. Major effort: Innovative chemical treatment methods for recovery of copper, silver, molybdenum, and mercury; extraction, purification, and use of rare-earth metals.

Rolla (Missouri) Metallurgy Research Center—$1,000,000. Major effort: Separation and use of waste plastics; recovery of valuable constituents from steelmaking furnace dusts, foundry dusts, and chemical plant wastes; development of high-temperature solder.

Salt Lake City (Utah) Metallurgy Research Center—$1,800,000. Major effort: Removal of sulfur from smelter gases; stabilization and utilization of mine and mill wastes; recycling automobile scrap; leaching copper mine waste, mill tailing, and silicate ore; recovery of gold and silver; processing lateritic nickel ore.

Tuscaloosa (Alabama) Metallurgy Research Laboratory—$800,000. Major effort: Development of concentration methods for recovering nonmetallic minerals; recovery of phosphate from Florida rock; concentration of potash ores; cleaning and utilization of clays.

Twin Cities (Minnesota) Metallurgy Research Center—$1,400,000. Major effort: Concentration of nonmagnetic taconite; development of low-temperature pelletizing process; production of super-grade pellets; recovery of copper and nickel from gabbro ore.

Washington, D.C. Headquarters.

Technical overhead	$300,000
Administrative overhead	745,000
Grants, contracts, fellowships	346,000
Total headquarters	1,391,000
Employee compensation fund	359,000
Total metallurgy funds	13,550,000

Dr. OSBORN. Here is some of the waste material made into plastic from our plant. Can you, Dr. Henrie, tell her how that was made?

Dr. HENRIE. This is just waste plastic material that was gathered up in Rolla, Mo., and they perhaps put it under slight temperature and pressure, and it molds very well. This is not segregated plastic. This is just as it comes—occurs in waste.

Mr. WYATT. There are two major kinds of varieties of plastics?

Dr. HENRIE. Yes, depending on the hardness of the plastics, but they apparently just gather all of them together. With a little bit of temperature and pressure the plastic welds together.

Mr. WYATT. What do you do besides making paper weights?

Dr. HENRIE. I suppose it can be used for patio blocks or any other similar use.

Dr. OSBORN. Mrs. Hansen, this is just off the record, please.

(Discussion off the record.)

SCRAP AUTOMOBILES

Mrs. HANSEN. As you travel the length of this country, particularly in the West, you see scrap automobiles all over the Nation. Has anyone ever thought of having the manufacturers of cars pay for the destruction of their old automobiles?

Dr. OSBORN. This is not answering your question directly, but I would like to mention that the General Motors Co. is doing a lot on their own on this problem because certainly it isn't good public relations for the automobile companies to have all these eyesore wrecks, as you are saying, around the country.

Mrs. HANSEN. They are getting worse every day.

Dr. OSBORN. Yes, right; and, for example, they are developing trucks to pick up automobiles within a 300-mile radius, wrecked automobiles, and they are built to tear it apart, compress it, and put it on a truck, and bring it into a central plant, so I know large-scale experiments are going on now by at least one large manufacturer to take care of this thing. But the Bureau of Mines has been working on incineration—which I think you are referring to, are you not?

Mrs. HANSEN. Yes.

Dr. OSBORN. It is a very neat idea and it is catching on. The last I heard was there are five companies that are going to use the Bureau of Mines method of automobile incineration in their automobile processing plants. We spent $22,000 and built this little prototype plant that will burn up two cars at a time in a smokeless way, that is, the smoke itself is consumed so that there is no air pollution from burning them. You know, often automobiles are just burned outside. They just throw some gasoline on them and burn them to get rid of the combustibles. In the Bureaus plant these are burned inside this little incinerator two at a time.

We do what? 48 a day in that incinerator?

Dr. HENRIE. Yes.

Mrs. HANSEN. Are you wasting any metal?

Dr. OSBORN. We are not wasting any metal. We are burning the combustible parts. The temperatures get high enough so that some of the lower melting point metals that run out are easily recovered, and we end up with a steel hulk that goes to the steel plants. This is catching

on and will help the disposal situation in some types of automobile reclamation.

EXTRACTING MERCURY FROM ORES

Mrs. HANSEN. I notice in your justifications a very interesting program for extracting mercury from ores. Since mercury is an immense problem right now will you discuss this program for us.

Dr. OSBORN. One of the things we are doing is systematically sampling coals for mercury across the country in each State that has coal resources. We have not had that information in the past. We needed to develop more highly refined methods of analysis first, which we have done and are continuing, so this program is going on. I think this is important to know how much mercury is going up the stacks in the process of combustion of coal, so we will have this. Tom, are there other mercury problems that you can comment on?

Dr. HENRIE. This work that you are referring to, Madam Chairman, was an outgrowth of other research that we were doing and it is a very good method to extract mercury from its mineral. It would eliminate many of the pollution problems of mercury such as mercury vapors because the process is in an aqueous system, as well as eliminating SO_2 contaminating from mercury roasting.

We have done some work along these same lines to prevent mercury from getting back into our streams from some of our commercial plants. However, I believe that most of the plants that have contacted me are taking care of this problem by their own techniques so we hope that before too long, everybody will not be worrying about mercury.

Mrs. HANSEN. What are your principal sources of mercury and what are your principal uses?

Dr. HENRIE. Our principal sources of mercury, of course, are in the California-Oregon-Nevada area as far as this country is concerned. Mercury has a number of uses, from helping to fill your teeth—the dentist uses a mercury-silver alloy—to the major use being in the chlor-alkali business.

Mrs. HANSEN. Isn't the mercury in your teeth poisonous?

Dr. OSBORN. It is.

Dr. HENRIE. I don't know why the environmentalists haven't gone into that, but, of course, when the dentist puts silver in your teeth it is as a silver amalgam he squeezes out the mercury from the filling and either you spit it out in the drain or you swallow some of it. I don't suppose that all mercury or all mercury compounds are poisonous, and mercury itself is not dissolved much by your body. One poisonous form of mercury is methyl-mercury and this is the compound that gets into the tunafish and swordfish, et cetera. Methyl-mercury is formed by decomposition of organic materials in the presence of mercury, like in swamps and waste discharge areas.

Mrs. HANSEN. Is mercury present in water?

Dr. HENRIE. Well, it would be probably in the bottom of swampy areas where individual plants discharge. You know of marsh gas, have smelled it as you have driven by swamps. Well, this is decomposition of organic materials and if you have mercury compounds in that area, methyl-mercury will form.

Mrs. HANSEN. I don't know how many requests we have had to save our swamps. Isn't that true?

Mr. WILES. Yes, ma'am.

Dr. HENRIE. It is a result of these industrial plants discharging mercury in the same area where decomposition is taking place. Here is another example of the use of mercury. Joe Corgan's hearing aid has a mercury cell and he is not too worried about it poisoning him. But not all mercury is poisonous and it is a very useful and necessary material.

Mrs. HANSEN. What is the basic use of mercury?

Dr. HENRIE. It is our only liquid metal at ambient temperatures, so it has great scientific uses, vacuum pumps and all sorts of special apparatus, as well as being a very useful material in metallurgical processing.

Dr. OSBORN. You know the old gold panners collected their gold by amalgamating it with mercury.

Mrs. HANSEN. Isn't there a lot of mercury in the streams?

Dr. OSBORN. Might be.

Mr. ZINNER. You couldn't take much gravel from the bed of any stream in the West and not find mercury in it.

Dr. OSBORN. From the old panning days.

Mr. ZINNER. Yes.

Dr. OSBORN. But it won't hurt you any. Maybe it is good for you.

Mrs. HANSEN. There are a lot of people disturbed by the presence of mercury.

Dr. HENRIE. I think here is another example of lots of experts perhaps and not enough expertise in defining the problems.

Mrs. HANSEN. I think you have to develop some scientific answers on the effects of mercury.

Mr. GALIFIANAKIS. Madam Chairman, what causes mercury to decompose?

Mrs. HANSEN. Mercury doesn't decompose.

Dr. HENRIE. It is the material in all your thermometers, and many other household items.

Mr. GALIFIANAKIS. Quicksilver.

Dr. HENRIE. Yes; that is right, and the supposed formation of methyl-mercury which is the contaminant of lakes and rivers comes from the combination of stagnant water where you have organic decomposition and mercury compounds being in that area. The methyl-mercury is slightly soluble in water, and I think it just goes through the cycle of being absorbed by smaller simpler forms of life which concentrate it. These simple forms of life are eaten by larger animals until it is finally eaten by the larger fish.

Mr. GALIFIANAKIS. This is the kind of mercury we are talking about, then, in fish, to whatever degree it is soluble?

Dr. HENRIE. That is right. It apparently collects in the fish. However there are some other insecticides and fungicides that are made from mercury compounds, also agricultural products, some of these are poisonous. The overall mercury problem is a very complex one. However, it should be recognized that it does have very many uses for mankind.

Mr. GALIFIANIKIS. Where did you say the principal source of mercury was?

Dr. HENRIE. From California, Nevada, and the Oregon area.

Mr. GALIFIANAKIS. Out of the water?

Dr. HENRIE. No; it is a mineral in regular ore bodies, a sulphide mineral principally.

Mr. GALIFIANAKIS. It is good to recall this knowledge from time to time.

Mr. ZINNER. The largest sources by far are in Spain and Italy.

Mr. GALIFIANAKIS. Do we import a lot?

Mr. ZINNER. Yes.

Dr. HENRIE. Yes, most of it.

MINING TECHNOLOGY FOR MARGINAL RESOURCES

Mrs. HANSEN. $1,927,000 is requested for advancing mining technology for marginal resources. Just what have you accomplished in this connection in the past few years?

Dr. OSBORN. Well, a very interesting type, if I may comment first, of deposit is that which can't be mined economically at present because it is too low grade or because it is too deep. Some of the interesting work that I have seen in my short tenure with the Bureau is studies on leaching in situ with the idea that we could fracture an ore body at depth, let's say a low grade copper or nickel or copper-nickel ore body that may be too low grade to mine by conventional means. Studies that fascinate me are those which involve fracturing which on a large scale might be accomplished by nuclear bursts safely, 2,000 or 3,000 feet underground say, fracturing the rock and then introducing appropriate solutions to oxidize the sulfides and produce heat to raise the temperature in the area and cause reactions to dissolve the copper and nickel which can then be pumped up in solution so we can continue to circulate. This is a sort of long-range program that I think is very important for the Bureau to be working on.

Mrs. HANSEN. Have you done any experimental work on nuclear fracturing?

Dr. OSBORN. What we have done is this. Some of us have gone underground in Nevada to what the extent of the rock breaking, and so on, to get some idea of how this technique could be applied. With respect to Dr. Henrie's group at Reno, they are working on penetration of solutions into blocks to see how fine the rock has to be crushed in order to get solutions through it, to extract minerals such as copper and nickel. Then our people at Minneapolis are working on temperature-pressure studies for solubility of nickel and copper, aren't they?

Dr. HENRIE. Yes.

Dr. OSBORN. You might go on. I think this is one of the very important types of research we are doing on marginal ore deposits. Do you want to add anything to that, Tom?

Dr. HENRIE. I think that we have reached a point in our mineral resources where we must look to leaner and leaner ores and try to extract the metal values as efficiently as possible. We are forced to this and I suppose that this is one good reason for Government research in this area. Because as of today a lot of these deposits in one way and another may not be attractive to the mining and metallurgical companies, so we have to find methods of extracting our ores, concentrating our minerals so that they can be effectively processed.

I suppose that Dr. Scott can comment a little better on mining, but as far as us working with people like the AEC, the Bureau of Mines has served on these committees and works closely in helping to design and develop mining procedures no matter what type of Government funding is involved. We do follow very closely the results of facturing rock by nuclear blasts as well as the extraction of the materials from these caverns.

Jim, did you want to add something?

Dr. SCOTT. You might look on page 32. There is an apparatus which we developed in the Coeur d'Alene area. Wilson Blake, one of our young engineers at Denver, worked with the American Smelting & Refining Co. and we received very excellent letters from this company regarding his work. This apparatus measures the microseisms, the small noises that occur in a rock mass when it is highly stressed or highly loaded and it records the direction and location of these noises. With this apparatus we have been able to predict the ground conditions and design a method whereby the ground is destressed previous to mining.

It is a system the mining company has adopted directly from our work where they destress the pillar, actually fracture in the solid, and create small incipient fractures which then allow the mining of this pillar without ever building up a tremendous load which can develop in a disastrous rock burst. It is the type of research for which the companies are very appreciative. They are mining to depths in excess of 1 mile in the Coeur d'Alene district.

DECREASING HAZARDS FROM CRASHES OF AIRCRAFT

Mrs. HANSEN. One of your more interesting comments in the justification is on a project to decrease hazards encountered by accidental crashes of aircraft. May we have your comments in this connection?

Dr. SCOTT. This work is being done by Dr. Van Dolah at Pittsburgh. It is the result of his expertise in the field of fires and explosions. This is recognition, by others in Government that we at our mining research laboratories have some particular unique expertise. They have come to him and asked him to look at this problem because many of the deaths in helicopter crashes, particularly in Vietnam are due to the fire hazard after the crash, and so he has set up an apparatus for testing the containers of fuel crashing into the ground at various angles in a drop test. We have the techniques for high speed photography to measure exactly what happens under these conditions and also we have tested Jello-like fuels to compare with standard liquid fuels. This fuel has a consistency similar to Jello you make in your home. The Army would like to use this Jello-like fuel instead of liquids. We are not in this research as an extensive program. It is only because of a request by another Government agency to do some work in this area that we are involved.

Mrs. HANSEN. Do they reimburse you?

Dr. SCOTT. Yes.

INTER-INDUSTRY STRUCTURES OF THE ELEVEN WESTERN STATES

Mrs. HANSEN. You say in your justification that, "a long-range project to develop the interindustry structures of the 11 Western States

with emphasis on the mineral industries which will be undertaken." Can you explain what that is all about?

Dr. OSBORN. Would you like to answer that?

Dr. HENRIE. I will have to read here just a second. You are moving quite fast, Madam Chairman. I believe that Paul will have to answer that question.

Mr. ZINNER. We are just trying to keep it in organization channels but I will be delighted to comment. The principal thrust of most of the Bureau's investigations is directed to national problems, things that attract attention nationally in the form of supply-demand relationships. But there are a great many things that have significance on a regional basis. While nationally the demise or the rise of a local mineral-related industry may mean little on the national scene, locally it means a great deal.

Mrs. HANSEN. Every industry in the State of Washington is under attack by somebody in this Congress.

Mr. ZINNER. I think that is correct and I think you will find locally that everybody has problems of this kind. So a number of years ago we started, in cooperation with the universities in most cases, an econometric type of exercise to try to measure the effects of changes in the mineral industry on the economy of a given region. This is what these programs are about.

UNCONTROLLED MINE FIRES

Mrs. HANSEN. How many mine fires are burning in the United States and where are they located?

Dr. OSBORN. We counted them recently and it was 289. Of these, 70 percent were in the West and 30 percent in the East. Most of them are out in your country.

Mrs. HANSEN. Where are the fires located?

Dr. OSBORN. Montana, Colorado, Wyoming, Utah, and so on, but the number will vary from time to time; at any rates there are between 250 and 300 uncontrolled fires. It is a serious matter. Some of these are small outcrop fires. They might have been started by a campfire or by lightning and most of them are not going to burn very far in before they go out.

The fires that are of great concern are those that are burning underground and burning up just million of dollars worth of coal, aside from contributing to air pollution. Mr. Corgan has estimated that the fires that we have put out have saved coal to the extent that the cost of putting them out was only about 5 cents a ton of coal saved.

Mrs. HANSEN. Then you can't afford not to put them out.

Dr. OSBORN. Exactly. The big fires are a terrible waste, aside from any air pollution, and I would think that we might ask Mr. Corgan roughly how many real serious fires there are. What would you say, Joe?

Mr. CORGAN. Well, I believe they are all serious. At least, if they are not serious in the very beginning they become serious if you don't do something about them. All of the fires certainly in the Appalachia area and in the East are serious because most of these fires are generally in abandoned mines where there are air currents beneath the surface and they carry the fires rapidly.

Most of the fires in the West are in virgin outcrops where they don't progress so fast because they can't get air, but they do destroy millions of tons or hundred of millions of tons of reserves.

COST OF CONTROLLING FIRES IN COAL DEPOSITS

Mrs. HANSEN. What would you venture to say would be the total cost and the period of time to control those fires based on your experience in Pennsylvania?

Dr. OSBORN. I have a table which I think you might like to have. This is very illuminating and there are two fires in Washington.

Mrs. HANSEN. What are the counties in the State of Washington where these fires are located?

Dr. OSBORN. These two fires are in King and Chelan Counties.

Mrs. HANSEN. I lived in a coal mine area for several years and there was a continuing smell of that burning.

Dr. OSBORN. This is a very interesting table. You will notice it gives the estimated tonnages of coal that will be destroyed if the fires aren't put out. That comes to over 300 million tons, excluding anthracite. Isn't that the total at the bottom? And over to the right it shows the cost to control per ton including anthracite fires is 12 cents.

Mrs. HANSEN. What is the total cost to control these fires?

Dr. OSBORN. The total cost, I think, is $52 million, isn't it, to put the fires out, down at the bottom there? That is what it would cost, estimated.

Mrs. HANSEN. Is there anything in this budget to begin this program?

Dr. OSBORN. Not on such a large scale. There is a small amount of money included.

Mrs. HANSEN. It seems to me, when you are talking about recouping our energy resources, you better get some of those fires out.

Dr. OSBORN. Right.

Mrs. HANSEN. Have you ever presented a request for funds to the Office of Management and Budget on this?

Dr. OSBORN. I am too new to be able to answer it from experience. Can you answer that, Paul?

FUND LIMITATIONS FOR CONTROL OF FIRES

Mr. ZINNER. I was just trying to find the right page in the book. There is under the health and safety appropriation a line item for the control of fires in inactive coal deposits, and that is governed by a piece of legislation that limits the amount we can ask for to $500,000 a year.

Mrs. HANSEN. At this rate you are going to be a hundred years controlling these fires.

Mr. ZINNER. On page 68 in the budget we ask for $222,000. That effort, has been fairly constant at this level for a number of years.

Dr. OSBORN. May I supplement what Mr. Zinner is saying by pointing out that a bill was introduced, H.R. 1437, by Congressman McDade which would change the existing legislation so that it would be more adaptable to the problem. This is now before the Congress.

Mr. MCDADE. I would love to have you co-sponsor it with me.

Mrs. HANSEN. I would love to do it. I am really startled and appalled by the fact that $436,910,000 of coal could be lost and that the cost to control these fires would only be $52,129,000. I don't know how you can afford not to put these fires out.

Dr. OSBORN. That is our point of view.

Mr. ZINNER. Madam Chairman, this is a question of authority. We simply have to have additional legislation in this area. We can't do anything more until we do.

Mrs. HANSEN. Are most of these fires on private land?

Mr. CORGAN. Many of those in the West are on publicly owned land.

Mrs. HANSEN. I think you have no excuse whatsoever not to be taking care of our public lands.

Mr. CORGAN. Well, we work on fires there regularly. We will work on nine next year. The appropriation request is for $222,000. I believe in your State and many other States what holds the States back is that under the present legislation the States or someone must pay 50 percent of the cost for work on private land. Mr. McDade's legislation changes that to a 75–25 percent ratio, which may be more of an inducement.

Mrs. HANSEN. It is a much more realistic figure because I don't think these States have the money right now to do it.

Mr. MCDADE. I don't believe they can, either, and that ratio follows some experience in the Appalachian bill that has worked well.

Mr. GALIFIANAKIS. This is the inactive coal deposits that we are talking about?

Dr. OSBORN. Yes.

Mr. GALIFIANAKIS. I can't understand the reason for the tolerance of fires. Why hasn't there been more concern about it?

Mrs. HANSEN. Mr. McDade and I have spent the last 5 years prodding, but we have had no sympathy from the Office of Management and Budget.

Mr. MCDADE. I might say if it weren't for the actions of this committee there probably wouldn't be anything going on.

Mrs. HANSEN. That is right.

APPALACHIA REGION CONTROL OF FIRES PROGRAM

Dr. OSBORN. May I introduce also another table which I will pass over to you, Madam Chairman, which is a summary of just the Appalachia region, in which there has been some mine fire work done. Here there are 35 fires with the cost of extinguishing estimated at approximately $21 million, and then it goes on with the strip-mine reclamation projects, the subsidence projects, well sealing, and so on. I think this is an interesting table relating just to Appalachia.

Mrs. HANSEN. Please insert the tables in the record.

(The tables follow:)

Appalachia - Mining Area Restoration

Bureau of Mines

Location and Item	MINE FIRES 1/		STRIP RECLAMATION		SUBSIDENCE		WELL SEALING		TOTAL	
	NO.	AMOUNT	NO.	AMOUNT	NO.	AMOUNT	NO.	AMOUNT	NO.	AMOUNT
PENNSYLVANIA										
Completed Projects	20	$ 6,966,000	3	$ 372,000	6	$4,977,000	2	$ 43,000	31	$12,358,000
Projects Underway	8	12,003,000	-	-	1	1,245,000	-	-	9	13,248,000
Approved-Pending Start	7	1,816,000	2	378,000	1	1,740,000	-	-	10	3,934,000
Subtotal-Pennsylvania	35	$20,785,000	5	$ 750,000	8	$7,962,000	2	$ 43,000	50	$29,540,000
OHIO										
Projects Underway			2	1,065,000					2	1,065,000
Approved-Pending Start			1	130,000					1	130,000
Subtotal-Ohio			3	$1,195,000					3	$ 1,195,000
VIRGINIA										
Projects Underway			1	$ 219,000					1	$ 219,000
MARYLAND										
Approved-Pending Start			1	$ 87,000					1	$ 87,000
WEST VIRGINIA										
Approved-Pending Start			1	$ 200,000					1	$ 200,000
NEW YORK										
Completed Projects							1	$167,000	1	$ 167,000
GRAND TOTAL	35	$20,785,000	11	$2,451,000	8	$7,962,000	3	$210,000	57	$31,408,000

1/ Mine Fire Projects include contract cost plus 16% for Bureau administration and engineering. All other projects are grant costs only. Amounts shown are total cost--Federal Government pays 75% of total.

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ESTIMATED COSTS OF CONTROLLING EXISTING UNCONTROLLED FIRES IN INACTIVE COAL DEPOSITS*

State	Numbered of Uncontrolled Fires	Estimated Total Reserves Endangered (tons)	Estimated Control Costs	Estimated Average Control Cost Per Ton
Alaska	4	250,000	$ 43,000	$ 0.172
Arizona	10	3,750,000	235,000	0.063
Colorado	36	31,962,000	1,180,000	0.037
Kentucky	6	5,275,000	422,000	0.080
Maryland	2	2,500,000	200,000	0.080
Montana	75	30,000,000	750,000	0.025
New Mexico	9	9,950,000	175,000	0.018
North Dakota	11	13,650,000	125,000	0.009
Ohio	6	7,500,000	600,000	0.080
Pennsylvania				
Anthracite.	12	112,000,000	41,000,000	0.366
Bituminous	41	51,125,000	4,090,000	0.080
South Dakota	3	1,000,000	25,000	0.025
Texas	1	300,000	10,000	0.033
Utah	19	16,150,000	560,000	0.035
Virginia	2	2,500,000	200,000	0.080
Washington	2	250,000	45,000	0.180
West Virginia	16	19,688,000	1,575,000	0.080
Wyoming	34	129,060,000	894,000	0.007
Total U. S.	289	436,910,000	$ 52,129,000	$ 0.12
Total Excluding Anthracite	277	324,910,000	11,129,000	0.03

*Dates of information: Alaska and Western States, 9/18/70; Pennsylvania Anthracite, 9/23/70; other, 10/30/70

Note - Estimated tonnages and costs supplied by field offices, except for Pittsburgh, which was from A. H. Harvey

LOCATION AND NUMBER OF UNCONTROLLED FIRES

Mrs. HANSEN. What percent of the fires are in the West?

Dr. OSBORN. Seventy percent of the fires approximately are in the West.

Mrs. HANSEN. Are most of them on public land?

Dr. OSBORN. Mostly on public land.

Mr. CORGAN. The number really is much greater than what we show in the table. We are starting this coming year to conduct an honest to goodness survey to get the true number, if that is possible, and we believe it will be much greater.

Mrs. HANSEN. Mr. McDade began this program and the committee has worked with him. It was not only the coal that was being destroyed it was also the smoke that was damaging the environment.

Dr. OSBORN. Another thing too, in these abandoned mines the fires in some cases are burning out the pillars that are holding up the roof. Then there is collapse and then more subsidence at the surface.

Mrs. HANSEN. I understand, and this is what distresses me.

Dr. OSBORN. You know that the gases from one or more underground fires in Congressman McDade's area actually have come up into the homes?

Mrs. HANSEN. I know. We heard testimony to this effect. It isn't only true in Mr. McDade's area but in other coal areas.

Dr. OSBORN. And it can be high in carbon monoxide. It can be noxious.

Mrs. HANSEN. That is right.

Mr. GALIFIANAKIS. We don't have any mines, but coal hit a critical shortage in our area and I was keenly interested about preserving the supply there. We had a bad coal shortage last year. The power companies are seeking new reservoirs of coal and it would seem to me they would have a very keen interest in this matter. I don't even think that is a known fact to people who, have, say, at least an indirect or a direct interest like the power companies who purchase coal.

MINE FIRE SURVEILLANCE SYSTEM

Mr. MCDADE. Madam Chairman, before we leave those, just in that connection on page 42 how much money do you have budgeted for the mine fire surveillance system? That is mentioned in the first paragraph.

Mr. CORGAN. That is expected to cost in the neighborhood of $50,000. However, we do have funds for that included in the $488,000.

Mr. MCDADE. I am not sure you are going to be able to do very much with that kind of money. That is not going to give much of a surveillance.

Mr. CORGAN. Just for anthracite.

Mr. MCDADE. I know. I still don't know whether it will. The rhetoric is fine. I said this many times before. I don't know where the dollars are, though.

ATMOSPHERIC MONITORING

There is also some rhetoric about atmospheric monitoring data to try to determine the success of reducing air pollution. How much money is in the budget for this?

Mr. CORGAN. We had specific reference there to the national culm bank fire. That is an item of $22,000.

Mrs. HANSEN. That is not going to accomplish very much.

Mr. MCDADE. No.

AMOUNT REQUESTED FROM OMB

Mrs. HANSEN. This will about pay your travel expenses to and from the fire area. Did you request more from the Office of Management and Budget?

Mr. ZINNER. No. This year the Budget Bureau allowed us everything that we asked for.

Mrs. HANSEN. Why didn't you request more?

Mr. ZINNER. I don't recall. I am trying to think what we did before we got to the Bureau of the Budget.

Mrs. HANSEN. Did you have any limitations imposed by the Department of the Interior?

Mr. ZINNER. Yes. This is what we had to face.

Mrs. HANSEN. You were assigned a budget figure and you distributed those funds?

Mr. ZINNER. That is correct. The first problem that stems from that procedure is that we obviously had to take care of implementing the authority under the health and safety part of it and that was such a large sum that there wasn't very much left to cover all of these other things.

Mr. MCDADE. You remember last year we went through an exercise in this committee of cutting your budget.

Mr. ZINNER. I remember very well.

Mr. MCDADE. Maybe you want us to go through that exercise again.

Mr. ZINNER. No, we don't welcome that.

Mr. MCDADE. I don't see much effort to put the money where the rhetoric is. You don't have to answer that, Paul.

Mr. ZINNER. I can't.

WILDERNESS MINERAL SURVEYS

Mrs. HANSEN. You are requesting an increase of $300,000 with 16 positions for the wilderness mineral surveys. How many acres are you going to complete with these funds?

Dr. OSBORN. We have, I think it is 7.6 million acres in the primitive areas and of this, as I recall, we have now completed the survey on 4.2 million, which leaves 3.4 million acres. In other words, we have a little over half done on the primitive part and we have our program now planned so that before 1974 we will have completed this entire 7.6 million acres of primitive area work. But to complete this schedule we have to work at a faster rate to get into many of these areas that are left.

Mrs. HANSEN. If you are like the rest of the department, the hard surveys are the ones left to be completed.

Dr. OSBORN. Yes, so we need this $300,000. But we are moving along, as far as I can see, at a good clip because we have our deadline for 1974, and if we have this money we will complete it before that date. But then we have over 9 million acres in the wilderness, canoe, wild, and other areas which we haven't started on.

Mrs. HANSEN. How did you assign the work?

Dr. OSBORN. We will identify the areas which do contain mineral resources which we hope will not be forever excluded from exploration and development. We recommend this.

Mrs. HANSEN. Will your recommendations be accepted?

Dr. OSBORN. What happens next?

Mr. ZINNER. Madam Chairman, the areas that have been surveyed to date have been those that the Forest Service recommended. These are all Forest Service lands. So accepting their priorities on this, both the Geological Survey and the Bureau of Mines have looked at those areas first. In general these have been the least mineralized of the areas either by purpose or by accident. We are now getting into the areas where there may be considerable mineralization and where perhaps the boundaries may be fixed based on the results of the surveys.

Mrs. HANSEN. Who will fix the boundaries?

Mr. ZINNER. The Congress in the end will fix the boundaries. Our recommendations will be made available to the Congress.

Mrs. HANSEN. This will be done after 1974?

Mr. ZINNER. It could happen anytime. It can happen next year.

Mrs. HANSEN. But you won't be completed until 1974?

Dr. OSBORN. That may be 1973, but before 1974.

NATIONAL MATERIALS POLICY ACT OF 1970

Mrs. HANSEN. Justify your requested increase of $400,000 and 20 positions to support the National Materials Policy Act of 1970.

Dr. OSBORN. This as you know is title II of the Resources Recovery Act of 1970 which provides for the establishment of a materials commission. For much of the materials the data to be supplied to the commission has got to be supplied by the Bureau of Mines. This is its source of information.

That commission has to report by June 30, 1973. I think it has another 2 months to turn in the report but it has to complete its work. So we have to gear up as fast as we can to get the material we know they must have if they are going to do the job. This $400,000 we estimate is the minimum for next year to develop the program.

MINERAL RESOURCE STUDIES IN MISSOURI RIVER BASIN

Mrs. HANSEN. Justify your request of $220,000 for mineral resource studies in the Missouri River Basin.

Dr. OSBORN. That is simply a transfer to keep us doing what we have been doing. This was previously included in the budget for the Bureau of Reclamation.

INTERNATIONAL ACTIVITIES

Mrs. HANSEN. You are requesting $692,000 for international activities. Summarize for the committee just what your activities will be in connection with this program for fiscal year 1972.

Dr. OSBORN. We have various means for collecting the data on foreign mineral production and so forth. This provides a chance for me to say, however, if we think of mineral resources being anything

nearly as important as agricultural resources of this country, then we are simply doing wrong by the mineral resources. At the last count I made anyway we have 4½ mineral attachés. One is half time I think in Mexico.

Mrs. HANSEN. How many agricultural attachés are there?

Dr. OSBORN. That is numbered in tens. I don't know whether it is like 40 or 50 or 90. They also are under the control of the Department of Agriculture instead of the State Department. They also have very high standing instead of being at the bottom of the totem pole diplomatically in the various embassies.

As far as international mineral activities are concerned, our mineral resources, from the outsider's viewpoint because I have been looking at the picture from outside the Government for a long time, is a very sad situation.

So the Bureau of Mines, the Department of the Interior, has a mineral data collecting system that is the best in the world. Other countries wait for our information to know what is going on in their countries or neighboring countries.

But to make it better we ought to have say 25 or 30 attachés, we ought to be on a reasonably high diplomatic level and under control of the Department of the Interior to some extent so we can get the data we need and also help some of the developing countries by having attachés out in that part of the world.

I am not exactly answering the question what we are doing with this amount of money, but I do know from the standpoint of the Government operation in mineral resources it is a very sad, small, unsatisfactory arrangement.

Mrs. HANSEN. I think this is a sad picture.

Dr. OSBORN. It is miserable.

MINE FIRE CONTROL PROJECT

Mr. MCDADE. I would like to draw the attention of the committee to page 52 where I find a picture of a mine fire control project that was funded by this committee and done by the Bureau of Mines, called a rice paddy effect. I don't think anybody knows what an environmental problem is unless you are forced to live in one of these homes around here. This one is successfully extinguished I believe.

Mr. CORGAN. Yes.

Mr. MCDADE. This is the so-called Taylor site. It is a demonstration for us of what we can do if we can get the money to do it. You will note this was burning at 2,500° F., emitting air pollution and causing water pollution and was a threat to life and limb. Now it is at least quiet.

Mr. CORGAN. Madam Chairman, that particular fire is now out completely, but the key thing was the so-called rice paddy system where we flooded all over the top of the fire and then dug it out one paddy at a time.

As a result there were no fumes or dust generated during the operation. As Congressman McDade said, this was a terrible fire. It had taken the paint off the houses a long ways around, but that has been eliminated completely.

Mrs. HANSEN. I think Mr. McDade is to be congratulated for adding these funds in spite of the Office of Management and Budget.

Mr. McDade. As you know, without the assistance of this committee it wouldn't have happened.

Mrs. Hansen. It couldn't have happened.

Health and Safety

Mrs. Hansen. Please insert pages 56 through 81 of the justifications in the record.

(The information follows:)

DEPARTMENT OF THE INTERIOR

BUREAU OF MINES

Health and Safety

Appropriation, 1970	$14,332,000	
Supplemental appropriation, 1970	12,000,000	
Second supplemental appropriation, 1970	1,120,000	
Total appropriation, 1970		$27,452,000
Unobligated balance available, start of year		732,255
Transferred to "Conservation and Development of Mineral Resources," for pay cost		-674,000
Transferred to "General Administrative Expenses," for pay cost		-30,000
Transferred to "Salaries and Expenses," Office of the Secretary		-190,000
Transferred to "Salaries and Expenses," Office of the Solicitor		-468,000
Total available, 1970		26,822,255
Appropriation, 1971	54,395,000	
Supplemental appropriation, 1971	1,400,000	
Pay cost supplemental	1,540,000	
Total appropriation, 1971		57,335,000
Transferred to General Services Administration		-30,000
Total available, 1971		57,305,000

DEPARTMENT OF THE INTERIOR

BUREAU OF MINES

Summary of Increases and Decreases, 1972

	Base for 1972	Increase 1972	
Inspections, investigations and rescue work			
To finance the Bureau's share of the expenses for The Interim Compliance Panel	- -	$ +600,000	
To increase inspections of metal and nonmetal mines and related training activities	$5,794,000	+1,900,000	
Nonrecurring amount provided for preliminary work on Health and Safety training facility	500,000	-500,000	$ +2,000,000
Health and safety research			
To expand health research program for coal mines	5,689,000	+1,800,000	
To expand safety research program for coal mines	14,545,000	+4,685,000	
Transfer of methane research funding from "Conservation and Development of Mineral Resources"	- -	+3,010,000	
To expand health and safety research program for metal and nonmetal mines	505,000	+2,400,000	+11,895,000
Program savings for public relations and internal reporting	125,000	-125,000	-125,000
Net Increase, 1972			+13,770,000
Budget Estimate, 1972			71,075,000

HEALTH AND SAFETY

Analysis by Activity

Activity	F.Y. 1970 Amount Available	Fiscal Year 1971 Total Appropriation	Pay Cost Supplemental	Transfers 1/	Amount Available
1. Inspections, investigations and rescue work	$15,639,210	$34,957,000	$ 1,359,000	$-27,000	$36,289,000
2. Control of fires in coal deposits	215,747	218,000	4,000	- -	222,000
3. Health and safety research	10,936,111	20,620,000	177,000	-3,000	20,794,000
Unobligated balance available, start of year	-732,255	- -	- -	- -	- -
Unobligated balance lapsing	31,187	- -	- -	- -	- -
Total	26,090,000	55,795,000	1,540,000	-30,000	57,305,000

1/ Represents transfers to General Services Administration.

HEALTH AND SAFETY

Activity	F.Y. 1970 Amount Available	F.Y. 1971 Amount Available	F.Y. 1972 Estimate	F.Y. 1972 Increase (+) or Decrease (-)	Page Reference
1. Inspection, investigations and rescue work	$15,639,210	$36,289,000	$38,219,000	$+1,930,000	60
2. Control of fires in coal deposits	215,747	222,000	222,000	- -	68
3. Health and safety research	10,936,111	20,794,000	32,634,000	+11,840,000	69
Unobligated balance available, start of year	-732,255	- -	- -	- -	
Unobligated balance lapsing	31,187	- -	- -	- -	
Total	26,090,000	57,305,000	71,075,000	+13,770,000	

1. Inspections, investigations and rescue work: Fiscal year 1971, $36,289,000; fiscal year 1972, $38,219,000; increase, $1,930,000. The increase consists of:

	Increase (+) or Decrease (-) Amount	Positions	Total Program	Total Positions	Explanation
(1)	$ +600,000	+27	$ 600,000	27	To finance the Bureau of Mines share of expenses for the Interim Compliance Panel.
(2)	+1,900,000	+73	7,694,000	425	To increase inspections of metal and nonmetal mines and related training activity.
(3)	-500,000	- -	- -	- -	Nonrecurring appropriation provided for planning, design and preliminary contracting for Health and Safety training facility.
(4)	-70,000	-5	- -	- -	Due to savings in public relations and paperwork management.
	1,930,000	95			

COST FACTORS INVOLVED IN INCREASE

(1) 27 technical specialists, management and support personnel, $370,000; travel of personnel, $20,000; rent, communications and facilities $45,000; supplies, equipment and contract services $165,000.

(2) 38 inspectors and supervisors for the Health and Safety Standards Enforcement Program, $480,000; 20 training specialists for the Metal and Nonmetal Mine Safety Education Program, $199,000; 15 supporting personnel including engineering support and State Plan administration, $182,000; personnel benefits, $69,000; full-year costs for the 90 new positions provided for in the 1971 Supplemental Appropriation Act, $585,000; extensive travel required for enforcement and education activites, $300,000; and supplies, equipment and other services, $85,000.

NEED FOR INCREASE

1. The Federal Coal Mine Health and Safety Act of 1969 establishes an Interim Compliance Panel composed of representatives from four executive departments. Section 5(c) of the Act provides: "Notwithstanding any other provisions of law, the Secretary of Health, Education, and Welfare, the Secretary of Commerce, the Secretary of Labor, and the Secretary [of the Interior] shall, upon request of the Panel, provide the Panel such personnel and other assistance as the Panel determines necessary to enable it to carry out its functions under this Act." The requested increase is to provide the required funds to pay the Bureau of Mines share of the costs of Panel operations in accordance with an agreement dated September 3, 1970, between the four agencies.

It is the function of the panel to work toward the orderly implementation of the Act through authorization of temporary deviation from its mandatory provisions until required technology and equipment are available to correct the substandard conditions in a particular mine. The panel must make technical and engineering evaluations of an operator's application for non-compliance,

perform necessary reviews, hold hearings as required, provide needed regulations and instructions and render written decisions. Reporting requirements include an annual report to Congress on its achievements and any other relevant information.

2. The foregoing estimates are based upon approximately 11,000 inspections plus the additional visits to the mines required to assure that violations are abated within the period granted to take corrective action. The number of inspections in States under State Plans will be limited to those required to verify that the States are carrying out an inspection program that is in accordance with their agreement and which assure a measure of health and safety in the mines at least equal to requirements under the Metal and Nonmetallic Mine Health and Safety Act. All underground mines and all large open pit mines in States that have entered into State Plan Agreements will be inspected at least once annually A representative cross section (20 percent) of medium and small open pit mines and sand, gravel, crushed stone, and quarry operations will be inspected each year. The 1972 estimate is based on the assumption that 32 States will enter into State Plan Agreements.

   In States that do not have a State Plan Agreement, all underground mines will be inspected twice each year, large and medium open pit mines will be inspected at the rate of one and one-half times each year and a 20 percent sample of all other mines will be inspected annually.

   The high interest in State Plan Agreements has resulted in a corresponding increase in demands for additional training--particularly of State mining personnel to assure that they are properly trained to carry out mine inspection and reporting programs that will fully meet prescribed standards. Recent publicity concerning mine health and safety in all types of mines has created a greater public awareness of the need for greater safety and emphasis on training has been intensified to achieve that objective.

PROGRAM STATEMENT

Situation: An increasing awareness of the hazards of mining by all segments of society has resulted in major legislation which strengthens the responsibility of the Secretary of the Interior to enforce mining practices designed to result in healthier and safer conditions in our Nation's mines. The Federal Metal and Nonmetallic Mine Safety Act (Public Law 89-577) applies to some 20,000 Metal and Nonmetal mines in the United States employing about 235,000 people. The Federal Coal Mine Health and Safety Act of 1969 is applicable to about 5,000 coal mines employing approximately 150,000 people.

It is estimated that virtually all of the provisions of both acts will be implemented in fiscal year 1971, and fiscal year 1972 will be the first year of operations with all provisions of the Acts in force and most of the employees recruited and trained to carry out their requirements.

The two Acts cited above provide for prescribed patterns of inspections of mines to insure that they operate within specified conditions and include authority to enforce correction of conditions or practices that may be detrimental to the Health and Safety of mining personnel.

Along with responsibility for inspection and enforcement to correct unsafe conditions in mines is responsibility to provide training to mine operators and workers throughout the industry on the hazards of mining and what they can do to make their work safer.

Close studies are made of mining technology and especially any new developments affecting it to determine how such technology may be applied toward safer operations in mines. Investigations are made of ways to improve existing machines or ways to apply new mining methods or equipment to alleviate or reduce unsafe or

unhealthful conditions that may exist. Applicable standards are revised or modified to reflect the results of studies made as to their effectiveness in protecting the miner.

Objectives: The major objective of the Health and Safety Program is to increase net benefits derived from natural resources by:

1. Reducing fatalities and disabilities of miners.
2. Reducing losses in productivity of mines. Through the foregoing, the cost of minerals and fuels is reduced.

PROGRAM OF WORK

COAL

Inspections and Enforcement: $22,356,000 (Increase, $600,000)

The Federal Coal Mine Health and Safety Act of 1969 prescribes a program of coal mine inspections to be carried out by the Bureau of Mines. The requirements of this program, briefly are:

1. To make a safety inspection of each underground coal mine at least four times annually.
2. To make a health inspection of each underground coal mine at least two times annually.
3. To make a spot inspection of each mine containing especially hazardous conditions at least every five working days.
4. To make an inspection of each surface mine at least two times annually.
5. To make additional spot inspections as required to assure compliance with the Act.

In the aggregate, about 40,000 inspections of all types will be made in the coal mines in fiscal year 1972. This compares to about 30,000 for 1971.

Inspections by TYPE

	1971	1972
Regular Inspections	5,600	11,000
PBR Inspections	5,600	- -
Health Inspections	2,800	5,000
Surface Mine Inspections	1,150	6,000
Regular Spot Inspections	7,500	8,000
Spot Inspections Every 5 Working Days	5,200	10,000
Spot Inspections Every 10 Working Days	2,400	- -
Total	30,250	40,000

A respirable dust sampling program is conducted to monitor the dust content of coal mine atmospheres on a regular and prescribed schedule to ascertain if regulatory requirements are met. Dust samples are collected by mine operators and sent to a central weighing facility for weighing in a clean room environment and a fractional part of the samples are chemically analyzed. Sampling results are reported on an expedited basis to the coal mine operator to keep him promptly informed of the quality of the atmosphere in his mine so necessary corrective action may be taken promptly. A complete historical record, by mine and section thereof, is maintained of sampling results for use in determining a mine operators compliance with regulatory requirements and for other uses in connection with efforts to improve health and safety in the mines. Automatic weighing facilities, computerized computation and recording, and teletype communications are required to meet required time constraints.

Early in fiscal year 1972, the Bureau will be performing noise inspections in conjunction with respirable dust inspections. During these noise inspections. Bureau inspectors will determine if the mine operator is complying with Federal noise regulations. Under this new program mine operators will also be responsible for conducting semi-annually noise tests and reporting the results to the Bureau.

In addition to the mine inspection work, the program includes the following functions designed to support and strengthen its effectiveness:

An investigation is made of each fatality in the mining industry to determine its cause or causes as an aid to preventing a similar future occurrence.

A system for post disaster rescues is now being developed which includes systems for communicating with trapped miners and rapidly transportable drilling equipment for both pinpointing their exact location and providing a way to get emergency supplies to them and also equipment capable of drilling holes of sufficient size for rescue purposes. Under an existing contract, the foregoing system will be designed, and required equipment provided and tested and turned over to the Bureau of Mines in fiscal year 1971 for use in connection with future disasters. Until final testing and approval of the system, definitive costs of maintaining the equipment and necessary operating crews trained and in a constant state of readiness for emergencies cannot be accurately determined. An effort will be made to meet such costs for fiscal year 1972 without requesting additional funds for this purpose, but a request for supplementary funds may be necessary when final arrangements for operation are completed.

Mine surveys and evaluations are made to determine conditions in the mines, recommend changes in mining practices or equipment to effect desired corrections and then verify that changes made have achieved expected results.

To meet the requirements of the new law, recruitment and training at an accelerated pace will continue until 1,000 mine inspection personnel including the required engineers, specialists, and supervisory mine inspectors are on the rolls. We plan to complete the initial staffing in fiscal year 1972.

Accident Statistics and Analysis: $1,750,000

The new coal mine legislation requires that all accidents be reported. Summaries of accidents are prepared by cause of accident, location in mines, and number of miners involved. These data will be correlated with the Bureau's existing personal injury statistics, inspection data, and other statistical information as a basis for determining the effectiveness of existing inspection programs and an indication of where greater emphasis should be applied to the program. Historical accident information combined with data on the chain of events preceding mine accidents and on the human factors contributing to injuries will be used as a means of evaluating a mine's performance and to assess the factors leading to unsafe conditions or unsafe acts as applies to accident prevention work.

Summary accident statistics will be utilized to evaluate mining methods and equipment and make recommendations as to new equipment or procedures that will result in a greater measure of health and safety for mine workers. The data will also be used in the application of operations research techniques to the mathematical evaluation of new or changed methods and equipment to solve existing problems or hazards.

Technical Support: $2,200,000

Technical assistance and expert advice is provided to aid mine operators to correct unsafe or unhealthful conditions through improved ventilation practices, improved roof support, use of dust collection and abatement equipment, and other improved mining technology.

A program is conducted to determine the standards that equipment, especially electrical equipment, must meet in order to be safely operated underground and in methane laden atmospheres. The program also includes necessary testing of equipment to see that it meets those standards with a system of approval for that equipment which passes such tests.

Constant attention is given to the development and promulgation of new or revised health and safety standards designed to support the overall objectives of the program.

Experts in the various facets of mining provide technical advice to health and safety enforcement and management personnel as an aid to decision making, problem solving, and resolution of disagreements. Technical advice is also provided to the Associate Solicitor--Mine Health and Safety and his staff concerning the technical ramifications of actions that come within his jurisdiction for decision. Members of the technical support center conduct reviews and surveys of actual conditions that exist in mines that may be the subject of disagreement or litigation and make recommendations for changes that should result and also serve as expert witnesses in court actions that may be required to resolve disputes involving technical phases of mine operations.

Education and Training: $3,819,000 (No increase)

The Bureau of Mines provides and presents courses of instruction to teach people in the coal mining industry the causes and prevention of accidents and unhealthy work environments, safe mining practices, first aid and mine rescue methods, all designed to develop a greater awareness of safety and to make the student a safer worker. These courses of instruction are in the form of classroom instructions, demonstrated lectures, motion pictures, and other instructional media. Educational training and safety motivation are essential ingredients in reducing accident frequency rates and otherwise encouraging and enhancing safe mining operations. Results of a study now in progress on the attitudes, learning capability levels and the motivating forces of those to receive such training will be used by the Bureau of Mines in the design and development of the instructional material to be used.

Education and Training Goals

Course	Persons Receiving Training 1970 (Actual)	1971 (Estimated)	1972 (Estimated)
First Aid	6,596	15,000	90,000
Accident Prevention	4,233	11,000	90,000
Mine Rescue	436	2,500	2,000
Mine Safety Committeemen	135	1,000	2,000
Use of Self Rescue Devices	- -	50,000	90,000
Pilot Program for Beginning Workers	- -	- -	175

Grants: $400,000 (No increase)

The funds requested are to aid States in financing the cost of improvements in their mining safety programs in accordance with the provisions of the Coal Mine Health and Safety Act of 1969. Specific objectives of the grants are to develop

and enforce more effective coal mine health and safety laws and programs related to coal mine employment, and to promote Federal-State coordination and cooperation in improving health and safety conditions in coal mines.

METALS AND NONMETALS

Inspection and Enforcement: $6,335,000 (Increase, $1,600,000)

The Federal Metal and Nonmetallic Mine Safety Act, P.L. 89-588 authorizes the Department of the Interior, Bureau of Mines, to enforce health and safety standards promulgated in accordance with the provisions of the Act in mines throughout the United States. Under the provisions of the Act the Bureau is responsible for developing and promulgating standards that will assure that approximately 20,000 metal and nonmetal mines, quarries, and sand and gravel pits throughout the United States are operated in a manner that protects the health and safety of the people employed therein. The Bureau of Mines conducts a nationwide program of inspection of all mines to verify that prescribed health and safety standards are met and, in cases where violations are found, to enforce corrective action including closure of the mine if required until necessary improvements are made.

Cooperative agreements may be made with States under which the States accept the primary responsibility for carrying out the inspection program under standards prescribed in the agreement. However, the Bureau of Mines must make an adequate number of inspections to assure the inspection program conducted by the States meets the requirements prescribed by the Act. State plans have been approved for two States with many additional States expected to participate in this program. Until such State plans are approved, the inspection responsibility of the Bureau of Mines continues with additional effort required to work out State plan agreements.

Technical assistance and advice is provided to the mine inspection force and to the mine operators on changes in mining methods, equipment, or practices that will improve health and safety conditions in the mines. Dust counting facilities are operated to completely analyze the impurities in mine atmospheres including radiation counts. Surveys are made of mines to determine problem areas and to determine the extent and nature of benefits gained through corrective actions taken.

Thorough investigation is made of all fatal accidents in mines and a comprehensive system of recording and reporting all other accidents is prescribed to provide information on the causes and contributing conditions and how these relate to the size and nature of the operation and the mining methods used.

Continuous review and evaluation of prescribed standards must be made to assure their effectiveness in relation to new technology or other conditions that would warrant consideration of changing them and thus achieve a greater measure of health and safety.

Education and Training: $1,359,000 (Increase, $300,000)

Training is provided in the form of classroom instruction, demonstrated lectures, motion pictures, and other instructional media to people in the Metal and Nonmetal mining industry to teach them how to work safely. Such training includes the causes and prevention of accidents, safe mining practices, first aid mine rescue methods and other courses designed to develop a greater awareness of safety and how a miner can protect himself from harmful elements. Training is also provided to State agencies concerning the various facets of the Bureau's inspection and reporting program to provide maximum cooperation with minimum duplication of effort. Requests for training have greatly accelerated to teach mining personnel how to meet the more exacting requirements of the new Act and also train State personnel in the methods, responsibilities, and reporting of inspections under State Plan Agreements.

EXAMPLES OF RECENT ACCOMPLISHMENTS

Coal Mine Health and Safety

A significant management accomplishment has been the gearing up, in the very short time established by the Congress, to commence conducting the health and safety inspections and investigations required by the Federal Coal Mine Health and Safety Act of 1969, and enforce the provisions thereof. The Act was approved on December 30, 1969; the "Mandatory Safety Standards" became operative on March 30, 1970, and the "Mandatory Health Standards" became effective on June 30, 1970. In those extremely short periods of three and six months respectively, Federal inspectors and their supervisors had to learn and understand all the provisions in the new Act and the new instructions that were issued regarding inspection, enforcement and reporting procedures.

The employment and training of some 750 additional inspection personnel in the shortest possible time has been a major problem in meeting the new requirements of the Federal Coal Mine Health and Safety Act of 1969. This problem is being resolved by the following changes in procedures:

(a) Reducing (by 60 percent) the time between the filling of an application for employment and actual hiring of eligibles. This was achieved by the administration of two special nationwide walk-in examinations for coal mine inspectors in the mining communities, conducting tests on Saturdays, mornings and evenings, to accommodate the miners' work schedules, and immediate rating of applications. Further reductions in the time required are anticipated with the recent introduction of a new Federal mine inspector examination which features an unassembled examination for higher grade positions in place of the former six-hour written test.

(b) Reducing (by more than 50 percent) the formal training period for inspection personnel through upgrading, intensifying, and increasing the classroom training to the extent that it could be used to replace much of the former extended period of on-the-job training--without sacrificing the effectiveness of the whole program.

A system was developed for collecting, weighing, recording and reporting dust samples, and facilities were installed and placed in operation for the expeditious reporting of sampling results.

Metal and Nonmetal Mine Health and Safety

Development and implementation of metal and nonmetal mine health and safety standards has held a high order of priority since the passage of the Metal and Nonmetallic Mine Health and Safety Act of 1966. This work has involved considerable effort and is nearing completion. One thousand seven hundred and eleven (897 mandatory and 814 advisory) standards became enforceable on July 31, 1970. A special applications manual was developed to provide guidance to inspectors in making uniform interpretation of the standards which also was distributed to the inspection force in July 1970. In June 1970, 133 of the standards were reevaluated, revised, and submitted for public review and comment. 87 of these were published in December 1970, in the Federal Register and became enforceable in January 1971. Objections to the remaining standards must either be withdrawn or public hearings held before they can be promulgated.

From January through July 1970, 601 regular mine inspections were made on a cross section of mining operations in order to familiarize industry with the Act of 1966 and the standards which were to go into effect on July 31, 1970. The inspections also were used as a device to train new inspectors. A goal of 3,000 inspections was established for the 11-month period from July 31, 1970 to June 30, 1971. It was anticipated that 1,000 inspections would be accomplished in the 5-month period from July 31 through December 31, 1970; the number of inspections actually made during this period was 1,200.

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One of the requirements of the Act of 1966 was to promote coordination between Federal and State inspection agencies. In this connection, State Plan Agreements and Guidelines were finalized and mailed to all State Governors on May 31, 1970. As of December 1970, two States, Arizona and Colorado, have been accepted under a State Plan Agreement. Thirteen other States have expressed interest either by direct correspondence or by submitting a proposed plan for review.

Education and Training

The Coal Mine Health and Safety Act of 1969 prescribes that approved first-aid programs be offered to all underground miners. A revised first-aid manual has been developed and published and a first-aid instruction course has been prepared for dissemination to industry. Courses for nationwide use have been developed for training miners in the use of a self-rescue device and in testing for methane and oxygen deficiencies.

To alleviate the shortage of health and safety teachers, a pilot program for training intern health and safety instructors has been completed and the interns assigned to field duties.

In cooperation with the Department of Health, Education, and Welfare and the Department of Labor, the Health and Safety Activity developed and is conducting a pilot miner training program to emphasize health and safety in training new miners and in upgrading the skills of existing mine workers. In both instances, special emphasis is being given to minority group training.

2. Control of fires in coal deposits: Fiscal year 1971, $222,000; fiscal year 1972, $222,000; no change.

PROGRAM STATEMENT

Fires in mined and unmined inactive coal deposits destroy valuable coal reserves, pollute the atmosphere with noxious and toxic gases, drain acid water into streams from burning and burned-out areas, and present a hazard to people and to grazing and forest lands. The adverse effects have had a growing impact upon the national population and economy. In 1949, Congress recognized the increasing seriousness of the problems arising from uncontrolled coal fires and began annual appropriations to the Bureau of Mines for the control and extinguishment of such fires. The program was intensified in 1954, when Congress enacted P.L. 83-738, which authorized the Secretary of the Interior, through the Bureau of Mines, to undertake comprehensive control measures.

PROGRAM OF WORK

In fiscal year 1972 the Bureau of Mines plans to initiate control work on 9 projects to control or extinguish coal fires in Alaska, Arizona, Montana, New Mexico, and Wyoming.

It is also proposed to establish an airborne infrared sensor program to begin a systematic coverage of the remote western coal field areas that will complete the Bureau's record of uncontrolled fires in this important region. The project is also designed to correlate with the Bureau's proposed nationwide inventory of uncontrolled coal fires, planned for initiation in F.Y. 1972. Research will be continued to improve coal fire control methods and investigate possible new techniques to improve effectiveness and lower project costs.

EXAMPLES OF RECENT ACCOMPLISHMENTS

From 1949 through FY 1971 a total of 197 fires have been controlled or extinguished in the Bureau's coal deposit fire control program. An estimated 771 million tons of coal have been conserved resulting in reduced air pollution, abatement of acid water drainage, and less ground subsidence hazards, thereby enhancing the health and safety of the public. The program was extended to the State of Alaska by initiating work on the first of four known fires. Five fires will have been controlled during F.Y. 1971 resulting in saving of an estimated 9 million tons of coal.

To improve effectiveness and lower the cost of controlling coal fires, remote sensing techniques were investigated and new methods of extinguishment were evaluated. The encouraging results of an aerial infrared sensing pilot program in the coalfields of Arizona, Colorado, New Mexico, and Utah indicate that the technique has potential for detecting heat anomalies resulting from coal fires at the outcrop and under shallow overburden.

3. Health and Safety Research: Fiscal year 1971, $20,794,000; fiscal year 1972, $32,634,000; increase, $11,840,000. The increase consists of:

	Increase (+) or Decrease (-) Amount	Positions	Total Program	Total Positions	Explanation
(1)	$ +1,800,000	+10	$ 7,489,000	98	To expand health research program for coal mines.
(2)	+4,685,000	+28	22,240,000	255	To expand safety research program for coal mines.
(3)	+2,400,000	+18	2,905,000	34	To expand health and safety research for metal and non-metal mines.
(4)	+3,010,000	+105	- -	- -	Transfer of methane control program previously funded under different appropriation.
(5)	-55,000	-4	- -	- -	Due to program savings in public relations and paperwork management.
	+11,840,000	+157			

COST FACTORS INVOLVED IN INCREASES

(1) 10 permanent positions (scientists and engineers) at annual average wage of $16,000, $160,000; personnel benefits, $13,000; travel and transportation of persons at average of $1,000 per professional employee, $10,000; supplies and materials, $100,000; and research contracts, $1,517,000.

(2) 28 permanent positions (scientists, engineers, and technicians) at annual average rate of $12,000, $336,000; personnel benefits, $27,000; travel and transportation of persons, $30,000; supplies and equipment, $700,000; and research contracts, $3,592,000.

(3) 18 permanent positions (scientists and engineers) at annual average rate of $16,000, $288,000; personnel benefits, $23,000; travel and transportation of persons, $20,000; supplies and equipment, $200,000; and research contracts, $1,869,000.

(4) Represents funding consolidation of methane control program under Health and Safety appropriation. Funding for the methane program was previously split between this appropriation and the Mining Research line, Conservation and Development of Mineral Resources appropriation. Total funding for the methane research effort is $5,133,000 and is included as part of the "Safety research in coal mines" program.

NEED FOR INCREASE

(1) Health research in coal mines: $7,489,000 (Increase, $1,800,000)

The increase is requested for expansion of the research required to develop the new and improved technology to reduce health hazards in coal mines to comply with the provisions and intent of the Federal Coal Mine Health and Safety Act of 1969. This research will contribute to upgrading of the standards in the Act.

(a) An increase of $1,090,000 is for expansion of research aimed at the development of control technology to reduce respirable dust to a minimum during coal mining and at the ultimate elimination of the problem of dust related lung disease.

(b) An increase of $400,000 is for expansion of research on mining equipment design improvements and other means of suppressing or minimizing noise that can adversely affect mine workers.

(c) An increase of $200,000 is for research on the possibilities of using diesel engine power in coal mines and for expansion of research on improved instrumentation for measuring oxygen content and for detecting and measuring noxious gases.

(d) An increase of $110,000 is for expansion of research on determination of potentially toxic materials in coal mines and means of eliminating or minimizing the hazard..

(2) Safety research in coal mines: $22,240,000 (Increase, $4,685,000)

The increase is requested for expansion of research required to develop the new and improved technology to reduce safety hazards in coal mines to comply with the provisions and intent of the Federal Coal Mine Health and Safety Act of 1969. This research will contribute to upgrading of the standards in the Act. Items included are:

(a) An increase of $321,000 for expansion of research on fire and explosion prevention in coal mines is primarily to offset increased costs anticipated for in-house and contract research and to allow continuation of this program at approximately the same level of effort as in fiscal 1971.

Every face ignition and every equipment fire in an underground mine is a potential disaster. Fortunately, most such ignitions fail to produce a propagating explosion. However, the potential for a disaster requires a concerted effort to decrease the probability of both ignitions and of propagation after an ignition.

The extent of the problem is evidenced by a recent report from inspection of an accident in an underground bituminous coal mine in which it was admitted that this mine had recorded 17 ignitions in two and one-half years time. The need for continuing efforts to control this hazard is all too evident. Increasing mechanization will increase the number of face ignitions since a large percentage are caused by continuous miners striking materials which results in an incipient flame.

(b) An increase of $2,410,000 is for expanding systems engineering research to improve the capability for designing and operating coal mines that are healthier and safer for the miner. A substantial part of these funds is for providing underground facilities, possibly by leasing mines or parts of mines, for conducting research and demonstrations.

(c) An increase of $1,164,000 is for expanded research effort on ground control problems in underground coal mining operations. New and expanded research effort will be directed toward the following: testing and adapting ground control systems now used effectively in non-coal mines for use in coal mines; to develop light-weight, high-strength, temporary supports to protect workmen at the mining face; to devise means and materials for using chemical monomers to solidify and strengthen fractured roof rock; to develop means for detecting fractures, hazardous roof

conditions, and to develop the methodology for testing new and improved mining systems incorporating safer ground control concepts; and increase research on the application of rock mechanics to coal mine design.

(d) An increase of $300,000 is to develop adequate guidelines for the safe disposal of coal refuse and to reduce surface disposal safety problems.

(e) An increase of $290,000 is for mine recovery and miner survival and rescue equipment development including personal breathing apparatus, wireless emergency communications, survival chambers, and probe and rescue drill guidance systems.

(f) An increase of $200,000 is for initiating the development of underground lighting units to meet the illumination standards instituted by the Health and Safety Act and expanding research in non-emergency communications including oral and surveillance systems.

(3) Research in metal and nonmetal mines: $2,905,000 (Increase, $2,400,000)

The increase is requested for expanded and new research in metal and nonmetal mines towards implementation of Public Law 89-577. The concern and actions demanding immediate attention in regard to coal mines are similarly present for noncoal mines.

By way of example, while safety hazards faced in the coal industry are greater than other industries as the graph of injury experience in 1969 shows, (see following page) metal and nonmetal mining rank as notoriously hazardous occupations considering both frequency and severity of injuries.

The Bureau proposes to increase funding for research on health and safety problems inherent in metal and nonmetal mines to $2,905,000. Specifically, the Bureau is proposing:

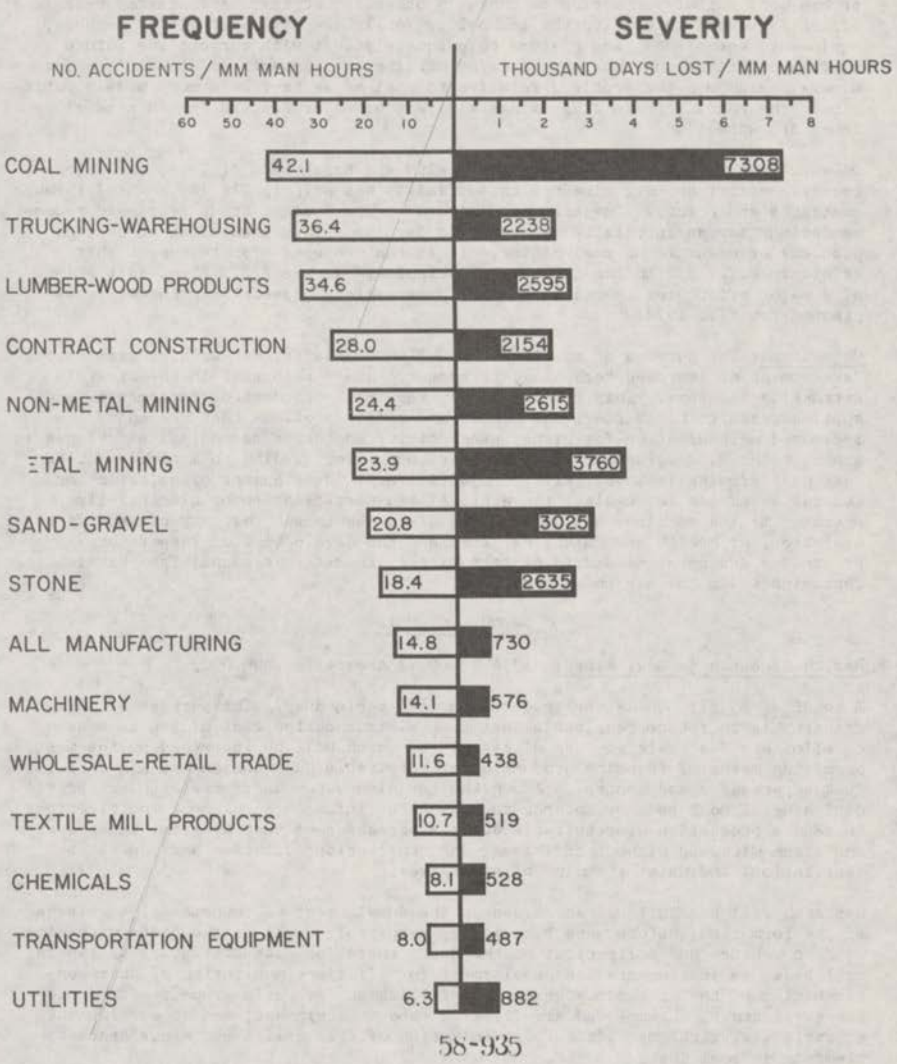
(a) An increase of $1,200,000 to attack the health hazards of respirable dusts with the high silica contents characterizing metal mining; toxic emissions from diesel-powered equipment; and the special hazard of radon exposure in uranium mining. A new type of personal dust sampler may have to be developed for metal and nonmetal mines. More precise analytic methods for silica must be brought into use next year. Effective means of controlling diesel emissions are being sought this year and must be demonstrated and put into mines in F.Y. 1972. A major research effort to control radon emissions into uranium mines will be undertaken. Mine wall sealants, and techniques for eliminating radon gas from mine atmospheres will be tested.

(b) An increase of $900,000 to reduce the hazards from rock bursts and pillar and wall collapse. These so-called "falls of ground" cause over a third of the fatalities in surface mining. The best approach to protecting miners appears to be instrumentation capable of predicting abnormal ground pressures and warning of impending bursts. Microseismic measurement techniques are promising and their development will be accelerated.

A pilot study this year to evaluate stability of larger mine waste dumps will be continued to find criteria for their safe construction.

(c) An increase of $300,000 to minimize fire hazards in metal and nonmetal mines; to develop safer electrical distribution systems; and to improve operator safety or particularly hazardous mining machinery. As an example, the widely-used front end loader has an exceptionally bad safety record. Guidelines for safer design must be found.

INDUSTRIAL INJURY EXPERIENCE - 1969



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PROGRAM STATEMENT

Situation: Because of increased mechanization to meet increasing mineral demands and a minimal level of research effort in the past to develop the technology to cope with the resulting problems, health and safety hazards in mining are numerous, severe, and out of proportion to those in other industries. A concerted research effort is needed to develop the technology for inherently safer mining methods, equipment, techniques, and systems to adequately cope with current and future mining conditions and thus assure safer working environments and conditions for miners. Although the problems relative to coal mines have been more widely publicized, the conditions in other mines also are of major concern and in need of immediate attention.

On enactment of the Federal Coal Mine Health and Safety Act of 1969, the major research effort on coal mine health and safety was principally implemented through contracts and grants. One contract awarded to TRW Systems Group developed recommendations for an integrated research and development program aimed at solving problems of underground coal mining. It is the proposed plan to expand this effort in F.Y. 1972 to the full extent stipulated in the Act. Also, initiation of a major effort for reducing the health and safety hazards in other mines is planned for F.Y. 1972.

Objectives: The purpose of the Bureau's Health and Safety research program is the development of improved technology to conserve human resources in the mineral-extraction industry. This responsibility requires: conduct of fundamental and applied research to overcome the health and safety problems that accompany increased mechanization for higher productivity and other technological changes in mining methods; development of methods or techniques leading to mining practices that will provide improved safety and efficiency; development of criteria for Federal schedules to regulate the approval and certification of electrically operated mining machines and devices and diesel equipment that may present fire, explosion, or health and safety hazards; and the development of respiratory-protective equipment needed to protect mineral industry personnel from harmful contaminants in the air where they work.

PROGRAM OF WORK

Health Research in Coal Mines: $7,489,000 (Increase, $1,800,000)

A total of $5,971,000 is for research on respirable dust. The purpose of this research is to reduce respirable dust to a minimum during coal mining in order to eliminate dust related lung diseases. Research will be increased on the most promising means of reducing production of respirable dust and on techniques for dust suppression and control. Among the techniques now under research are preconditioning of coal beds by methods such as water infusion; equipment modifications to reduce production of respirable dust; suppression of dust by foam, water sprays and steam with and without additives; dust collection; dilution and control by ventilation; and water stemming of explosives.

Research will be continued as needed on the development of fundamental knowledge of the formation, nature, and behavior of respirable dust; on the basic mechanics of dust capture and collection; on the dust generation characteristics of typical coal beds; on instrumentation development for efficient monitoring of dust contamination of the mine atmosphere; on establishment of performance requirements for respirators; on enclosed air-filtered cabs on equipment; and on development of rapid analytical methods for determination of free silica and minor trace elements in coal dust.

A total of $600,000 is for acceleration of research on suppressing or minimizing noise that can adversely affect mine workers. The high noise level from the operation of mechanical equipment in the restricted and confined space in mines can contribute to the incidence of mine accidents as well as result in impairment of hearing.

A total of $918,000 is for research on noxious gases and other toxic materials. This includes research on the possibilities of use of diesel engine power in coal mines, development of detectors and monitors, and investigation of possible toxic materials used in or native to coal mines and means of protection.

Safety Research in Coal Mines: $22,240,000 (Increase, $7,640,000 including transfer of methane program)

A total of $5,133,000 is for the methane control program aimed at degasification of coal beds prior to mining and control of residual methane during the mining process. The entire research effort to achieve efficient control of methane will continue with simultaneous development of technology that can be applied to most coal seams of commercial importance. Research will be continued to relate specific physical properties of coal and the structural features of coalbeds to the presence, movement, and emission of methane; to develop equipment, instruments, and engineering criteria needed for measuring and predicting, in advance of mining, the quantity of methane in a block of coal, the pressure under which it occurs, and the coalbed characteristics that govern its movement; and to determine how stresses in the solid coal around a mine opening combine with other factors to release methane into the workings. These stress studies are aimed at determining the extent that methane emission can be controlled by deliberate changes in load from overburden pressure on the solid coal ahead of the face.

In other studies to determine and assess the factors related to methane control, investigation of the influence of fragmentation properties of methane emission will be continued. To provide a basis for predicting gassy mining conditions, research will be continued on the modes of formation of methane and other hydrocarbons in various ranks of coal and carbonaceous rocks.

Efforts will be continued to develop practical methods for removing large volumes of methane from coalbeds before mining begins and for controlling drainage of methane from the solid coal ahead of the working face during mining. Research will be continued on effectively controlling emission from gob areas and on removing methane from abandoned gob areas.

A total of $4,027,000 is for other fire and explosion prevention research. This research includes a continuation of the development of improved instrumentation to determine flammable and toxic gases present in coal mines.

Effort will be expanded in the determination of practical methods for the extinguishment of fires in an incipient stage. Flame extinguishment at this point would prevent many disasters since it is by far the easiest place for quenching. Since it is impossible to completely prevent ignitions or extinguish a fire immediately after initiation, extended research on the extinguishment of established fires will be continued. Research will be continued on preventing ignition of flammable gases by frictional sparks and by incendive sparks generated by contact with dissimilar metals such as aluminum and rusty iron. The Mine Safety Act requires mined out areas to be either ventilated or sealed off. Research initiated in F.Y. 1971 will be continued to develop feasible methods of preparing bulkheads which will withstand pressures and conditions known to exist in coal mines.

A total of $5.0 million is for research on ground control in coal mines. Research will be expanded to adapting ground control successfully used elsewhere to use in coal mines; to developing new ground control methods based on chemical strengthening of rock and coal; to developing the technology to cope with the serious problem of roof fall near the face areas of working mines; to improving knowledge of rock mechanics and coal mine bumps; to developing means of detecting fractured and hazardous roof conditions; to developing guidelines for the disposal of coal refuse to minimize the hazards of refuse bank fires and slides; to develop underground coal refuse disposal systems to enhance mine support and subsidence control;

and to developing improved backfill technology. Conventional mining employing explosive charges has adverse effects on the stability of the roof. Methods to reduce or eliminate this effect will be investigated.

A total of $1,610,000 is programmed for research related to industrial-type hazards, illumination, and communications in underground mines. To reduce industrial-type hazards, standards development will be initiated for mining equipment design and operation and for miners' wearing apparel. Mine lighting unit development will be initiated to conform with underground illumination standards and with conditions at the mine production face. Research will be done on a non-emergency oral communications systems and a surveillance system to monitor continuously and remotely parameters such as methane, carbon monoxide, dust, and temperature at any selected points in a mine.

To increase the probabilities of miners surviving a disaster and to ensure maximum safety of reopening and restoring a mine after an explosion will require a $2,000,000 research program. The major efforts will be improving emergency wireless communications technology for locating trapped isloated miners, developing a superior probe and rescue drilling system that should be capable of reaching trapped miners in any underground opening in minimum time, improving the comfort and increasing the oxygen supply of breathing apparatus for use by trapped miners and for mine recovery and rescue, continuing the development of survival chambers to ensure compatibility with the mine environment, and initiating research to develop improved monitoring techniques for a mine sealed after an explosion or fire.

Funding for systems engineering research will be $3,360,000. A substantial part of these funds will be used to provide underground experimental and demonstration test facilities for all facets of the health and safety research program. The other part of systems engineering research will involve establishing an appropriate data bank to assist in identifying health and safety problems which would be useful for selecting the most expedient research approach. Research will be conducted to develop statistical analysis methods for predicting coalbed and enclosing strata characteristics from bore holes drilled from the ground surface, and to refine computer simulation and other mathematical models of the whole or parts of a mining system, all of which would be invaluable for the design and operation of a mine in a manner least harmful to miners.

Research leading towards the development of advanced mining systems which will provide a more safe and healthy environment will be funded at $1,110,000. Studies will be continued on pneumatic and hydraulic transportation methods which should be significantly safer than current methods. Other research will be conducted on novel materials handling methods, problems related to oil and gas wells that penetrate coalbeds, and geophysical techniques to identify natural and man-made hazards in the coalbed and enclosing rock ahead of the production face.

Metal and Nonmetal Mine Research: $2,905,000 (Increase, $2,400,000)

A total of $1,505,000 is for research on the techniques for control, detection and monitoring of the radiation levels in mines; exposure of miners to radiation; on the use of diesels in mines; and on control, detection, and monitoring of respirable dust.

A total of $1.1 million is for ground control research including the development of instrumentation to monitor ground pressure and detect impending roof failure in non-coal mines; developing means of reducing the severity of rock bursts in deep vein-type mines; and establishing criteria for stable mine waste dumps, embankments, and tailings ponds.

A total of $300,000 is for research on reduction of electrical and fire hazards and safer equipment design.

EXAMPLES OF RECENT ACCOMPLISHMENTS

The Bureau of Mines mobilized for response to its increased research responsibilities under Fiscal Year 1971 funding. Task forces identified the problem areas that affect the health and safety of mine workers and helped set in motion a coordinated plan of attack for both inhouse and contract research. Examples of the results follow:

Significant advances were made in the technology to provide life support, to locate and to rescue trapped miners following a mine explosion, inundation, or a major ground collapse. These new developments resulted from a three part Coal Mine Rescue and Survival System contract--communications, life support, and rescue. The Development of a communications subsystem is a significant advance in mine safety. The capability now exists for wireless or through-the-earth communication (see pictures on next two pages) with trapped miners from the ground surface by both voice (electromagnetic) and code (seismic). Another important aspect of this contract is that the Bureau of Mines will have drilling equipment that can be transported in a matter of hours by truck, plane or helicopter to any mine in the United States to rescue trapped miners. The miners can receive food, medicine, and water through an 8-inch probe hole drilled from the surface. Another drill would provide a 28-inch hole through which the miners would be rescued. The life support part of the contract includes the development of a one-hour personal breathing apparatus and a refuge chamber that could be installed in a mine to support 15 men for 14 days. The total system is scheduled for testing and delivery in early 1971. The Rescue and Survival contract is essentially the implementation of recommendations made by the National Academy of Engineering which were requested by the Bureau.

In the research program for development of advanced technology for the control of respirable dust in coal mining, a water-polymer-wetting agent foam developed under a research contract reduced the dust count by more than 90 percent in laboratory scale coal mine model tests. In addition to high dust collection efficiency this foam collapses reasonably soon, is nontoxic, nonirritating, does not damage equipment, and is easily cleaned up. The foam will next be tested in mines under operating conditions.

Initial experiments to determine the potential of water stemming for reducing the production of airborne respirable dust during blasting indicated that about 80 percent dust reduction can be obtained.

A feasibility study of a portable mine dust meter conducted under contract resulted in the development of a bread-board version of a simple, rugged and potentially inexpensive device, based on forward light scattering. The prototype is equipped for measuring either float or respirable dust and has a built-in calibration feature. Completion of this development will provide a much needed instrument for use in evaluating dust control techniques and practices.

In connection with the search for a very rapid analytical procedure for free silica, a visual microspectrophotometric technique based on the molybdenum blue reaction was developed to measure total silicon in a sample. The procedure is applicable to samples containing 1 to 6 milligrams of respirable coal dust and thus permits determination of free silica with the small samples collected on the personal sampler.

Inhouse laboratory experiments indicate that the use of a sharp, heavily loaded disc cutter for coal and rock fragementation can produce a coarser product than a blunt, lightly loaded disc cutter. These results imply that production of respirable dust, as well as combustible dust, can be minimized by utilizing proper cutting tool geometry and optimum load levels.

A comprehensive state-of-the-art evaluation of all types of dust collection equipment showed that no commercially available dust collector is satisfactory for use in coal mines. It was found that dust collectors based on particle inertia (venturi type scrubbers) were applicable to the respirable coal mine dust problem, and a research contract is planned for development of an efficient unit utilizing this principle. It is estimated that such a dust collection system can be operated for about 4 cents per ton of coal produced.

Large scale tests in the Experimental Coal Mine at Bruceton, Pa., show the explosion hazard of coal dust in shuttlecar roadways can be controlled by adequate wetting with a saturated solution of ammonium phosphate.

Laboratory studies showed that ground oyster shells were at least as effective as standard limestone dust for inerting coal dust and have additional advantages. Oyster beds are extensive, the silica content of the powdered materials can be reduced to 0.6 percent by washing the unground shell, and its low bulk density makes the powdered shell more readily dispersible than the limestone dust.

The actual percentage of incombustible content of coal dust can be determined at the mine with a prototype nuclear analyzer developed by the Bureau of Mines. Development of this instrument will allow more timely evaluation of rock dusting practices in mines and thus reduce the coal dust explosion hazard.

The National Bureau of Standards at the request of the Bureau of Mines has prepared recommendations for better illumination in coal mine working areas. These recommendations include guidelines for interim standards under which all working places shall be illuminated by permissible lighting, and recommendations for research and development leading to future improvement in mine lighting and in measuring instruments.

A solid state blasting machine was developed, constructed and field tested in two prototypes. The machine can fire up to 50 blasting caps in series and is potentially permissible. A contract is in preparation for optimization of circuit design and production of a limited number of production prototypes which will meet permissibility requirements and will be used for further testing. This development is intended to provide the blasting machine for firing of more than 20 shots at one time under permissible conditions.

Advances were also made in the detection of noxious gases. A rapid and accurate single-sweep polarographic method was developed for the laboratory analysis of very low concentrations (1 to 50 ppm) of oxides of nitrogen-air samples. Gas chromatographic techniques for the analysis of routine mine air samples for oxygen, nitrogen, methane and carbon dioxide were streamlined, reducing the average time for a run from 6 to 3 minutes. The method is also applicable to diesel exhaust analysis where carbon monoxide concentrations must be determined.

ITEMIZATION OF ESTIMATE

Department of the Interior
Appropriation Title: Health and Safety

Bureau of Mines

	Actual 1970	Estimate 1971	Estimate 1972	Increase (+) or Decrease (-)
Program and Financing				
Total obligations	$26,791,068	$57,305,000	$71,075,000	$+13,770,000
Unobligated balance available, start of year	-732,255	- -	- -	- -
Unobligated balance available, end of year	- -	- -	- -	- -
Unobligated balance lapsing	31,187	- -	- -	- -
Budget authority	26,090,000	57,305,000	71,075,000	+13,770,000
Budget authority				
Appropriation	27,452,000	55,795,000	71,075,000	+15,280,000
Transferred to other accounts	-1,362,000	-30,000	- -	+30,000
Appropriation (adjusted)	26,090,000	55,765,000	71,075,000	+15,310,000
Proposed supplemental for wage board increases	- -	55,000	- -	-55,000
Proposed supplemental for pay act increase	- -	1,485,000	- -	-1,485,000

	Actual 1970	Estimate 1971	Estimate 1972	Increase (+) or Decrease (-)
Obligations by Objects				
11 Personnel compensation	$12,714,000	$24,877,000	$30,256,000	$ 5,379,000
12 Personnel benefits	1,023,000	2,015,000	2,450,000	435,000
21 Travel and transportation of persons	836,000	2,397,000	2,950,000	553,000
22 Transportation of things	88,000	322,000	200,000	-122,000
23 Rent, communications, and utilities	386,000	729,000	750,000	21,000
24 Printing and reproduction	155,000	230,000	250,000	20,000
25 Other services	7,512,000	18,789,000	25,512,000	6,723,000
26 Supplies and materials	760,000	2,295,000	2,900,000	605,000
31 Equipment	2,700,000	4,600,000	4,855,000	255,000
32 Lands and Structures	96,000	387,000	190,000	-197,000
41 Grants, subsidies and contributions	519,000	662,000	760,000	98,000
42 Insurance claims and indemnities	2,000	2,000	2,000	- -
Adjustment for rounding	68	- -	- -	- -
Total obligations	26,791,068	57,305,000	71,075,000	+13,770,000

Personnel Summary

	Actual 1970	Estimate 1971	Estimate 1972
Total number of permanent positions	1,380	2,242	2,494
Full-time equivalent of other positions	21	45	45
Average number of all employees	1,040	1,996	2,411
Average GS grade	9.2	9.3	9.3
Average GS salary	$12,856	$12,952	$13,058
Average salary of ungraded positions	$8,467	$9,166	$9,922

MINE SAFETY PROGRAM

Mrs. HANSEN. Your safety program has been very severely criticized from a great many sources. Could we have the current status of the program, the effectiveness of it, and the practicality of regulations which have been issued?

Dr. OSBORN. I think, Madam Chairman, it would be good for Deputy Director Henry Wheeler to give us an introduction to this. He has been on top of it since it started.

Mr. WHEELER. Madam Chairman, it is a pleasure to be back with you again.

It is true we have been criticized and I think we have been criticized rather uniformly by everybody; by the industry for being too tough and by the workers for not being tough enough. I think this indicates we must be doing something right. At least we are not on one side or the other. We are trying to play this down the middle.

We have not made as many inspections as the law requires us to make.

Mrs. HANSEN. Why?

Mr. WHEELER. We just simply have not been able to expand our personnel fast enough. When the new coal mine law went into effect last March, about a year ago, it quadrupled the workload we had to do. We started to work very hard to build up our work force to take care of that, and we can see the light at the end of the tunnel.

By the end of this fiscal year we will have on board enforcement personnel at least in the amount of the 1,000 people it will take to do this job.

We started off with less than 300 people.

However, we have made over this period of time over 12,000 inspections of coal mines, we have issued something like 45,000 notices of violations calling attention of the operators to the violations of the law, and we have issued about 2,000 closure orders where we close mines for, in most cases, relatively short periods of time in order to force operators to comply with the law.

Normally what we do is to cite a violation. If there is an imminent danger—if something is about to happen right now which would get a mineworker hurt we issue an order and withdraw the workers from the mines immediately and do not let them go back to work until the condition is abated. This happened in 982 cases last year.

Most of the time the condition is one which does not pose an imminent danger to the worker, and in those cases we give the operator a reasonable time to comply with the law. If he does comply with the law within that period of time, his operations are allowed to continue uninterrupted. If he does not comply with the law in the reasonable time specified, then an order is issued and the workers are pulled from the mine until the condition is abated.

In every case where a violation is cited, he is subject to assessment of a civil penalty.

So because of the shortage of personnel we have had to——

SHORTAGE OF MINE INSPECTION PERSONNEL

Mrs. HANSEN. Why have you had a shortage of personnel?

Mr. WHEELER. Primarily the problem has been one involving the time it takes to recruit, employ and train people to become inspectors.

Mrs. HANSEN. How long does it take you to recruit a mine inspector and how long does it take you to train them?

Mr. WHEELER. It doesn't take as much as it used to.

Mrs. HANSEN. How long is that?

Mr. WHEELER. When we started, it took us 9 months with the regular civil service procedures.

Mrs. HANSEN. What complicated the procedures?

Mr. WHEELER. Between the time they give an examination and the time the man went to work for us it took 9 months. I could give you a chart which shows how this was broken down. We have cut this down to 4½ months. We can also give you a chart to show you what we are doing now.

(The information follows:)

Average time required for processing Federal Mine Inspector Applicants

	Weeks
Former system:	
Written examination	6
Examination processed	4
Application rated	6
Entry on register	1
Certificate issued	4
District managers review	6
Selection and notification	3
Medical examination	4
Medical review	4
Notification to report	2
Total	40
Current system:	
Application rated	1
Inquiry forms processed	2
Entry on register	1
Certificate issued	1
District managers reviews and interviews	3
Selection and notification	1
Medical examination	3
Medical review	2
Notification to report	2
Total	16

Mrs. HANSEN. What was the delay?

Mr. WHEELER. It was the old thing of giving the examination, waiting until all the examinations come in, somebody getting together and rating them, giving them a Civil Service grade, then put them on the Civil Service Register, et cetera.

Dr. OSBORN. We have a school at Mount Hope, W. Va., and the training period is 10 weeks. Then there is an apprentice period.

Mr. WHEELER. This is after the 4½ months involved.

Mrs. HANSEN. Most of the criticism has been because of lack of personnel. Actually you have a lot of redtape in the Federal Government on hiring people.

Mr. WHEELER. This is true. As I say we have reduced it by one-half. Possibly we could have and should have reduced it more, but we are in the middle, as you have indicated you are in so many of your problems. On the one hand we want to get the number of people in the mines up, and on the other hand we want the people that we put there to be adequately trained and able to do this job, and in effect we compromise. We are not giving the people as much training as we

would like to before we make inspectors out of them. We are giving them what we think is enough to enable them to do a job, but not as much as we would like to give them.

So we are going to get the 1,000 people we need by the end of this year, but they will not be adequately trained by the end of this year.

Mrs. HANSEN. When will they be adequately trained?

Mr. WHEELER. They will be adequately trained to do a job by August or September. They will be learning in their jobs for another 6 or 8 months.

UTILIZATION OF MINE SAFETY PERSONNEL

Mr. MCDADE. Are you making efforts to move these people around in accordance with your evaluation of the effectiveness of State health and safety laws?

Mr. WHEELER. We are not moving them so much with regard to the effectiveness of State health and safety laws.

Mr. MCDADE. Aren't some States more vigorous, more active and better with health and safety laws than other States?

Mr. WHEELER. They sure are.

Mr. MCDADE. Why don't you take that into consideration when you face a shortage of manpower?

Mr. WHEELER. We take that into account to some extent, but we also have to make other choices which are more basic, like whether we want to make a complete inspection or spot inspection or a health inspection or utilize the time of our people in approving ventilation plans and roof plans.

When you don't have enough people to do all of the things the law requires, we have to allocate and reallocate our personnel.

To start off we thought it was necessary to get into as many mines as possible with what we called a partial but representative inspection. We caught a lot of static about that. I still think it was the right thing to do because although we didn't inspect the mine completely, we did inspect enough of the mine to tell the operator what he had to do to get in compliance with the law.

By making a partial inspection this let us get in all of the mines faster than we would have if we spent a lot of the time in each mine.

Then we went back and made a complete inspection. Then we started emphasizing spot inspections. The law requires in some mines that an inspector be there every 5 working days.

Then we started health inspections. Then in February we put emphasis on ventilation plans and roof control plans.

The point I am trying to make is, over this period of a year we have directed our attention to get compliance in every respect of the law, but not all at the same time because we have not had enough people. We had to do one and then the other, and reallocate our forces from time to time.

STATE INSPECTION SITUATION

The State situation, Congressman McDade, under this law is a changing situation. Many of the States, including the State of Pennsylvania, are clearly uncertain as to what their role should be under this

law, where the overall responsibility for enforcing health and safety has now been stressed in the Federal Government.

We met with some of the people from the States. Serious consideration is being given by the State of Pennsylvania to doing away with the inspection of mines by State personnel. I think this would be a sad thing if it were to happen, and it very well may, because the States are wondering why they should spend State money to inspect mines when the Federal Government is going to do it for them.

Our feeling is that two inspections are better than one and we would like to see the States continue. But it is a problem which the States are facing up to. So all of what you say is true.

Pennsylvania, there is no question about it, has a very strong inspection agency. It is being decimated.

Mrs. Gutschall, whom you may know, is meeting with those people up there this week to try to see how we can accommodate those people, whether they ought to come to work for us or whether we can make some arrangement to have the State do some of the work for us.

Incidentally, she is now on our payroll working for us, not the State.

Mr. McDade. You have a very effective person. But your whole colloquy doesn't reassure me very much.

Mr. Wheeler. In what regard?

Mr. McDade. It sounds to me like you have more problems now than you started out with. You are talking about States dropping their whole health and safety program because you are now in it. The question I asked you was, Why didn't you allocate your resources to take advantage of State programs? And you tell me States are going to get out of the business.

Mr. Wheeler. This is one of the effects of the law that was passed by the Congress. There is no way under this law that we can delegate our responsibility to the State.

Mr. McDade. I didn't say you should.

Mr. Wheeler. I am looking. If we can find a way to use the State people more effectively, I would like to do it, but I don't know how to answer your question.

Mr. McDade. Let me ask, isn't there some overlap or could you contract with States or what can you do?

Mr. Wheeler. There is a provision in the law where we can make grants to the States to assist them in various areas, one of them being enforcement. We have publicized the fact we are in business to make grants under this provision. We have signed two grants, one with West Virginia, and one with the State of Kentucky. Both of these grants are to assist the State in educating and training miners, not to reinforce their inspection function.

We have not yet received any kind of a request from the State of Pennsylvania. I think it is because of the uncertainty that now exists in the State agency. I don't believe—you can find out better than I can, but I don't believe they really know what the future of that agency will be.

So in that situation it is very hard for us to deal with them.

Dr. Osborn. It is a very unsatisfactory situation.

Mr. McDade. I am not reassured.

Mrs. Hansen. What can bring about a satisfactory situation?

CONTRACT WITH NATIONAL ACADEMY FOR PUBLIC ADMINISTRATION TO STUDY STATE PLAN

Dr. OSBORN. We are working on it. For one thing, The Bureau of Mines last June entered into a contract with an organization called the National Academy for Public Administration to study this problem, realizing it was difficult.

As a matter of fact, by law we have to come up with some kind of a solution. The Academy went around the country talking to the State people, Pennsylvania and other States, and just put this report on our desks about a week ago.

I have read part of it. I think Henry Wheeler's group has gone through it. Within a few days I am to get a summary recommendation from them on what we think ought to be done in light of this contract report.

I believe the report will be helpful, but we haven't had a chance to have conferences on it yet. It has been moving fast in the last few days.

USE OF STATE INSPECTION PERSONNEL

Also, last week I had quite a talk with Mrs. Gutschall about her role in the Bureau of Mines with respect to what her recommendations would be talking with the State people of Pennsylvania, using this perhaps as a prototype for working something out with other States.

In addition, Friday night I attended a meeting of the Holmes Safety Association Council of Pennsylvania where I talked with some of these people. They are very proud of their work in Pennsylvania and don't want to be just run over by the Federal Government.

On the other hand, if the State program is on the way out, they ought to make some kind of an accommodation. These are professionals, and, of course, the Federal Government can use them.

So we have these various elements. Certainly in the next few weeks we have to come up with some kind of a plan. We don't have it now.

Mr. WHEELER. If nothing can be done in the States to save these people, we will hire them and make Federal inspectors out of them and put them on our roles.

Mr. MCDADE. You had a dual inspection system of State and Federal in many States for a long time.

Dr. OSBORN. The 1969 law ran right over this. We now have to do the inspections. This isn't true in the metal and nonmetal mines. It is highly difficult.

Mrs. HANSEN. Do you have a distinct feeling that the States will say if the Federal Government is going to do this, we are not?

Dr. OSBORN. The Federal Government has to. In the case of the metal and nonmetal mines law, we can make arrangements where the States will do it, and we now have such arrangements with two States, Colorado and Arizona. They are carrying out their own inspections with our people only making, I think one inspection a year. At any rate we are making fewer inspections than we would otherwise, but enough to make sure the State is doing the job well.

That is the situation in the metal and nonmetal mines. The coal mines are another matter under the new law. We have to do this and this right down the line.

Mrs. HANSEN. This is regardless of what the State does?

Dr. OSBORN. Yes.

Mr. MCDADE. That is because you have a variation between States, isn't it?

EFFECTIVENESS OF STATE INSPECTION PROGRAMS

Dr. OSBORN. I am not sure what the original reason was. I know their inspection was not very thorough in some States. I think Congress felt this was a national problem and no matter what State a mine is in, it ought to have this same uniform type of inspection.

Mrs. HANSEN. Going back to Mr. McDade's statement, Pennsylvania admittedly has a good mine inspection program.

Mr. MCDADE. One of the best in the Nation.

Dr. OSBORN. It was probably the best.

Mrs. HANSEN. Now that the Federal Government makes inspection, is the State of Pennsylvania still going to make their inspections?

Dr. OSBORN. We are not certain. Another thing has happened, the administration has changed in Pennsylvania. The State department of mines and mineral industries, which was a strong organization, has had a very important role in Pennsylvania working with the university's college of mineral industries, and working with the Federal Bureau of Mines. That has been washed out now and the State has a department of environmental resources, and I can't even find an analog of the department of mines and mineral industries in their structure.

I have been on the phone with the acting secretary of the department of environmental resources in Pennsylvania pleading with him to give some identity to an organization we can work with, at least. This is right now, as of today, the situation in Pennsylvania.

In addition, the former secretary of mines and mineral industries has been pushed out. His deputy, Mrs. Gutschall, has gone. The next man in line has gone.

So the administration that has run that department over the last 8 years is decimated. There isn't even anybody to talk to. So as of today it is very difficult, but we will try to work through this.

Mr. MCDADE. The point is the committee wants to see this program well administered if you need a change in the basic legislation or whatever we have to do to get the program operating effectively.

Dr. OSBORN. I think the Federal program is coming along very well despite a great deal of uninformed criticism.

As Mr. Wheeler just said, we are now talking to the point of the State-Federal regulations, which is exceedingly difficult, and we don't see how it is going to develop at the moment.

Using Pennsylvania as the example, there are other reasons besides simple negotiation; there is also disturbance in the structure in Pennsylvania.

Mr. MCDADE. Are there other States thinking of dropping out of State inspection programs; and if so, which ones?

Mr. WHEELER. I think they are all giving serious thought to it, Congressman. I think Michigan did not have nearly as much as Pennsylvania, but decisions are being made in both the area of coal mine health and safety and metal and nonmetal mine health and safety to divert State funds for other purposes if the Federal Government is going to do the job.

Mrs. HANSEN. You are not going to progress very rapidly on your metal program since the Federal Metal and Nonmetallic Mine Safety Board of Review has not been appointed.

Mr. WHEELER. I don't know that we needed one yet, but we will. From our point of view it is unfortunate that the States appear to be headed out of business insofar as coal mine inspections are concerned, but I think it was perhaps an inevitable result of the way this law was enacted.

Dr. OSBORN. Or I think we might say it was inevitable in view of the variation in quality of inspection among the States with a Nation that was insisting on more uniform and high quality inspection.

Mr. MCDADE. And the Nation and Congress are going to insist upon high quality, and we have to get it.

Mr. WHEELER. We are going to have high quality inspections, Congressman.

Mrs. HANSEN. You have to do something about eliminating the redtape so that you can hire the needed personnel.

Mr. WHEELER. We have done something. By the end of this fiscal year we will have all of those people on board but not as fully trained as we need them.

TRAINING PROGRAM

Mrs. HANSEN. You are going to have to develop a topflight training program and you are going to have to shorten your hiring time so that you get people aboard.

Mr. WHEELER. We have done that. We have cut the training in half. We have cut the recruiting and hiring in half. We have a training program in Mount Hope which has been going on continuously since last October. We have now turned out 310 inspector trainees. I think we graduated about 100 from that class last week, and there will be another 125 begin to go to those classes in the middle of April.

So there is an ongoing program. It is just taking a little time.

Mrs. HANSEN. A great many people can be killed while you are puttering around with the Civil Service Commission.

Mr. WHEELER. Yes, ma'am; that is true.

Mrs. HANSEN. Do you have any trouble recruiting qualified inspectors?

Mr. WHEELER. Enough people have taken the examinations already and passed the examinations to give us all of the people we need. So the answer to your question is no.

PENALTY AMENDMENTS

Mrs. HANSEN. How many penalties have been imposed as a result of your inspection?

Dr. OSBORN. We have sent out letters to 882 different mines citing 13,228 violations with a total proposed fines of $1,651,157.

Mrs. HANSEN. What has happened since the notices went out?

Dr. OSBORN. Now we are continuing, and fines have been calculated for the balance, making a total of about 44,000 citations of violation.

Mrs. HANSEN. After you cited the violations, what happens?

Dr. OSBORN. The coal mining companies receiving the letters have 15 working days in which to protest this penalty.

Mrs. HANSEN. When a company has a violation, do you close them immediately?

Dr. OSBORN. Only if it is an imminent danger situation. It is only closed until they correct the situation, but they are fined.

MINE ACCIDENTS

Mrs. HANSEN. Please insert in the record a list of mine accidents and their location State-by-State for the past 5 years.

(The information follows:)

MAJOR COAL MINE ACCIDENTS IN LAST 5 YEARS

Date	Mine	Company	Location	Type of accident	Men killed
June 1, 1966	Dora No. 2	Doverspike Bros. Inc.	Dora, Pa.	Suffocation	5
July 23, 1966	Siltix	The New River Co.	Mount Hope, W. Va.	Explosion	7
Aug. 7, 1968	River Queen	Peabody Coal Co.	Greenville, Ky.	do	9
Nov. 20, 1968	Consol No. 9	Mountaineer Coal Co.	Farmington, W. Va.	do	78
Dec. 30, 1970	Nos. 15 and 16	Finley Coal Co.	Hyden, Ky.	do	38

Mrs. HANSEN. You have had a large mine accident in Kentucky recently. What was the death loss?

Dr. OSBORN. Thirty-eight.

Mrs. HANSEN. What was the death loss in the West Virginia disaster?

Dr. OSBORN. In 1968 and that was 78.

Mrs. HANSEN. Have you had any other major accidents in the last 2 years?

Dr. OSBORN. No.

May I give a little background on this?

Mrs. HANSEN. Please do.

Dr. OSBORN. I was checking on the record the other day in regard to what we call major disasters; that is, where five men or more are killed at a time. In the 26 years since the war including 1945, giving us 26 years, there have been 52 major disasters or an average of two a year. Some people are inclined to think this is something new. We had a bad one last year. We have averaged two a year.

Mrs. HANSEN. This is exactly why Congress has been upset.

Dr. OSBORN. Sure, it is terrible. We have had one in the last 2 years. Maybe things aren't getting worse as some people imply.

CAUSE OF MINE ACCIDENT IN KENTUCKY

Mrs. HANSEN. Have they determined the cause of the Kentucky accident?

Dr. OSBORN. Yes. We have written our report and the cause was determined, without any question, as being the use of nonpermissible explosives or permissible explosives in a nonpermissible way which ignited coal dust which was thrown into suspension by the explosion.

Mrs. HANSEN. Was this the operator that permitted it?

Dr. OSBORN. It was an explosive man, a local man, who came in to do the explosives work. This is not the kind of explosives used in breaking the coal. They were using permissible explosives there, they

would blast the coal all right. But this was blasting a large boom hole in the roof for equipment because it is only a 33-inch seam and they had to have more headroom.

The owner in the testimony, the operator, maintained he didn't know what was going on, he didn't know the use of the explosives was happening or that they were being used in a nonpermissible way. The operator was not underground at the time. All underground were killed instantly.

Mrs. HANSEN. What was the cause of this accident?

Dr. OSBORN. This is a case where it was determined very efficiently. I think the Bureau of Mines did a very fine job in getting in there and investigating this and coming out 30 days after the accident with a finished report in the hands of Congress.

Mrs. HANSEN. Is the mine open again?

Dr. OSBORN. No. There is a closure order on the part of the Bureau, but that can be removed whenever all the safety conditions are met.

INCREASE REQUESTED FOR SAFETY INSPECTIONS IN METAL AND NONMETAL MINES

Mr. WHEELER. Madam Chairman, because the increase in funds we are asking for is primarily in metal and nonmetal mines, I could go on with what I was saying. In the noncoal mines we have made over 2,000 inspections, and we have cited over 15,000 notices of violation in noncoal mines.

Mrs. HANSEN. What are the major violations in nonmetal mines?

Mr. WHEELER. Most of them I would say are haulage violations where equipment is defective and ropes and cables, this kind of thing. Maybe there is not adequate ventilation for diesel engines that are used underground. Gasoline is taken underground where it is not permitted anymore. These kind of things.

ADVISORY COMMITTEE ON COAL MINE SAFETY RESEARCH

Mrs. HANSEN. You have been criticized rather severely for the composition of the Mine Safety Board. What is the present status of that advisory committee on coal mine safety?

Dr. OSBORN. That advisory committee will have its second meeting in May. It is still functioning. It is a committee of the Department, not of the Bureau, as you know.

Mrs. HANSEN. That is right.

Dr. OSBORN. There will be some changes in its makeup.

Mrs. HANSEN. Have the changes been made?

Dr. OSBORN. I know of two. There may be a few more.

One of the problems—I believe it is appropriate to take a minute to mention it—is that the law states this Coal Mine Safety Research Advisory Committee shall be composed of certain ex officio people and in addition people who are knowledgeable in coal mine safety research, but who have no connection whatsoever, that is, have now or have had, with the coal industry and who are not members of the Federal, State, or any other government.

I must say in defense of the people in charge of picking that committee it is pretty hard to find an expert in coal mine safety research

who has or had no connection whatsoever with the coal industry or is a member of the Federal, State, or any other government.

Mrs. HANSEN. Does that preclude professors?

Dr. OSBORN. If they know anything about coal research, they are consultants to the industry. And in the State universities where most of our coal mining people are, they are generally State employees. It is kind of difficult to pick qualified people.

Mrs. HANSEN. What choices do you have?

Dr. OSBORN. I was just pointing out the problems and I fortunately don't have to name this committee.

Mrs. HANSEN. I am intrigued by what professionals you could appoint.

Dr. OSBORN. Let me say again, one of the people who is criticized in the press had done research in psychology and at least one of our research projects in the coal industry has to do with psychology, studying the habits of the men, the hours during the day when they have the most accidents, this sort of thing, the effects of their social life on accidents. We are trying to run all of these things down.

So I think the justification for this person being on the committee was after all that at least one of the research fields is psychology. These are some of the problems we have with that part of the law.

Mr. MCDADE. Has the Department recommended that law be changed?

Dr. OSBORN. Not that I know of.

Mr. WHEELER. I might read that law for you.

The chairman of the committee and a majority of the persons appointed by the Secretary pursuant to paragraph (1)(D) of this subsection shall be individuals who have no economic interests in the coal mining industry, and who are not operators, miners, or officers or employees of the Federal Government or any State or local government.

Mr. MCDADE. How do you recommend that law be changed?

Dr. OSBORN. I think it needs to be changed so we can get some expert research advisers because we can use them. It could be very helpful to have people out in the country advising us on coal research. We will be spending about $30 million next year, on mine safety research. We could use some good advice.

But we have not had the chance as yet to talk about this with Congress. We will. This is one of our points.

Mr. WHEELER. It should not prohibit these people. It ought to guarantee the proper balance.

This is the situation in our advisory committee on metal and nonmetal mines. Here we have to have a balance between labor and management and the States. Perhaps they have some biases but these biases are balanced off within the committee.

Mrs. HANSEN. Please insert in the record the present composition of the Mine Safety Board indicating the background of each member.

(The information follows:)

SECRETARY'S ADVISORY COMMITTEE—COAL MINE SAFETY RESEARCH

An Interior Department Advisory Committee on Coal Mine Safety Research has been appointed under terms of the Coal Mine Health and Safety Act of 1969.

As required by the act, three committee members represent the Directors of three major Federal scientific agencies: S. Daivd Freeman, Office of Science and Technology; John M. Ide, National Science Foundation; and Robert E.

Ferguson, National Bureau of Standards. As further required, a majority of the other members have no economic interest in the coal industry, are not coal mine operators or miners, and are not officials or employees of the Federal Government or any State or local governments. The other committee members are—

H. Lynne Barber, of Cincinnati, Ohio, a retired mining executive;

William D. Carlson of Laramie, Wyo., president of the University of Wyoming;

Ben B. Chastin of Birmingham, Ala., associate professor of chemistry Samford University, Birmingham;

Walter R. Hibbard, of Neward, Ohio, vice president for research, Owens-Corning Fiberglas, and former Director of the Bureau of Mines. Dr. Hibbard has been designated chairman of the committee by Secretary Morton;

Cloyd D. McDowell, of Harlan, Ky., president of the Harlan County Coal Operators' Association;

Frederick J. Robbins, of Hinsdale, Ill., chairman and chief executive of Bliss & Laughlin Industries;

Lewis E. Evans, of Washington, D.C., safety director of the United Mine Workers of America;

Jo Ann Gray, of Denver, Colo., former director of stewardess training for Continental Airlines;

Harold T. Suter, of Morgantown, W. Va., vice president of Consolidation Coal Co.;

Ted Q. Wilson, of Oneida, Tenn., an attorney; and

Robert F. Ziems, of Arlington, Va., also an attorney.

Earl T. Hayes, Chief, Scientist of the Bureau of Mines, will serve as the committee's executive secretary.

CONSTRUCTION OF TRAINING ACADEMY AT BECKLEY, W. VA.

Mrs. HANSEN. You were originally going to construct a training school at Beckley, W. Va. What has happened to that?

Dr. OSBORN. This is still being planned. A public statement was made to this effect on January 27, and we are following along the lines of that statement. The site has been selected, in other words, and the general plan has been stated.

Mrs. HANSEN. Was consideration given to West Virginia University?

Dr. OSBORN. Yes. The site selection team looked at several places in the country but I would like to turn the question specifically over to Mr. Wheeler.

Mr. WHEELER. As a matter of fact, we had a study made for us by the University of West Virginia to advise us on what the curriculum should be and how this kind of an academy should be set up, so the university played a very important role it it. They also recommended Morgantown as a possible site, and some of our people did go there and look at Morgantown as well as Beckley, and a number of other places that were offered to us by various communities.

Mrs. HANSEN. Please insert in the record the reasons why the Beckley site was selected.

Mr. WHEELER. Yes.

(The information follows:)

The Beckley site is particularly suitable for the Academy for the following reasons:

1. It is centrally located in the major coal mining area of the United States and in the largest coal producing State.

2. It is in the heart of a coal mining area which should provide a fertile field for recruiting students with a substantial background of mining knowledge.

3. Coal seams are available that can be developed into a demonstration mining facility for training purposes.

4. It is near to one of the largest coal mine health and safety districts which would assist in utilization of equipment and on-the-job training assignments.

5. Development of the area is not so concentrated that future expansion would be precluded. It is a rural area but not remote.
6. Beckley is in an area of persistent critical unemployment and additional industry in that area should help to relieve the depressed conditions of this part of Appalachia.
7. Adequate commercial transportation is available to service Academy requirements but without the distraction of congested traffic.
8. The leadership and citizens of Beckley have shown a sincere interest in having the Academy there. The site for the Academy was provided without cost.
9. Although the Academy should, and will, be separate from other training facilities, Beckley Community College issues associate of arts degrees as planned for the Academy, and this should facilitate exchange of credits.
10. Adequate hotel and motel facilities are available in Beckley to provide housing for students in short-term courses and seminars at the Academy which will supplement the resident student instruction program.
11. Outside distracting influences during off-duty hours are at a minimum.
12. The Academy students and faculty living and working in the heart of a mining area should generate a new awareness of mine health and safety that hopefully will permeate outward and thus help to reduce accidents.

COAL INSPECTIONS AND ENFORCEMENT

Mrs. HANSEN. Justify your requested increase of $600,000 and 27 positions for coal inspections and enforcement.

Dr. OSBORN. Do you want to discuss that, Mr. Wheeler?

Mr. WHEELER. This $600,000 increase is to pay the Bureau of Mines share, or it amounts to about one-half of the cost of the interim compliance panel which has been set up in accordance with a requirement in the law. The purpose of this interim compliance panel is to consider requests from industry for interim approvals to use nonpermissible equipment in so-called nongassy mines for a period of time and to grant them the right to have a higher level of respirable dust than the 3 milligrams per cubic meter, which is specified in the law. This year we paid that amount of money out of our health and safety funds, and we would like to have some money specifically allocated for that purpose so we can use that $600,000 to do more inspections and enforcement.

AVERAGE AGE OF COAL MINERS

Mrs. HANSEN. What is the average age of your coal miner?

Dr. OSBORN. I think he is about 46, but we can get it.

Dr. SCOTT. Fifty-three years old.

Mr. WHEELER. That is not quite right.

Dr. SCOTT. That is the figure that was quoted most last year.

Mrs. HANSEN. Please insert the information in the record.

Dr. OSBORN. Yes.

(The information follows:)

The average age of the Bureau's coal mine inspectors on the rolls in March 1971 is 46.4 years.

NEW EMPLOYMENT SITUATION IN MINING INDUSTRY

Mr. WHEELER. It has come down a little.

Mrs. HANSEN. How many beginning workers do you have going in the mines each year, and what is their age?

Mr. WHEELER. Mine workers?

Mrs. HANSEN. Yes.

Mr. WHEELER. That I will have to find out for you. I don't know. I know that the average age of the new mine inspectors that we are hiring is 41.

Mrs. HANSEN. I am asking about the workers.

Mr. WHEELER. This I will have to find out for you. I don't know.

(The information follows:)

No specific records are maintained on the age of new workers entering into the mining industry but discussion with representatives of the Department of Labor and the Mine Workers Union indicated that the average age is between 23 and 25 years.

(Discussion off the record.)

Mrs. HANSEN. How is the employment picture changing since you have been moving toward more usage of machines?

Dr. OSBORN. We have been moving very rapidly toward machines, that is entirely right. It has also been true that the younger men have not been going into the industry. Since the enactment of the 1969 Coal Mine Health and Safety Act, but also before that, the need for more highly trained labor has been emphasized and educational programs are underway which we think, and which must, change this picture. May I give you a couple of examples?

This is the sixth year that a project in Pennsylvania called the Elders Ridge project has been going on where about 60 or 70 unemployed people have been brought in for a 6-month training course using a practice machine that the Joy Manufacturing Co. provided for it, and using their very complicated machinery, and so on. These men have been trained in that time as electrical technicians and as machine operators, and out of 70 something on an average of 65 have graduated and all have been snapped up and are being used.

In an industry that has 140,000, 65 isn't very many but this has been a pilot operation to find out how to do it. This is going to be multiplied. At least, there is going to be more than one in the country very soon.

Secondly, last Friday night, I inspected a site for a school—let's call it a school—an instructional project which is being built near Indiana, Pa., which is within a triangle where there are three tremendous coal mine powerplant complexes. I mean, they are really tremendous mines. Two of them would be turning out 5 million tons of coal a year, and the other 3 million tons of coal a year, and this is fed by conveyor belt right into the powerplant boilers. They have to have miners, and machine operators are the big thing. So the companies are putting up about $350,000 and the Bureau of Mines about $95,000 for the first year of operation. They are providing the land and building the facility. It will include an aboveground model mine with all of this complicated machinery. This is an 8-week course and they will take the people who have already passed through the examination, and so on, to be regular miners with the company, and these men will be given an intensive training course aboveground, alternating with a couple of days a week underground in machine operation, and these will be almost all young men. They are getting them through the regular State employment system.

Those cooperating are, first, the Pennsylvania State University which developed the program and will be in charge of it; secondly, the

State department of mines and mineral industries which existed until a few months ago; third, the coal operators; fourth, the United Mine Workers; and, fifth, the U.S. Bureau of Mines, and all five have gotten together and this is going ahead. The site is already cleared and this will be built and they will be training people.

The third program is one that was developed by the Bureau of Mines, by Mr. Wheeler's group, where at three places in the country we have schools, or will have opening very soon, one in Butte, Mont., one in Leadville, Colo., and one in Virginia, and these are 2-year programs like a vocational school, but the vocation is mining, and this certainly will develop some miners.

So I feel very hopeful that these training programs are going to develop the people we need for the industry. Right now the industry is extremely short of people and this is one reason for this high accident rate. We have inexperienced people underground.

Do you have anything you want to add to that?

Mr. WHEELER. No; that is right. I think we should say that these three programs that you speak about in Montana, Colorado, and Virginia will all be financed by the Department of Labor. We are acting as consultant to them, but it is not financed out of our appropriation.

(Discussion off the record.)

Mr. WHEELER. It is very important to have a place for them to go to work after they are trained, and, fortunately, we have that.

INSPECTION AND ENFORCEMENT OF SAFETY IN METAL AND NONMETAL MINES

Mrs. HANSEN. Justify your requested increase of $1.6 million and 73 positions for inspection and enforcement of the metal and nonmetal mines.

Dr. OSBORN. This is to bring us up to the staff we need. We have 112 inspectors now in the metal and nonmetal mines. A full complement will be about twice that, when we finally have it a year or so from now.

HEALTH RESEARCH IN COAL MINES

Mrs. HANSEN. Justify you requested increase of $1.8 million and 10 positions for health research in coal mines.

Dr. OSBORN. That has mostly to do with dust. Do you want to comment on that?

Mr. WHEELER. Most of it is for research on respirable dust.

Mrs. HANSEN. How much progress have you made?

Mr. WHEELER. Well, I think we have made quite a lot. Let me say that in most of the mines in the United States we have been able to get down to the 3.0-milligram standard where at least a great many people thought that it was not going to be possible a year ago. Most of this was done by controlling ventilation. Some of it is going to take other things like water, and bit design, and foam, and you can talk about that.

Dr. SCOTT. This is one of our major areas of research in dust. We have been doing this also with our contract research with industrial firms. As an example, one is with the Monsanto Co. in which we

are experimenting with foam suppressant to catch coal dust right at the cutter head. Now we are following this up with a contract this year which is going to be a field demonstration of that particular technique. That is just one aspect. There are fragmentation studies and many other aspects.

SAFETY RESEARCH IN COAL MINES

Mrs. HANSEN. Justify your requested increase of $7,640,000 and 28 positions for safety research in coal mines.

Dr. SCOTT. This includes $3 million approximately that was taken—if you note, we had a decrease in our C. & D. funds of $3 million, so this will take up the slack on that decrease. We are just transferring all the methane work into the health and safety funding area.

The other increases are going to be for related developments for degasification of coal previous to mining, the measurement of the stress relationship in terms of gas outbursts, things of this sort.

METAL AND NONMETAL MINE RESEARCH

Mrs. HANSEN. Justify your requested increase of $2.4 million and 18 positions for metal and nonmetal mine research.

Dr. SCOTT. Principally this work is going to be in the area of noxious gases, toxic materials, diesels in mining, a lot to do with radon daughter control in uranium mining, also ground-support research. Much of this work is being done at our Spokane laboratory.

Dr. OSBORN. We increased the number of employees out there by about 20 this year.

Dr. SCOTT. Have you ever visited our Spokane lab?

Mrs. HANSEN. No, I haven't.

Dr. SCOTT. You would be very welcome.

Mrs. HANSEN. I would like to.

A total of $27,452,000 was appropriated in fiscal year 1970 for health and safety. Please insert in the record a tabulation indicating your unobligated balances by program activity as of June 30, 1970.

Dr. Osborn. Right.

(The information follows:)

Unobligated balances by program activities—As of June 30, 1970

Health and Safety	*Unobligated balance*
Inspections, investigations and rescue work	$27,045
Control of fires in coal deposits	253
Health and safety research	3,889
Total	31,187

OBLIGATIONS INCURRED DURING FISCAL YEAR 1971

Mr. HANSEN. Appropriations to date for health and safety in fiscal year 1971 total $55,795,000. Please insert in the record a tabulation indicating the obligations which have been incurred monthly for the first 8 months of fiscal year 1971 and your projection of the monthly obligation for the remaining 4 months of the fiscal year.

(The information follows:)

Health and Safety Appropriation

Monthly Obligation Rate

July, 1970	$ 1,670,371
August, 1970	2,687,009
September, 1970	2,570,149
October, 1970	2,905,723
November, 1970	2,497,483
December, 1970	2,660,997
January, 1971	3,253,748
February, 1971	3,361,621
Subtotal, 1st eight months	(21,607,101)
March, 1971 est.	4,916,899
April, 1971 est.	8,020,000
May, 1971 est.	9,511,000
June, 1971 est.	11,210,000
Total obligations .	55,265,000
Transfer to GSA space ...	30,000
Transfer to GSA for Mine Safety Academy Design .	500,000
Total appropriation to date	55,795,000

The obligation rate is heaviest in the fourth quarter primarily due to the length of time of developing contract requirements and progressing through standard Government contracting procedures. The situation by activity is as follows:

Inspection, Investigations and Rescue Work: The rate of obligation will be heaviest in the last portion of the year due to several timing factors. For instance, time required for getting State proposals and negotiating grants delayed the actual making of grants until March. $384,000 was obligated during March for awards under the State grant provisions of the Coal Mine Health and Safety Act. Two contracts on the mine rescue system totaling nearly $2,000,000 could not be developed and awarded until after completion of a research contract on developing the system was completed in March 1971. The first contract on maintaining a standby disaster capability, modifying, adding to and testing equipment developed under the research contract, and providing and testing equipment for emergency drilling of 5 to 6 foot wide shafts for mine rescue is expected to be awarded in May. The second contract on providing and testing communications equipment for locating and communicating with trapped miners is expected to be awarded shortly thereafter. Contracts for various types of safety and respirable dust analysis equipment and rescue station installation will be let in the fourth quarter--these funds were provided by a supplemental appropriation in late December of this year. In addition, because of the rapid build up of personnel, salary costs will be much higher in the fourth quarter of the year.

Health and Safety Research: Most of the mine health and safety research contracts and grants will not be awarded until the fourth quarter of 1971 because of the long lead time in formulating contract specifications, requesting and receiving contract proposals and bids, reviewing proposals, and selecting contractors. Through February 28, 105 contracts and grants were out for proposals or proposals were under review for contractor selection and/or negotiation. These amounted to an estimated cost of approximately $15 million, whereas the uncommitted funds for these purposes were approximately $11 million. It is expected that the excess in contracts and grants will be funded in F.Y. 1972.

The 105 contracts for which proposals had been solicited or received by February 28, 1971, but for which contracts had not yet been awarded and funds obligated are as follows:

		Estimated Amount ($1,000's)
1.	Grouting of Horizontal Holes in Coalbeds	36
2.	Evaluation of Anenometers for Use in Coal Mines	25
3.	The Evaluation of Present Shotcrete Technology for Improving Coal Mine Ground Control	111
4.	Hazard Analysis of Ground Control Systems Used in Coal Mines	100
5.	Engineering Review of Prototype 50-Cap Blasting Machine	25
6.	Mine Surveillance and Communication System--Safety Research Center, Bruceton, Pa.	200
7.	Ignition Suppression Device	100
8.	Microminer--Research Dust Generator	75
9.	Quick Disconnect Couplers for Trailing Cables	50
10.	Lightweight Gas-Inflatable Safety Prop	300
11.	Investigation of Flexible Materials for Personnel Shield	50
12.	Chemical Stabilization of Coal Mine Structures Feasibility Study on Surface Impregnation Equipment	100
13.	Development of Permissible-Type Remote Reading Data Acquisition System for Ground Pressure and Deformation Measuring Devices	100
14.	Suppression of Fire on Underground Coal Mine Conveyor Belts	200
15.	Fire Suppression of Mining Equipment	500
16.	Develop a Nonincendive Explosive for Use in Secondary Breakage and Battery Starting (Anthracite Mines) in Methane Atmospheres in Underground Coal Mines	100
17.	Development of Underground Coal Mine Production Planning and Scheduling Model (Non-Simulation)	150
18.	Requirements for a Mining Research Data Storage and Retrieval System	100
19.	Automatic Brakes for Mine-Track Transportation Systems in Underground Mines	250
20.	Development of An Automatically Operated Air Lock for Ventilation and Traffic Control in Underground Coal Mines	135
21.	Instrument for Rapid Analysis of Major Elements in Coal Mine Dusts	80
22.	Experience Survey	50
23.	Underground Coal Mine Materials Handling Systems: Numerical Models of Accidents, Productivity, and Costs	500
24.	Hydraulic Drilling Systems for Probe Holes.	295
25.	Pneumatic Transport Face Haulage in an Underground Coal Mine	125
26.	Improved Cap Lamp	50
27.	Exploratory Studies of Flame and Explosion Quenching	150
28.	Laboratory Coal-Mine Dust Incombustible Meter	60
29.	Mine Dust Surveys	100
30.	Design, Develop, and Test an Improved Probe-hole Bit and Rescue-bit Assembly	350

		Estimated Amount ($1,000's)
31.	Probe Drill Guidance Systems	410
32.	Effects of Blasting in a Coal Face on the Properties of Roof Rock	200
33.	Measurement of Spray Drop Size and Velocity.	75
34.	Mass Dust Monitors	150
35.	Retractable Probe-hole Bit	170
36.	Development of a Differential Methanometer..	13
37.	Effect of Stress on Permeability of Coal ...	90
38.	Continuous Mining Machine Water-flushed Bits	150
39.	Prototype Development of a Peristaltic Conveyor	100
40.	Solids-handling Pumps for Underground Haulage of Coal	75
41.	Feasibility of Developing Hydraulic Techniques to Replace Conventional Transporting Systems in Underground Coal Mines	80
42.	Machine Design	725
43.	Design and Construction of New Coal-Dust Test Chamber	50
44.	Development of a Multiplexed Borehole Inclinometer Probe, Data Acquisition, and Calculation System	125
45.	Circuit Breaker Development and Application.	80
46.	Design and Development of Protective Canopies and Environmental Cabs for Mobile Equipment	300
47.	Exploration of Illumination Concepts for Underground Coal Mines	80
48.	Protection and Trouble Shooting of Coal Mine Electrical Cables	75
49.	Quick Opening Permissible Electrical Enclosures	50
50.	Mine Air Turbulence Meter	100
51.	Feasibility of Remote Control and Development of Remote Control Devices and Sensors	175
52.	Temporal and Spatial Analyzer of Dust Concentrations in Clouds	225
53.	Development of TV Techniques for Spacial Applications in Underground Mines	120
54.	Feasibility Study for Improved Pressure Gradient: Instrumentation Technology for Use in Developing Coal Mines	75
55.	Techniques to Achieve Control Illumination..	30
56.	Development of Portable Illumination Instrument	75
57.	Coal Mine Combustion Products, Identification and Analysis	70
58.	Evaluation and Feasibility of Isolated Electrical Supplies in Underground Coal Mines	50
59.	Development of Minimum Luminance Requirements for Underground Coal Mine Tasks	100
60.	Factors in Controlling Bit Diviation in Drilling Horizontal Holes in Coal Beds ...	100
61.	Mine Air Monitor	100
62.	Exploratory Studies of Extinguishment of Rock Covered Mine Fires	100
63.	Dust Electrical Charge Instrument	100
64.	Evaluation of in-hole Motors for Drilling Horizontal Holes in Coalbeds Parallel to Bedding	120

		Estimated Amount ($1,000's)
65.	Directional Control of Horizontal Holes	100
66.	Neutron Activation Analysis of Respirable Mine Dusts for Trace Elements	50
67.	Comprehensive Field Study of Strata Behavior in Long-Wall Coal Mines	620
68.	Development of a Geologic Logging System for Special Use in Coal Mine	150
69.	Feasibility Study of Penumatic Stowing for Ground Control in Coal Mines	75
70.	Plastic Liners Using Sand or other Materials for Extenders	175
71.	Improved Respirator Facefit	75
72.	Suppression of Burning on Pillars in Coal Mines	450
73.	Development of a Borehole Gauge for Deep Hole Stress Determinations	150
74.	Micro Seismic Techniques for Monitoring Ground Stability in Longwall Coal Mining Systems	100
75.	Aerodynamics of Airflow in Coal Mine Working Faces	125
76.	Dust Collection System for Controlling Coal Dust	350
77.	Comprehensive Field Study of Strata Behavior in Long-wall Coal Mines	620
78.	Air Curtain Face Mask	100
79.	Feasibility of Seismic Detection and Delineation of Old Coal Mine Workings and Areas of Subsidence	250
80.	Pulsed and Continuous Wave Seismic Holography Experiments and Applications to Problems in Mining	200
81.	Statistical Techniques for Characterizing Coal Seams	100
82.	Personal Dust Sampler	68
83.	Kinetic Studies on Gas Hydrates	25
84.	Design of Roof Bolt Patterns for Jointed Rock	29
85.	Design, Development, and Demonstration of a Coal Mine Rescue Capsule	179
86.	Coal Mining Using High Pressure Water Jets .	95
87.	Design of a Program of Acoustic Research ...	19
88.	An Electromagnetic and Seismic Noise Survey Related to Coal Mine Rescue Communications	50
89.	Consultation and Standardization of Electromagnetic Measurements and Techniques	100
90.	Research & Development on Lithium Nickel Flouride Batteries in Mine Life Support Equipment	220
91.	Coal Mine System Model	271
92.	Human Engineering (Underground Coal Mines) .	95
93.	Automated Breathing Metabolic Simulator	74
94.	Breathing Metabolic Simulator	81
95.	Suppression of Respirable Coal Dust in Mines	233
96.	A Liquid Underground Support System in Coal Mines	98
97.	Invetigation of Failures of Roofs in Coal Mines	121
98.	Helix Pressure Gauge to Indicate Roof Bolt Loads	20

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		Estimated Amount ($1,000's)
99.	Correlation of Mine Rock Failure with Time Elapse Before Support Installation ..	43
100.	Noise Generation and Hearing Protection in Underground Coal Mines	60
101.	Acoustic Separation Processes	83
102.	Comprehensive Study of Intrinsic Safety Criteria	48
103.	Development of Minimum Luminance Requirements for Underground Coal Mining Tasks ...	195
104.	Engineering Evaluation of Mill Tailings Disposal Practices and Potential Dam Stability Problems in Southwestern United States	150
105.	Personnel Dosimeter for Uranium Miners	43
	Total	15,095

CONTRACT RESEARCH—HEALTH AND SAFETY

Mrs. HANSEN. A great deal of your mine safety work is done by contract. Please insert in the record a general statement on policy guidelines with reference to contracting this work, a tabulation indicating contracts which have been awarded so far in fiscal year 1971, indicating the name of the contractor, the purpose of the contract, and the funding in connection therewith.

Dr. OSBORN. Be glad to.

(The information follows:)

Contracts and Grants for Health and Safety Research

It is a general policy that the health and safety research and development work for which the Bureau of Mines has responsibility will be conducted through contracts and grants to the maximum extent possible, consistent with efficiency.

Research and development will be conducted in Bureau of Mines laboratories to the extent necessary to maintain the inhouse competence for proper and effective management and monitoring of the overall program and to obtain the required results by the most expeditious means. The latter entails inhouse R & D on projects which can best be accomplished by this means because of special expertise not available elsewhere.

Information on the contracts and grants which have been awarded through February 28, 1971 is attached.

Contracts and Grants Awarded through January 31, 1971

1. H0110079 (70-7) Westinghouse Electric Corp.
"Systems Analysis of an Inherently Explosion-Proof Coal Mine Operation"
Eff. Date: 6/30/70 Duration: 6 mo. $ 99,010

2. G0110235 (71-7) Lehigh University
"Fluid Dynamics of Small Particles Transport and Deposit"
Eff. Date: 9/1/70 Duration: 3 yrs. 51,745 1/

3. G0110269 (71-8) Lehigh University
"Spontaneous Electrostatis Precipitation of Dust"
Eff. Date: 11/1/70 Duration: 3 yrs. 20,370 1/

4. H0110401 (71-20) University of Texas
"Early Warning System of Impending Rock Failure for Safety in Coal Mines and Excavations"
Eff. Date: 1/1/71 Duration: 2 yrs. $109,447

5. G0110124 (71-28) University of Pittsburgh
"The Penetration Characteristics of a 10mm Nylon Cyclone"
Eff. Date: 8/28/70 Duration: 3 yrs. 38,727 1/

6. G0110894 (71-34) University of Colorado
"Research on Constitutive Relations of Coal"
Eff. Date: 1/1/71 Duration: 1 yr. 91,840

7. G0110427 (71-41) Michigan Technological Institute
"Underground Mining with Regard to Structural Damages"
Eff. Date: 7/1/70 Duration: 5 mos. 8,933

8. H0100186 (71-43R) Stanford Research Institute
"Development of Portable Mine Dust Concentration Instrument"
Eff. Date: 12/21/70 Duration: 10 mos. total
Existing contract amendment allowing increase in cost 2,954

9. G0110850 (71-49) Colorado School of Mines
"Slurry Data Bank"
Eff. Date: 1/1/71 Duration: 1 yr. 19,897

10. G0110851 (71-50) Colorado School of Mines
"Properties of Coal-Water Slurries"
Eff. Date: 1/1/71 Duration: 18 mos. 40,171

11. H0110231 (71-53) University of California
"Finite Element Analysis of Mine Structures"
Eff. Date: 9/3/70 Duration: 2 yrs. 30,000 1/

12. H0210001 (71-62) ESSA (Department of Commerce)
"Determination of the Electromagnetic Environment in Coal Mines"
Eff. Date: 10/19/70 Duration: 1 yr. 191,000

13. G0110678 (71-71) Penn State University
"Determination and Description of Characteristics Affecting Performance of the Loading Function in Underground Coal Mining"
Eff. Date: 1/1/71 Duration: 1 yr. 20,563

14. H0100173 (71-175) Mel-Labs Inc.
"Dust Suppression by Improved Design of Cutting Assemblies for Mining Machines"
Eff. Date: 10/26/70 Duration: No change (Remains 1 yr.)
Existing contract amendment
Increasing funding 39,390

15. H0100173 Mel-Labs Inc.
"Dust Suppression by Improved Design of Cutting Assemblies for Mining Machines"
Eff. Date: 12/4/70 Duration: Extends time from 1 yr. to 13 mos. & 8 days.
Existing contract amendment
Extending time and increasing funding 18,600

16. WF-M-71-001 Night Vision Laboratory
Fort Belvoir (71-221)
"Hand Held Infra-Red Scanner"
Eff. Date: 9/15/70 Duration: 18 mos. 182,000
(71-219) Amendment No. 1
Changes scope of work and funding of the original agreement. Additional tasks are expected to result in costs in excess of the original estimate.

17. S0110601 (M-1008) Theo. Barry & Assoc.
"Industrial Engineering Study of Hazards Associated with Underground Coal Mine Production"
Eff. Date: 12/1/70 Duration: 1 yr. 210,344

18. H0110688 (M-1011) Urbdata Association
"Mobile Shield for Underground Coal Mine Workings"
Eff. Date: 1/12/71 Duration: 18 mos. 283,317

Subtotal 1,458,308

1. Contracts and Grants awarded during February 1971

19. S0111164 (71-5) Mitre Corporation
"Systems Engineering - Management Support"
Eff. Date: 2/1/71 (Estimated Cost) 89,666

20. H0110929 (71-9) Deter Company Inc.
"Dust Suppression in Coal Mines"
Eff. Date: 2/24/71 Duration: 1 yr. 103,830

21. G0111025 (71-11) Carnegie Mellon University
"A Numerical Model for the Study of Particle Interactions in Relation to Dydraulic Transport"
Eff. Date: 1/1/71 Duration: 1 yr. 22,268

22. H0111021 (M-1003) James H. Cobbs Eng.
"Horizontal Borehole Packers for Use in Coalbeds"
Eff. Date: 2/26/71 Duration: 9 mos. 21,047

23. H0101439 (M-1007) Atlantic Research Corp.
"Evaluation of Methanometry in Coal Mines"
Eff. Date: 2/24/71 Duration: 1 yr. 67,553

Subtotal 304,364

Total 1,762,672

1/ For FY 1971 only.

Mrs. Hansen. Please insert pages 82 through 89 of the justifications in the record at this point.

(The pages follow:)

DEPARTMENT OF THE INTERIOR

BUREAU OF MINES

General Administrative Expenses

Appropriation, 1970	$1,647,000	
Second supplemental appropriation, 1970	152,000	
Total appropriation, 1970		$1,799,000
Transferred from "Health and Safety" to cover pay cost		+30,000
Total available, 1970		1,829,000
Appropriation, 1971	1,799,000	
Pay cost supplemental	98,000	
Total appropriation, 1971		1,897,000
Transferred to the National Oceanic and Atmospheric Administration		-16,000
Total available, 1971		1,881,000

Summary of Increases and Decreases, 1972

	Base for 1972	Decrease 1972	
Reduction in costs related to transfer of Marine Mineral Mining Program to NOAA	$5,000	$-5,000	
Net decrease, 1972			-5,000
Budget estimate, 1972			1,876,000

GENERAL ADMINISTRATIVE EXPENSES

Analysis by Activities

Activity	F.Y. 1970 Amount Available	F.Y. 1971 Total Appropriation	F.Y. 1971 Pay Cost Supplemental	F.Y. 1971 Transfers	F.Y. 1971 Amount Available
General administrative expenses (Total program costs, funded)	$1,823,921	$1,799,000	$98,000	$-16,000 1/	$1,881,000
Unobligated balance lapsing	5,079	- -	- -	- -	- -
Total	1,829,000	1,799,000	98,000	-16,000	1,881,000

1/ Transferred to the National Oceanic and Atmospheric Administration.

GENERAL ADMINISTRATIVE EXPENSES

Activity	F.Y. 1970 Amount Available	F.Y. 1971 Amount Available	F.Y. 1972 Estimate	Increase (+) or Decrease (-) 1972 Compared with 1971	Page Reference
General administrative expenses (Total program costs, funded)	$1,823,921	$1,881,000	$1,876,000	$-5,000	85
Unobligated balance lapsing	5,079	- -	- -	- -	
Total	1,829,000	1,881,000	1,876,000	-5,000	

General Administrative Expenses: Fiscal year 1971, $1,881,000; fiscal year 1972, $1,876,000; decrease, $5,000.

The decrease of $5,000 represents annualization of funds transferred in fiscal year 1971 to the National Oceanic and Atmospheric Administration in association with the transfer of Marine Mineral Mining activities from the Bureau of Mines.

PROGRAM OF WORK

The General Administrative Expenses appropriation provides for the immediate office of the Director and the key administrative positions in the Headquarters Office and the Eastern and Western Administrative Offices. The balance of the cost for general administrative positions is charged to program funds appropriated directly or transferred from the Department of Defense; Atomic Energy Commission; Department of Health, Education, and Welfare; or other agencies.

The Office of the Director provides executive direction in conducting programs designed to conserve and develop mineral resources and to promote healthful working conditions in the mineral industries.

The general administrative functions include the Office of the Assistant Director--Administration and four staff and service divisions in Washington; two staff and service divisions in Denver, Colorado; and two field administrative offices. Administrative services consist of development, presentation, and execution of budgets; administration of equal opportunity under civil rights laws and Executive Orders; planning, coordinating, and evaluating the Bureau's financial management program; maintaining payroll, retirement, and leave records; maintaining accounts for control of funds and recording assets, liabilities, and income and expense; preparing financial reports; recruiting; training, placing, classifying, and servicing employees; management of ADP systems and programs; organization and staffing management; centralized mail, files, and communication services; contracting for supplies, equipment, construction, research and development, grants, and other services; and recording, utilization, maintenance, and disposal of Government property.

Costs of general administration are met from both the General Administrative Expenses appropriation and assessments on other funds including charges assessed to transfer, working, and contributed funds. A breakdown of the source of funding is supplied below:

	Amount Available 1970	Amount Available 1971	Estimate 1972	Increase (+) or Decrease (-)
General administrative expenses	$1,829,000	$1,881,000	$1,876,000	$ -5,000
Other administrative funding:				
Conservation and development of mineral resources ..	1,031,000	1,051,000	779,000	-272,000
Health and safety	646,000	763,000	1,201,000	+438,000
Helium fund	55,000	61,000	61,000	- -
Working, contributed, and transfer funds .	320,000	323,000	323,000	- -
Total, administrative funding	3,881,000	4,079,000	4,240,000	+161,000

An increase of $161,000 from program funds is needed to provide additional administrative services for program increases proposed in 1972. Significant increases are included in programs primarily relating to health and safety in the extractive mineral industries which are being expanded to carry out the provisions of the Federal Coal Mine Health and Safety Act and the Federal Metal and Nonmetallic Mine Safety Act.

Specifically, the $161,000 increase would provide for the following:

1. $29,000 for additional costs for within-grade salary advances.

2. $73,000 for personnel staff increases in support of the health and safety inspection and research force.

3. $47,000 for increased procurement management related to expanding health and safety research programs.

4. $12,000 to meet increasing financial workload requirements.

Personnel management.--In order to meet the program requirements of the rapidly expanding Health and Safety activity and to cope with the tremendous increase in workload, the following additional positions are needed at the Pittsburgh office where personnel records are maintained for the entire Health and Safety organization: One Position Classifier (GS-11/12); one Personnel Staffing Specialist (GS-5); one Appointment Clerk (GS-4); two Clerk-Stenographers (GS-4); and one Clerk-Typist (GS-3).

Maintenance of a Health and Safety work force of 2,000 personnel will require continuing personnel recruiting support at the Headquarters Office which will be provided by an increase of two professional Staffing Specialists. A small additional amount is needed to support these two positions and to provide essential travel in connection with health and safety training and development programs and continuing recruitment efforts.

Procurement management (contracting).--To cope with the extremely heavy workload in the area of research contracting and awarding of grants brought about by the passage of the Federal Coal Mine Health and Safety Act of 1969, the following additional positions are needed: Two Contract Specialists (GS-9/13); one Purchasing Agent (GS-7); one Supply Technician (GS-4); and one Clerk-Typist (GS-3). Under this Act, a variety of research in the area of mining health and safety is authorized, and much of it cannot be performed in-house. The contractural workload has trebled, requiring additional staffing to assure proper and timely contracting and grant procedures.

Finance.--To meet the increased workload resulting from increased employment, one additional Payroll Clerk (GS-5) is needed. In addition, a small increase in funds is needed to cover additional costs for travel, supplies, and equipment.

EXAMPLES OF ADMINISTRATIVE IMPROVEMENTS

To increase the supply of eligibles for coal mine and coal mine electrical inspector positions, a special "walk-in" examination was conducted during the period February 16 through March 2, 1970. Bureau personnel were designated as special U. S. Civil Service Examiners and administered the test at 43 locations throughout the coal mining regions of the United States. Approximately 1,500 individuals took the tests, with 375 achieving final eligibility for one or both of the occupations. Through steps such as this, the hiring time for mine inspectors has been reduced by 60%.

All finance operations, except those of the Helium activity, were consolidated, and the automated financial accounting system was fully operative by the end of fiscal year 1970. Helium fund accounting will be integrated into the consolidated operation within the next year. In addition, new reporting procedures, implemented in August, 1970, significantly improved the financial information available to Bureau managers.

The Federal Standard Requisition/Issue Procedures (FEDSTRIP) was implemented in fiscal year 1970 as an automated method of ordering, receiving, and paying for supplies purchased from the General Services Administration. A Procurement Evaluation Property Accounting and Reporting System (PREPARES) was developed for the automation of routine, recurring procurement and property management tasks and was fully operative in the procurement area by the end of fiscal year 1970. These systems simplify purchasing procedures and procurement and property reporting.

Outstanding safety progress was achieved in employee injury prevention in fiscal year 1970. The Bureau surpassed its Mission SAFETY-70 goal with a disabling injury frequency rate of 2.7 per million manhours of work compared with its assigned rate of 3.0. The total number of work injuries decreased 8 percent. Special projects and programs conducted to strengthen the safety function and to reduce accident costs included: Bureau-wide driver improvement projects, Bureau-wide sight conservation program; wilderness safety training program, and the environmental pollution control program.

ITEMIZATION OF ESTIMATE

Department of the Interior
Appropriation Title: General Administrative Expenses

Bureau of Mines

	Actual 1970	Estimate 1971	Estimate 1972	Increase (+) or Decrease (-)
Program and Financing				
Total obligations	$1,823,921	$1,881,000	$1,876,000	$ -5,000
Unobligated balance lapsing	5,079	- -	- -	- -
New obligational authority	1,829,000	1,881,000	1,876,000	-5,000
New obligational authority				
Appropriation	1,799,000	1,799,000 1/	1,876,000	+77,000
Transferred to other accounts (-)	- -	-16,000 1/	- -	+16,000
Transferred from other accounts	30,000	- -	- -	- -
Appropriation (adjusted)	1,829,000	1,783,000	1,876,000	+93,000
Proposed supplemental for pay act increase	- -	98,000	- -	-98,000

1/ This represents the part year transfer to NOAA; full year effect, $21,000.

	Actual 1970	Estimate 1971	Estimate 1972	Increase (+) or Decrease (-)
Obligations by Objects				
11 Personnel compensation	$1,360,000	$1,475,000	$1,470,000	$ -5,000
12 Personnel benefits	106,000	118,000	118,000	- -
21 Travel and transportation of persons	48,000	55,000	55,000	- -
22 Transportation of things	8,000	10,000	10,000	- -
23 Rent, communications, and utilities	127,000	91,000	91,000	- -
24 Printing and reporduction	9,000	8,000	8,000	- -
25 Other services	86,000	60,000	60,000	- -
26 Supplies and materials	34,000	30,000	30,000	- -
31 Equipment	46,000	34,000	34,000	- -
Adjustment for rounding	-79	- -	- -	- -
Total obligations	1,823,921	1,881,000	1,876,000	-5,000

Personnel Summary

	Actual 1970	Estimate 1971	Estimate 1972
Total number of permanent positions	140	138	138
Full-time equivalent of other positions	1	1	1
Average number of all employees	132	134	133
Average GS grade	9.2	9.3	9.3
Average GS salary	$12,856	$12,952	$13,058
Average salary of ungraded positions	$8,467	$9,166	$9,922

OBLIGATIONS, 1970–72

Mrs. HANSEN. Please insert in the record a tabulation indicating the proration of administrative expenses to various program activities by activities for fiscal years 1970, 1971, and 1972.

(The information follows:)

BUREAU OF MINES

Projected Obligations for General Administration
Fiscal Years 1970, 1971, and 1972

	1970	1971	1972
Conservation and Development of Mineral Resources:			
Research:			
Coal	$ 172,000	$ 205,000	$ 148,000
Petroleum	67,000	56,000	51,000
Oil shale	58,000	59,000	42,000
Metallurgy	293,000	275,000	229,000
Mining	158,000	185,000	83,000
Marine mineral mining	22,000	6,000	- -
Explosives	14,000	16,000	12,000
Resource development:			
Statistics	51,000	51,000	38,000
Economic analysis	12,000	12,000	9,000
Bituminous coal	22,000	23,000	16,000
Anthracite	17,000	18,000	31,000
Petroleum	24,000	20,000	14,000
Minerals	107,000	109,000	95,000
International activities	14,000	16,000	11,000
Total, Conservation and Development of Mineral Resources	1,031,000	1,051,000	779,000
Health and Safety:			
Inspections, investigations, and rescue work	408,000	471,000	645,000
Control of fires in coal deposits	5,000	3,000	4,000
Health and safety research	233,000	289,000	552,000
Total, Health and Safety	646,000	763,000	1,201,000
General Administrative Expenses	1,829,000	1,881,000	1,876,000
Helium Fund	55,000	61,000	61,000
Contributed, Transfer, and Working Funds	320,000	323,000	323,000
Total, General Administration	3,881,000	4,079,000	4,240,000

Mrs. HANSEN. Please insert page 90 of the justifications in the record at this point.

(Page 90 follows:)

BUREAU OF MINES

EXPLANATION OF ADMINISTRATIVE PROVISIONS

Purchase of passenger motor vehicles

The Bureau of Mines requests authority to replace 55 passenger motor vehicles. The vehicles requested for replacement represent about 15 percent of the Bureau's fleet of passenger motor vehicles and all meet the General Services Administration standards for replacement on the basis of age or mileage. The replacement of these vehicles is necessary in the interest of economy and efficiency since most of the Bureau's vehicles are subject to use under adverse conditions due to poor roads in mountainous areas and under all types of weather conditions in the various field areas.

Contributions

Various industrial organizations have expressed interest in many phases of the Bureau's activities and are at times willing to contribute funds, experienced personnel, special equipment, etc., toward accomplishing certain objectives useful to industrial purposes. The Bureau endeavors to cooperate with industry wherever possible and authorization to accept such contributions is a distinct aid in furthering such cooperation.

Sale of metals and mineral products

In some of the metallurgical pilot plants of the Bureau, quantities of special metals may be manufactured which might be of value to industrial concerns. Funds received from the sale of such products would be covered into miscellaneous receipts.

REPLACEMENT OF AUTOMOBILES

Mrs. HANSEN. Justify your request to purchase 55 passenger motor vehicles for replacement.

Mr. THOMSON. The justification for these 55 automobiles is to replace cars that we now have which meet the GSA standard of mileage or age. Most of them are for the health and safety personnel that use the cars very heavily. They are generally located in places where GSA does not have a car pool or has been unable to take over our entire fleet.

Mrs. HANSEN. Please insert in the record where your safety people are located.

(The information follows:)

LOCATION OF MINE SAFETY DISTRICT AND SUBDISTRICT OFFICES

Most of the Bureau's health and safety personnel are located at district and subdistrict offices located throughout the United States. The location of these offices are as follows:

Coal mine safety field installations

District A Office	Pittsburgh, Pa.
Subdistrict A Office	Wilkes-Barre, Pa.
Subdistrict A Office	Johnstown, Pa.
Subdistrict A Office	St. Clairesville, Ohio
District B Office	Mt. Hope, W. Va.
Subdistrict B Office	Morgantown, W. Va.
District C Office	Norton, Va.
Subdistrict C Office	Birmingham, Ala.
Subdistrict C Office	Barbourville, Ky.
District D Office	Vincennes, Ind.
Subdistrict D Office	McAlester, Okla.
District E Office	Denver, Colo.
Subdistrict E Office	Salt Lake City, Utah
Subdistrict E Office	Seattle, Wash.
Field Health Group	Pittsburgh, Pa.

Metal and nonmetal mine safety field installations

Eastern District Office	Pittsburgh, Pa.
Subdistrict Office	Albany, N.Y.
Southeastern District Office	Birmingham, Ala.
Subdistrict Office	Norton, Va.
North Central District Office	Duluth, Minn.
Subdistrict Office	Vincennes, Ind.
South Central District Office	Dallas, Tex.
Subdistrict Office	Rolla, Mo.
Rocky Mountain District Office	Denver, Colo.
Subdistrict Office	Salt Lake City, Utah
Subdistrict Office	Phoenix, Ariz.
Western District Office	Alameda, Calif.
Subdistrict Office	Seattle, Wash.
Subdistrict Office	Reno, Nev.
Field Health Group	Denver, Colo.

HELIUM FUND

Mrs. HANSEN. Please insert pages 91 through 93 of the justifications in the record at this point.

(The pages follow:)

BUREAU OF MINES

HELIUM FUND

(In thousands of dollars)

Estimated income, 1971:	
Operations	$ 8,960
Borrowing authority	50,000
Anticipated supplemental borrowing authority	48,500
Estimated income, 1972:	
Operations	8,000

Financial Summary

	Actual 1970	Estimate 1971	Estimate 1972
Income and expenses (funded):			
Income:			
Sales of helium	$ 9,547	$ 7,810	$ 7,100
Other income	1,885	1,150	900
Total income	11,432	8,960	8,000
Expenses:			
Production and marketing expenses	1,661	2,019	2,300
Research expense	1,098	653	- -
Administrative and other expense	1,470	1,045	900
Total expense	4,230	3,717	3,200
Net income (funded)	7,202	5,243	4,800

	Actual 1970	Estimate 1971	Estimate 1972
Unfunded balance, start of year	$-12,272	$-29,300	- -
Borrowing authority	24,000	50,000	- -
Anticipated supplemental borrowing authority	- -	48,500	- -
Changes in selected resources	1,384	- -	- -
Total funds available	20,314	74,443	4,800
Capital outlay:			
Crude helium for underground storage	46,835	31,331	2,395
Land, structures, and equipment	2,779	491	105
Total capital outlay	49,614	31,822	2,500
Long-term contract commitments	- -	42,000	- -
Unfunded balance, end of year	29,300	- -	- -
Unobligated balance, end of year	- -	621	2,300

Helium Fund: Fiscal year 1971, $50,000,000; fiscal year 1972, none; decrease, $50,000,000.

On January 26, 1971, the Under Secretary of the Interior notified the four companies holding contracts for the sale of helium to the United States under the conservation program that such contracts were terminated pursuant to the terms thereof. The terminations are effective 60 days from the date of posting of the letters of notification. Thus, purchases of helium by the United States under all four contracts will cease on March 27, 1971. A supplemental request for F.Y. 1971 is anticipated for liquidating obligations under the contracts.

Under authority of the Helium Act Amendments of 1960 (P.L. 86-777), the Bureau of Mines will continue helium production and sales during 1972 from its two production plants at Excell, Texas, and Keyes, Oklahoma. Shipments of helium in small cylinders and compressed gas trailers will continue from the Bureau's Amarillo, Texas, shipping terminal. The terminal is connected to the Exell plant by a pipeline for transporting high-purity helium. Tank car shipments of helium will continue from the Exell and Keyes plants. Helium extracted from natural gas supplies at the two plants in excess of that sold for use will be added to underground storage.

Helium research conducted in recent years--and at a reduced level in 1971--is being discontinued in fiscal year 1972. Limited engineering development and laboratory services required in connection with production and sales and conservation will, however, be continued.

Total helium production by the Bureau of Mines during F.Y. 1972 is expected to be about 630 million cubic feet. Bureau of Mines sales for F.Y. 1972 are estimated at $7,100,000.

As of June 30, 1970, the Government had $324.8 million invested in the helium program. Of this amount, $210.9 million is owed to the U.S. Treasury in accordance with the Helium Act Amendments of 1960, leaving a net investment of $113.9 million. The investment at June 30, 1970, was about 19% in helium plants and facilities and about 81% in helium stored underground.

On June 30, 1972, the Government's investment is estimated to be $403.4 million, of which $288.3 million will be owed to the U.S. Treasury, leaving a net investment balance of $115.1 million. The estimated increase from June 30, 1970, of $1.2 million in net Government investment (equity) results from an increase in retained earnings accrued during 1971 and 1972.

Mrs. HANSEN. Will you please give us the current status of the helium program?

Dr. OSBORN. Well, currently the Government has two plants. There are five plants under contract with four contractors supplying helium. In addition, there are privately operated four plants which produce helium for the market. Now, the Federal Government has decided to terminate those four contracts, and so it is in the process of doing this.

Mrs. HANSEN. What is your estimate of the cost in fiscal year 1972 of the proposed postage rate increase?

Mr. THOMSON. We estimate that it will cost an additional $75,000. This gives a total cost of $325,000.

TOTAL OBLIGATIONS

Mrs. HANSEN. Please insert pages 94 through 100 of the jusitfications in the record.

(The pages follow:)

Obligations Incurred by the Bureau of Mines by Activity
and Source of Funds, Fiscal Years 1970, 1971, and 1972

	1970	1971	1972
Coal:			
Bureau of Mines appropriation	$ 7,113,045	$ 8,805,000	$ 8,770,000
Department of Health, Education, and Welfare	782,267	810,000	825,000
Department of the Interior	8,039	60,000	60,000
Department of the Air Force	10,022	10,000	11,000
Department of the Navy	11,708	12,000	12,000
General Services Administration	10,845	11,000	12,000
National Aeronautics and Space Administration	50,372	38,000	40,000
Contributed Funds	10,750	- -	- -
Total	7,997,048	9,746,000	9,730,000
Petroleum:			
Bureau of Mines appropriation	2,762,726	2,710,000	3,000,000
Department of Health, Education, and Welfare	524,346	671,000	680,000
Department of the Air Force	102,113	105,000	110,000
Department of the Army	19,552	29,000	30,000
Department of the Navy	50,050	52,000	55,000
Atomic Energy Commission	60,500	63,000	63,000
Federal Highway Administration	54,419	56,000	- -
Civil Service Commission	442	- -	- -
Contributed Funds	418,156	414,000	414,000
Total	3,992,304	4,100,000	4,352,000

	1970	1971	1972
Oil Shale:			
Bureau of Mines appropriation	$ 2,462,325	$ 2,508,000	$ 2,500,000
Atomic Energy Commission	156 CR	- -	- -
Contributed Funds	884	- -	- -
Total	2,463,053	2,508,000	2,500,000
Metallurgy:			
Bureau of Mines appropriation	12,455,730	12,959,000	13,550,000
Atomic Energy Commission	473,140	356,000	350,000
Department of the Air Force	37,305	- -	- -
Department of Health, Education, and Welfare	101,769	105,000	104,000
National Aeronautics and Space Administration	52,089	5,000	5,000
General Services Administration	11,123	- -	- -
Department of the Navy	1,000	- -	- -
Department of State	1,780	- -	- -
Department of Agriculture	9,068	- -	- -
Department of Transportation	2,529	- -	- -
Department of the Interior	64,766	- -	- -
Contributed Funds	77,996	60,000	50,000
Total	13,288,295	13,485,000	14,059,000
Mining:			
Bureau of Mines appropriation	6,496,405	7,940,000	4,900,000
Defense Agencies	116,933	3,750,000	3,260,000
Atomic Energy Commission	32,136	5,000	5,000
Department of the Army	15,581	75,000	75,000
National Aeronautics and Space Administration	209,986	309,000	215,000
Department of the Interior	4,223	4,000	4,000
Post Office Department	1,044	1,000	1,000
Tennessee Valley Authority	- -	3,000	- -
Contributed Funds	29,965	29,000	25,000
Total	6,906,273	12,116,000	8,485,000

	1970	1971	1972
Marine Mineral Mining:			
Bureau of Mines appropriation	$ 935,840	$ 290,000	$ - -
Department of the Interior	27,662	10,000	- -
Total	963,502	300,000	- -
Explosives:			
Bureau of Mines appropriation	677,181	693,000	693,000
Atomic Energy Commission	7,131	5,000	4,000
Department of the Air Force	132,758	130,000	125,000
Department of the Army	311,546	153,000	150,000
Department of the Navy	177,286	73,000	70,000
National Aeronautics and Space Administration	94,211	35,000	35,000
Department of Commerce	18,678	- -	- -
Department of Transportation	37,953	48,000	45,000
Federal Aviation Administration	9,740	6,000	5,000
Contributed Funds	5,300	14,000	14,000
Total	1,471,784	1,157,000	1,141,000
Statistics:			
Bureau of Mines appropriation	2,147,010	2,207,000	2,207,000
Economic Analysis:			
Bureau of Mines appropriation	531,160	546,000	546,000

	1970	1971	1972
Bituminous Coal:			
Bureau of Mines appropriation	$ 954,308	$ 975,000	$ 975,000
Atomic Energy Commission	28,406	29,000	29,000
Department of Health, Education, and Welfare	380,061	530,000	420,000
Veterans Administration	51,000	55,000	55,000
Department of the Air Force	140,054	145,000	150,000
Department of the Army	111,325	115,000	120,000
Department of the Navy	86,901	89,000	89,000
Department of Agriculture	149	- -	- -
General Services Administration	255	- -	- -
Department of Justice	307	- -	- -
Post Office Department	1,600	2,000	2,000
Total	1,754,366	1,940,000	1,840,000
Anthracite:			
Bureau of Mines appropriation	703,532	1,788,000	1,788,000
Department of the Interior	- -	94,000	100,000
Total	703,532	1,882,000	1,888,000
Petroleum:			
Bureau of Mines appropriation	850,605	880,000	880,000
Minerals:			
Bureau of Mines appropriation	4,510,585	4,705,000	5,593,000
Atomic Energy Commission	30,035	30,000	30,000
Department of the Army	118,997	65,000	65,000
Department of Health, Education, and Welfare	2,035	2,000	2,000
Department of Justice	5,935	6,000	6,000
General Services Administration	3,403	3,000	3,000
Post Office Department	93	- -	- -

	1970	1971	1972
Minerals (continued):			
Government of the District of Columbia	$ 1,796	$ 2,000	$ 2,000
National Aeronautics and Space Administration	39	- -	- -
Department of the Air Force	65	- -	- -
Federal Aviation Administration	354	- -	- -
Department of Agriculture	766	1,000	1,000
Department of Commerce	322	- -	- -
Department of the Interior	340,549	285,000	70,000
Contributed Funds	7,379	3,000	3,000
Total	5,022,353	5,102,000	5,775,000
International Activities:			
Bureau of Mines appropriation	668,434	692,000	692,000
Department of State	162,579	185,000	175,000
Central Intelligence Agency	195,000	- -	- -
Department of the Interior	33,263	50,000	34,000
Contributed Funds	3,200	- -	- -
Total	1,062,476	927,000	901,000
Inspections, Investigations, and Rescue Work:			
Bureau of Mines appropriation	15,639,210	36,289,000	38,219,000
Atomic Energy Commission	1,337	1,000	1,000
Department of the Interior	3,617	3,000	3,000
Contributed Funds	1,204	- -	- -
Total	15,645,368	36,293,000	38,223,000
Control of Fires in Coal Deposits:			
Bureau of Mines appropriation	215,747	222,000	222,000
Contributed Funds	239	- -	- -
Total	215,986	222,000	222,000

	1970	1971	1972
Health and Safety Research:			
Bureau of Mines appropriation	$ 10,936,111	$ 20,794,000	$ 32,634,000
Department of the Navy	15,000	10,000	10,000
Total	10,951,111	20,804,000	32,644,000
General Administrative Expenses:			
Bureau of Mines appropriation	1,823,921	1,881,000	1,876,000
Department of the Interior	150,069	154,000	155,000
Contributed Funds	1,332	- -	- -
Total	1,975,322	2,035,000	2,031,000
Drainage of Anthracite Mines:			
Bureau of Mines appropriation	70,957	200,000	200,000
Demonstration Grants:			
Bureau of Mines appropriation	670,689	18,000	- -
Research, Training and Technical Services:			
Bureau of Mines appropriation	80,292	- -	- -
Appalachian Mine Area Restoration:			
Appalachian Regional Commission	1,160,156	7,715,000	7,368,000
Contributed Funds	857,956	855,000	800,000
Total	2,018,112	8,570,000	8,168,000
Helium Production:			
Federal and non-Federal sources	52,459,571	35,539,000	5,700,000

	1970	1971	1972
Summary:			
Bureau of Mines appropriation	$ 72,705,813	$107,102,000	$119,245,000
Other Agencies	6,661,424	16,561,000	15,241,000
Contributed Funds	1,414,361	1,375,000	1,306,000
Helium Production:			
Federal and non-Federal sources	52,459,571	35,539,000	5,700,000
Total	133,241,169	160,577,000	141,492,000

NONREIMBURSABLE EMPLOYEES

Mrs. HANSEN. To what extent are you engaged in the nonreimbursable detail of employees, either in or out of your Bureau?

Mr. THOMSON. I believe that outside of the Bureau we still have one or two employees detailed to the White House.

Mrs. HANSEN. Please insert in the record a tabulation of these nonreimbursable employees both in and out of the Bureau, indicating the name of the Bureau, the other agency involved, the type of the project, and the duration of the detail.

Dr. OSBORN. Be glad to.

(The information follows:)

DETAILS OF NONREIMBURSABLE EMPLOYEES

Bureau or agency	Position title	Duration of detail	Type of assignment
White House	Secretary (stenography)	Indefinite	Serves as personal assistant to the staff assistant to the President.
Do	Mail clerk	6 months	Performs mail and messenger duties.

Mrs. HANSEN. What major exceptions have been taken during the past year to your operation by the Department's Survey and Review?

Mr. THOMSON. There hasn't been any exception taken by Survey and Review during the past year. In fact, they have not completed, as far as I know, any survey. They are working on a solid waste program survey, but we have not received the report.

Mrs. HANSEN. You list 5,808 permanent positions at the end of fiscal year 1971, with only 220 unfilled positions anticipated as of June 30, 1971. Does this indicate you anticipate the employment of most all the qualified mine inspectors you will require?

Mr. WHEELER. Yes.

Dr. OSBORN. Yes.

Mrs. HANSEN. Dr. Osborn, may I express my appreciation to you and to your staff for an excellent presentation and a rather far-ranging discussion of all problems.

Dr. OSBORN. Thank you very much, Madam Chairman. It has been a pleasure. It is good to have somebody to talk to who is interested.

Mrs. HANSEN. The committee is very interested. Mr. McDade?

Mr. MCDADE. Madam chairman, thank you. Dr. Osborn, you did an excellent job, and you have been a fine witness. Your testimony is helpful to the committee in reaching its decisions, and we appreciate your frankness as well as that of the people who accompany you here.

Dr. OSBORN. Thank you for your remarks.

Mr. MCDADE. You did a fine job.

Mrs. HANSEN. I think you have made one of the best presentations I have ever heard the Bureau of Mines make.

Mr. McDade. No question about it.
Dr. Osborn. Thank you.
Mrs. Hansen. Mr. Galifianakis?
Mr. Galifianakis. I would like to associate myself with my seniors, the chairman and my friend on the other side. I am not entitled to all that commentary.
Mrs. Hansen. Yes, you are. Thank you again. We have had a very informative and educational day.

Tuesday, March 23, 1971.

OFFICE OF OIL AND GAS

WITNESSES

DR. WILSON M. LAIRD, DIRECTOR
JOHN RICCA, DEPUTY DIRECTOR
DAVID R. OLIVER, INDUSTRIAL SPECIALIST (PETROLEUM)
LEONARD A. VICKERS, ADMINISTRATIVE OFFICER
FRANCIS M. WILES, DIRECTOR OF BUDGET, INTERIOR DEPARTMENT

Mrs. Hansen. The committee will come to order.
We are very pleased to have with us this morning Congressman Del Clawson of California. We are very glad to welcome you to the committee, Mr. Clawson.
Mr. Clawson. Thank you, Mrs. Hansen.

JUSTIFICATION MATERIAL

Mrs. Hansen. We now have the Office of Oil and Gas. We will insert pages 1 through 18 of the justifications at this point in the record.
(The pages follow:)

OFFICE OF OIL AND GAS

SUMMARY AND HIGHLIGHT STATEMENT

COORDINATION OF OIL AND GAS ACTIVITIES

The Office of Oil and Gas was established on May 6, 1946, pursuant to Presidential Letter of Harry S. Truman. The office consists of a small staff organization responsible for leadership, information, and coordination of Federal oil and gas policies and activities. The estimate of funds required for FY 1972 is $853,000, an increase of $100,000 from the 1971 level of support. The estimate of level of staff required for FY 1972 is 38 headquarters staff, plus 9 field staff positions funded by reimbursement from the Office of Emergency Preparedness. This office prepares and implements emergency plans and special study programs for the oil, gas and pipeline industries. The only proposed major program changes are the addition of three vacant, authorized, professional level positions for petroleum economics and statistics, consumer affairs, and environmental affairs.

ADMINISTRATION OF OIL IMPORT PROGRAM

This program was established March 13, 1959, pursuant to Presidential Proclamation No. 3279, as amended. The Administration established maximum quotas for importers of crude oil and petroleum products into the U. S. and Puerto Rico. An expanding program, including quotas for crude oil imports intended for the petroleum industry has increased the technical and administrative support requirements for this office for 1972. A comprehensive oil import regulating agency program requires an aggressive, effective industry compliance, inspection and surveillance program. Two additional field offices in major oil importing centers (Los Angeles and Chicago) will be established in 1972 to be responsible for this vital program. The estimate of funds required for FY 1972 is $576,000, an increase of $117,000 over 1971 and the proposed 1972 level of staff is 29 positions, an increase of 6 positions over 1971.

OIL IMPORT APPEAL BOARD

The Board was established to conduct hearings on appeals from importers who request a change in their quota or who do not qualify for a quota. 1971 funds provide for 2 employees and transcripts of hearings. Due to a double workload, there are requirements for 1 additional petroleum economist position and additional program support funds--notably to cover costs of hearing transcripts. For 1972 the proposed level of funding is $66,000 and a proposed level of staff of 3 positions, an increase of 1 position.

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OFFICE OF OIL AND GAS

Analysis by Activity

Activity	Fiscal Year 1970 Amount Available	Fiscal Year 1971 Total Appropriation	Pay Cost Supplemental	Transfers	Amount Available
1. Coordination of Oil and Gas Activities	$712,806	$718,000	$35,000		$753,000
2. Oil Import Administration	348,434	438,800	20,200		459,000
3. Oil Import Appeals Board	21,874	24,200	1,800		26,000
Unobligated balance lapsing	1,886	--	--		--
Total	$1,085,000	$1,181,000	$57,000		$1,238,000

Activity	F.Y. 1970 Amount Available	F.Y. 1971 Amount Available	F.Y. 1972 Estimate	Increase (+) or Decrease (-) 1972 compared with 1970	Page Reference
1. Coordination of Oil and Gas Activities	$712,806	$753,000	$853,000	+100,000	4
2. Oil Import Administration	348,434	459,000	576,000	+117,000	11
3. Oil Import Appeals Board	21,874	26,000	66,000	+ 40,000	15
Unobligated balance lapsing	1,886	--	--	--	
Total	$1,085,000	$1,238,000	$1,495,000	+257,000	

U.S. DEPARTMENT OF THE INTERIOR
OFFICE OF OIL AND GAS

Salaries and Expenses

Appropriation, 1970	$994,000	
Pay cost supplemental, 1970	90,500	
Total available, 1970		$1,084,500
Appropriation, 1971	$1,181,000	
Pay cost supplemental, 1971	57,000	
Total available, 1971		$1,238,000

Summary of Increases and Decreases, 1972

	Base for 1972	Increase 1972	
Increase in Coordination of Oil and Gas Activities	$753,000	$ +100,000	
Increase in Oil Import Program	459,000	+117,000	
Oil Import Appeals Board	26,000	+ 40,000	
Net increase, 1972			$257,000
Budget estimate, 1972			$1,495,000

OFFICE OF OIL AND GAS

Justification

This budget request for Fiscal Year 1972 is $1,495,000. The requested amount will provide direct funding support for the following three separate offices and functions.

	Office	Function	Amount
1.	Office of Oil and Gas	Coordination of Oil and Gas Activities	853,000
2.	Oil Import Administration	Oil Import Regulation	576,000
3.	Oil Import Appeals Board	Oil Import Regulation	66,000
			$1,495,000

Office of Oil and Gas

Coordination of Oil and Gas Activities: Fiscal Year 1971, $753,000; Fiscal Year 1972, $853,000; Increase, $100,000. The increase consists of:

Increase (+) or Decrease (-) Amount	Positions	Total Program	Total Positions	
+$100,000	--	$853,000	38	Activate 3 vacant authorized, professional-level positions for petroleum economics and statistics, consumer affairs, and environmental programs; petroleum production data study; increased support costs.
$100,000			38	

Cost Factors Involved in Increases:

Activate three vacant permanent professional positions - oil and gas economics and data analysis, consumer affairs, and environmental affairs $76,000; travel and other supportive costs, $9,000 - total $85,000.

Office of Oil and Gas portion of computerized joint Federal agency national petroleum production statistics program conducted by the Oklahoma University Research Institute, $15,000.

Need for Increases:

Upgrading and strengthening professional services in oil and gas economics and statistics, consumer affairs and environmental affairs areas.

The future availability of the Nation's fossil fuel energy resources have been identified as significant problems affecting the national and personal security, the environmental well-being, and the pocket book of every consumer.

First: While there are ample energy resources in the United States, these are not being developed at rates needed to satisfy demand. Dependence on imported energy is increasing.

Second: The energy "crunch" is going to require steadily increasing amounts fossil and nuclear and hydro-powered output for the foreseeable future. We need "a balanced energy mix".

Third: The demands for clean air, low-sulfur emissive fuels, low-leaded gasolines, and general protection of the environment will make the energy crunch worse as certain traditional fuels have to be processed in ways to meet environmental quality standards.

Fourth: The requirement for improved fuels to protect the environment will cost the consumer more and will limit his freedom of choice.

Fifth: High costs have deferred many desirable capital investments which normally would correct or compensate for problems. Examples: more crude oil and natural gas pipelines from the Texas-Louisiana area to the Midwest and Eastern industrial corridor; more exploration for new production, on- and offshore; improved refining processes; better distribution facilities; increased tanker production.

The Office of Oil and Gas in its assigned mission and program urgently requires additional professional staff capabilities in three problem areas--Petroleum and Gas Industrial Specialists to handle the following areas of responsibility:

1. Economic and Energy Data Programs and Analysis, including forecasting domestic and worldwide Supply, Demand and Logistics problems, trends, and programs.

2. Consumer Data Compilation, Analysis, and Services to provide coordination, liaison and distribution of oil and gas information to the consumer.

3. Environmental Data Compilation, Analysis, and Services to provide coordination, liaison and distribution of oil and gas information to all concerned.

It is necessary to establish an additional professional level Industrial Specialist position for each of these three important program areas. The existing limited staffing of the Office of Oil and Gas will not permit the merited, full-time attention to these continuing problem areas for the decade of the '70's. It has been noted that assignments to the office from the Secretary, Congressional inquiries, and the public have been complicated and delayed because of admitted office "lack of expertise", or staffing. Approval of the additional staffing requested (3 professional-level positions) is absolutely required to enable the Director of the Office of Oil and Gas to discharge properly assigned international and domestic responsibilities for energy, oil and gas data analysis, environmental matters, and consumer interests.

Continuing Oklahoma University Research Institute petroleum production study included in the request for a $100,000 increase over the Fiscal Year 1971 level of funding is the sum of $15,000 for our joint agency national petroleum production statistics study program which is being conducted by the University of Oklahoma Research Institute. This continuing project, which has an annual cost of more than $50,000 will again jointly funded by the Bureau of Land Management, the U. S. Geological Survey, the Federal Power Commission, and the Office of Oil and Gas.

Mission

The Office of Oil and Gas, within the Federal establishment, provides leadership and coordination for all oil and gas matters, advice and assistance to Federal agencies and international organizations on all phases of petroleum and gas, and serves as the principal channel of communication between the Federal Government and the petroleum, gas petrochemical, allied industries, as well as the Interstate Oil Compact Commission and State oil and gas regulatory agencies. We must now provide this same service for the consumer in fulfilling his expectations related to efficient energy supply and his environment.

Domestic and international studies are made to maintain knowledge on adequacy of petroleum and gas, to define deficient areas or elements, and to develop ways to alleviate actual or potential deficiencies. The preparation of national emergency plans and development of oil and gas preparedness programs, and the recruitment, training, and assignment of 600 Defense Executive Reservists for the Emergency Petroleum and Gas Administration are assigned responsibilities of this office.

Advice, assistance, and studies on a wide range of oil and gas matters is continually provided the Secretary of the Interior, the Congress, its Committees, the Departments of State, Commerce, and Defense, the Office of Emergency Preparedness, Office of Civil Defense, and other Federal agencies concerned with petroleum and gas and the supply thereof.

The office prepares analyses and evaluation of petroleum and gas supply and demand data from Federal, state, and industry sources. Federal sources include the U. S. Geological Survey, Bureau of Mines, Department of Commerce, Federal Power Commission, Interstate Commerce Commission, and any agency developing, maintaining, and publishing data bearing on petroleum and gas supply. State sources include the Interstate Oil Compact Commission and the oil and gas regulatory agencies of producing states. Industry sources include information published by advisory committees to the Secretary of the Interior, such as the National Petroleum Council, and the Emergency Advisory Committee for Natural Gas, and oil and gas trade associations and direct contact with the executive and technical personnel in the oil and gas industries.

Program and Activities

The Office of Oil and Gas is one of the activities under the direction of the Assistant Secretary for Mineral Resources concerned with the Minerals Category of departmental programs. The subcategory under which its programs are conducted is Fossil Fuels--Information, Support and Regulatory Functions. The two principal elements of concern are: (1) Minerals Data Collection, Analysis, Reports and Services, Planning and Coordination and (2) Regulation. The office also has direct responsibilities in international activities and emergency preparedness programs.

Minerals (Fossil Fuel) Data Collection, Analysis and Services

A. Analysis and Forecasting

The Office of Oil and Gas consolidates defense, industrial, and civilian petroleum and natural gas requirements; correlates these requirements with probable availability; makes comprehensive supply-demand studies; and prepares forecasts of the probable availability of petroleum and gas to meet peacetime requirements of the United States and friendly foreign nations.

In collaboration with the Department of Defense and the Office of Emergency Preparedness, this staff office conducts petroleum and gas supply-demand and industry studies to coordinate probable military demands with essential civilian and industrial requirements of the United States and friendly foreign nations to meet emergency or wartime requirements.

Studies include data on capacity and facilities in the Free World to produce, refine, store, and transport oil and gas under peacetime, emergency, limited or nuclear wartime conditions.

With petroleum and natural gas providing almost three-fourths of the nation's energy requirements from 1972-1980, this office is directly concerned with efforts to conserve the nation's energy resources and meet its energy demands, requiring it to be fully informed on all aspects of the nation's energy position. As the agency responsible for liaison between the petroleum and gas industries and the Federal establishment, this office is uniquely positioned to program for data collection, studies, and economic analysis and evaluation. The prospective workload, the continued prospects of further interruptions of Middle East crude oil supply to the Free World, the expanding field of energy data, the new developments in offshore petroleum and gas exploration require a fully staffed organization and adequate "support service" funding. Because of rapidly changing conditions in the nation's energy economy, such as 1968 discoveries of oil in Alaska and the expanding energy demand, there is need for frequent and continuing appraisals of the potential deliverability of oil and gas from domestic and foreign sources.

B. Committee Activities

The Office of Oil and Gas chairs or furnishes staff representatives or Government Co-chairmen to a variety of international, Federal, state, and industrial committees interested in or affected by petroleum and gas operations or supply. Some of these are:

Domestic:

National Petroleum Council (Government Co-chairman)
Emergency Advisory Committee for Natural Gas (Government Co-chairman)
Petroleum Statistics Interdepartmental Liaison Group (Chairman)
American Petroleum Institute Committees on Statistics (Representative)
Committee on the Secondary Impact of Pollution Abatement (Member)
Interstate Oil Compact Commission (Observer)
Departmental Trans-Alaskan Pipeline Committee (Member)

International:

North Atlantic Treaty Organization Petroleum Planning Committee (Member)
U.S./Canadian Joint Emergency Requirements Planning Committee (Member)
Foreign Petroleum Supply Committee and its Petroleum Security Subcommittee (Chairman)
Emergency Petroleum Supply Committee (Chairman & Co-chairman)
Organization for Economic Cooperation and Development Special Committee for Oil (Member)
Operating Committee of the Advisory Committee of Export Policy Department of Commerce (Member)
United Nations Economic Commission for Europe - Gas Committee (Representative)

C. Special Programs - Continuing Studies and Projects

1. In March 1966, the Bureau of the Budget assigned to the Department of the Interior "focal agency" responsibility for implementing the Interagency Petroleum Statistics program. The program has achieved important progress in designing data systems for petroleum resources, productive capacities, well drilling, expenditures and revenues, petroleum transportation, measurement techniques, definitions, and standardization of terms. Industry sources are now providing significantly improved statistical information on wells, reserves, and expenditures, and standardized reporting forms and terminology. This program, expanded in its concentration on oil and gas reserves producing capacities and expenditures will continue through 1972.

2. Continuing surveillance is maintained on the availability of petroleum products to meet the defense establishment's domestic and overseas requirements.

3. Programming and analysis of a computerized "Study of Major U. S. Oil and Gas Fields" is underway to fill the need for better data on production, reserves, productive capacity, geographic and geological location, and geologic and engineering characteristics of United States oil and gas fields. The study treats individual pools, emphasizing the physical parameters of the reservoirs and the nature of the resources in a format amenable to computer analysis. This program is being assisted by the Oklahoma University Research Institute, which provides the data processing capability. It is jointly funded by the Bureau of Land Management, the U. S. Geological Survey, Federal Power Commission, Oil Import Administration, and the Office of Oil and Gas.

4. The office participates with the National Petroleum Council, an industry advisory group to the Secretary of the Interior, in certain study projects such as: "Future Petroleum Provinces of the United States", "Crude Oil Deliverability", "Air and Water Pollution", "Petroleum Storage Capacity", and "Capacity of Crude Oil Gathering Systems and Deep Water Terminals". The following studies are programmed for Fiscal Year 1971: "U. S. Energy Outlook", "Seabeds Draft Treaty Study", "Environmental Conservation for the Oil and Gas Industries". For 1971 and 1972 the new U. S. Energy Outlook (through 1985 and 2000) study will be the major joint concern of NPC and this office. Individual task groups will study Energy Demand; Oil Demand, Supply, Logistics, and Capital Supply; Gas Demand, Supply and Transportation, Other Energy Resources (Coal, Shale, Tar Sands, Nuclear and New Energy; and Energy) Government Policies. We consider this joint Government/industry effort to be the most important energy study underway. These studies have significant impact and application in developing government policy positions on energy problems.

5. Various aspects of oil imports into the United States and their relation to our national security, the balance of payments problems, the abatement of air and water pollution and improvement of the environment will continue to be studied in Fiscal Year 1972. The Office of Oil and Gas has significant, continuing leadership and support responsibilities within the Department on all oil matters. An example is the Office of Oil and Gas participation in the Department's Trans-Alaskan Pipeline environmental impact statement.

Emergency Planning, Coordination, and Regulation

A. Emergency Preparedness - Domestic Activities

1. National Defense Executive Reserve/Emergency Petroleum and Gas Administration--Over 600 Executive Reservists are now fully ready to carry out their assigned duties in the Emergency Petroleum and Gas Administration. This standby organization is capable upon activation of exercising effective Federal direction and control of petroleum and gas industry operations in a major national emergency. EPGA readiness/training/preparedness is continually being perfected by exercises, which are based on general war assumptions and utilize each reservist in his assigned position. In 1972, other system-wide readiness training exercises will be conducted, involving the national headquarters and regional organizations. EPGA petroleum and gas emergency operation procedures and organization are being revised and updated as necessary after national and regional EPGA exercises.

2. Compilation and analysis of petroleum and gas resource data for analysis includes oil refineries, petrochemical plants, oil and gas pipelines, non-military oil storage facilities, major oil fields, natural gas processing plants, aviation gasoline facilities. The program provides also a capability for assessment of damage and analysis of postattack situations. The office, in collaboration with the Office of Civil Defense, is now supervising the updating of the U. S. oil storage capacity information for the National Resources Analysis Center.

3. Since 1967, the Office of Oil and Gas has been assigned continuing responsibility for "Vulnerability of Natural Gas and Petroleum Products Distribution Systems" phases of the Office of Civil Defense, Department of the Army's "Five Cities Study" on post nuclear attack damage assessment and recovery measures. The "Vulnerability of Utilities - Gas and Petroleum" phase of the study will continue through Fiscal Year 1972. The survey team has completed reports on three cities: San Jose, California; Albuquerque, New Mexico; and Detroit, Michigan; and is now working in New Orleans, Louisiana on two state/area-wide vulnerability studies which include examinations of the area and national econometric models for these energy industries and their interrelationships with other industries (communications, transportation, electricity).

4. Preparation of a study and a handbook for distribution to industry and civil defense program directors covering disaster protection for petroleum refineries, ("Minimizing Damage to Refineries and Liquid Fuel Production Facilities"), includes a program for strengthened construction, rapid damage repair and restoration to full production of natural gas in natural or military-attack disasters. This handbook should be ready for the printers in the Spring of 1971 and distributed shortly thereafter.

5. Assist, as requested by OEP or others, in (OEP) Regional Field Boards for Fuels and Energy in conditions of limited or threatened supply. By making Washington staff members and Regional Mobilization Representatives available for technical guidance, liaison between suppliers and consumers and between industry and Government (Federal, State and local) activities, the Office of Oil and Gas is providing leadership expertise and support to several OEP Regional Directors.

B. Emergency Preparedness - International Activities

In the (Emergency) Planning Coordination and Regulation Program, this office:

1. Provides United States representatives and technical staff support at meeting of the Petroleum Planning Committee of NATO.

2. Participates in joint petroleum planning with the Departments of Defense and State in connection with programs with NATO countries.

3. Coordinates civil emergency and preparedness programs with the Departments of State, Defense and the Office of Emergency Preparedness in international oil and gas matters with groups such as NATO Petroleum Planning Committee, NATO Civil Wartime Oil Organization, Joint Canadian/U. S. Emergency Requirements Planning Committee.

4. Provides leadership and coordination among agencies of the Federal Government in dealing with threatened or actual petroleum supply crises in situations such as the Arab-Israeli War of 1967, the undeclared Arab-Isreeli hostilities of 1970; the interruption of the Trans-Arabian Pipeline crude oil deliveries; reduction of production by American-owned operating oil companies in Libya in 1970; the international tanker shortage.

OIL IMPORT ADMINISTRATION

Administration of Oil Import Program:
Fiscal Year 1971, $458,800; Fiscal Year 1972, $576,000; Increase $117,000.
The increase consists of

Increase (+) or Decrease (-)

Amount	Positions	Total Program	Total Positions	Explanation
+ $117,000	+6	$576,000	29	For compliance inspection and surveillance program field offices Los Angeles, Calif. and Chicago, Illinois
+ $117,000	+6			

Cost Factors Involved in Increases

Four (4) professional level and two (2) supporting clerical positions for two new Oil Import Administration field offices which will be located in Los Angeles, California, and Chicago, Illinois - salaries and benefits $88,000. Additional support costs, including travel for professional level compliance, inspection and surveillance positions; office rental and other support services $29,000. Total program $117,000.

Need for Increase

Strengthening and expanding oil import compliance/inspection/surveillance program to provide nationwide coverage and services.

An effective compliance inspection and surveillance program is essential to assure the equitable application of the regulations of the oil import control program to all importers. To permit distribution of valuable allocations without the ability to assure the accuracy of the information upon which the distribution is based is an unacceptable risk. The Oil Import Administration must be in a position to assure that importers understand and comply with oil import regulations. There are expanding import regulation programs with the additions of residual fuel oil problems, asphalt problems, and special considerations for Canadian crude oil and finished products. The responsibilities of the small Oil Import Administration's staff have been increased to include preparation of data for the Oil Policy Committee. Since the oil import program is now more assured of a "long term future," the current national and international energy and (tanker) transportation problems have convinced the Department that the Oil Import Administration must be fully staffed and funded at the headquarters and field levels for 1972. Accordingly, approval of the requested FY 72 funding level of $576,000 is considered essential.

The National Security Purpose

A viable, responsive domestic petroleum industry is essential to national security and national energy resource management. In cases of interruption of foreign oil supply, national security requires the capability within the domestic oil industry to continue to provide U.S. petroleum requirements.

Objectives of the Oil Import Program

The program is designed to insure a stable and healthy oil industry in the United States capable of exploring for and developing new petroleum reserves to replace those being depleted by reserving a share of the domestic market for domestic oil producers, refiners and marketers. The basis of the program is the certified requirements of our national security which make it necessary that we preserve to the greatest extent possible a vigorous and healthy petroleum industry in the United States capable of supplying the essential and continuing petroleum requirements of the United States.

Authority:

Pursuant to Section 2 of the Act of July 1, 1954, as amended (72 Stat. 678, 19 U.S. C. 1862b) the Director, Office of Civil and Defense Mobilization, made an appropriate investigation and determined that crude oil and crude oil derivatives and products were being imported in such quantities and under such circumstances as to threaten to impair the national security. The President concurred in the recommendation of the Director, Office of Civil and Defense Mobilization, and issued Presidential Proclamation No. 3279, dated March 10, 1959, "Adjusting Imports of Petroleum and Petroleum Products into the United States" (24 F.R. 1781), as amended. The Presidential Proclamation authorized the Secretary of the Interior to issue regulations. The Secretary of the Interior, pursuant to the Presidential Proclamation established on March 13, 1959, an Oil Import Administration within the Department of the Interior, issued regulations for the operation of the oil import program, and delegated, except for appeals, authority conferred upon him by the proclamation to the Administrator, Oil Import Administration. During 1970 the President established an Oil Policy Committee of which the Director of the Office of Emergency Preparedness is the Chairman. This Committee is designed to provide policy direction to the Oil Import Program.

Program Operations and the Compliance/Inspection/Surveillance Program

By Presidential Proclamation 3969 of March 10, 1970, overland imports of crude and unfinished oils from Canada into Districts I-IV were restricted. Ethane, propane, butane and some natural gas liquids have been expected from restriction. These actions have greatly complicated enforcement of the regulations by both the Bureau of Customs and the Oil Import Administration. As a result it is particularly desirable that personnel be available to Customs and industry in the Chicago and Midwest area to better monitor the workings of this new program. Also, allocations of No. 2 (heating) oil are being made to deepwater terminal operators on the East Coast. This has brought into the Oil Import Program an entirely new category of allocation holders and the program is proving exceedingly difficult to monitor because of the nature of these deepwater terminal operations.

In order to obtain an allocation and license, refiners are required to furnish to the Oil Import Administration the quantity of material processed in its refinery capacity as defined in the regulations. Both the definitions of "inputs" and refinery capacity used for the purposes of this application are contained in the oil import regulations. The same procedure is followed by the petrochemical plant operators. In each instance these definitions do not include all feedstocks, nor do the definitions of "refinery capacity" and petrochemical plant include all facilities normally considered to be such in

the industry. In addition the products from these refineries and petrochemical plants must meet certain technical requirements contained in the oil import regulations.

In filing applications for an allocation and license the prospective importer is required to certify the accuracy of the information contained in the application. At present Oil Import Administration personnel compute allocations and issue licenses to import based upon this information without being able to verify the accuracy or correctness of the information in any substantial number of cases. Although the oil import regulations contain adequate legal authority for such verification by physical inspection of plants and records, there have never been adequate funds or personnel to make such verifications.

After allocations and licenses are granted, the oil is imported. The quantities imported are reported to the Oil Import Administration by the importer and are endorsed on the back of the license by the Bureau of Customs. This has provided some basis of verification, but the system does not provide assurance that the reporting is accurate and not subject to falsification. There has been only intermittent verification of these reports by the Oil Import Administration because there have been no funds or personnel available for a regular program.

In order to assure that the new allocation holders in both areas are well informed it is imperative that Oil Import Administration personnel be available and that frequent, continuing compliance and surveillance inspections be maintained. The three field offices will serve an important secondary purpose of providing Oil Import Administration personnel immediately available to industry at the operational level of industry in which problems arise.

The entire proposed increase in funding will be used to expand the compliance inspection and surveillance program in the Oil Import Administration into a comprehensive effort to assure compliance with oil import regulations.

There are currently about 581 refineries and petrochemical plants earning regular allocations. These plants are located in 44 states and 300 cities and towns. These facilities should be inspected and applications verified on a cyclical basis of not less than once every two years. In addition to these plants the Oil Import Administration, during the last two years, has received an average of 60 applications per year based upon estimated inputs to several facilities in most applications. The regulations require that these plants be inspected before any allocation can be granted.

The following tabulation indicates the geographical area and the number of facilities (1) which will be the responsibility of each of the proposed offices. Any plants or areas not listed will be in the vicinity of Washington and can best be inspected by personnel from Washington.

OIL IMPORT FIELD OFFICES

Chicago		Houston		Los Angeles	
Illinois	24	Texas	159	California	65
Ohio	24	Oklahoma	18	Nevada	2
Kentucky	10	Tennessee	5	Colorado	3
Michigan	14	Mississippi	4	New Mexico	9
Minnesota	2	Florida	1	Utah	4
Wisconsin	2	Alabama	10	Montana	10
Missouri	1	Georgia	3	Wyoming	11
Arkansas	12	No. Carolina	1	Arizona	4
Indiana	16	Louisiana	74	Hawaii	1
Nebraska	2		275	Oregon	1
Kansas	16			Washington	5
Iowa	3			Alaska	3
North Dakota	2				118
New Jersey	15				
New York	4				
Pennsylvania	19				
Delaware	4				
Massachusetts	3				
Connecticut	3				
	176				

(1) Does not include deep water terminals.

Summary

It is generally agreed by the Oil Import Administration, internal auditors of the Interior Department, and the industry that a national compliance, inspection and surveillance program is essential to the proper administration of the mandatory oil import control program. In addition to providing assurance of compliance with the regulations such a program would give Oil Import Administration personnel the required broad and detailed statistical data of the regulated industries necessary for an effective and rational program implementation.

In order to implement a compliance and surveillance program with manageable travel costs it is planned to establish three offices outside Washington in areas which contain a concentration of refineries and petrochemical plants. These offices would be minimally staffed with industrial specialists and a secretary in each office. We anticipate each industrial specialist will be in a travel status 50 percent of his time. The Houston, Texas, office has been opened in Fiscal Year 71. If the requested funds are appropriated, two additional offices will be opened in Fiscal Year 72. For FY 1972 this expanded compliance inspection and surveillance program will require six additional positions in the field offices with a funding increase of $117,000 over the FY 1971 level of funding.

OIL IMPORT APPEALS BOARD

A. Oil Import Appeals Board: Fiscal Year 1971, $26,000; Fiscal Year 1972, $66,000; Increase, $40,000. The increase consists of:

	Increase (+) or Decrease (-) Amount	Positions	Total Program	Total Positions	Explanation
(1)	+ $33,000	+1	$51,000	3	One professional level petroleum economist and temporary typist assistance
(2)	+ $ 7,000		$15,000		Increase program support costs, including hearing transcripts
	+ $40,000	+1			

Costs Factors Involved in Increases

(1) Upgrading and strengthing economic backup and industry survey/investigation for preparation for hearings; additional clerical/ typist assistance on as required basis total $33,000.

(2) Additional support - travel $2,000, other services including hearing transcripts - $5,000; total $7,000.

Need for Increase:

(1) The Interior Board member, as designated by the Secretary, serves as Board Chairman. He is a staff member of the Office of the Solicitor and his salary is paid by that office. Appropriated funds for the Oil Import Appeals Board's employees' salaries and other necessary support services and expenses are administered by the Administrative Officer of the Office of Oil and Gas.

The Chairman is required to provide industry and company survey and economic backup investigation on all material facts relative to the petitions and requests for relief or additional import quotas. This assembly and analysis of data has proved to be too time consuming and difficult for the Chairman to handle alone. This is the justification for the requested 1972 budget increase including $40,000 for salaries, benefits and increased support costs. The addition of one professional-level petroleum economist position to assist the Chairman and the members of the Board prepare for hearings, analyze appeals and petitions, research previous decisions, etc., is considered mandatory for successful, timely, responsive Oil Import Appeals Board operation in Fiscal Year 1972.

(2) This funding must provide for the salary and benefits of support staff positions plus hearing transcript costs, travel and other general support expenses. In relation to the small total appropriation, one item remains a major cost item--the cost of verbatim transcripts, which, last year, cost over $7,000, or more than one-fourth the total agency budget for 1971.

Mission:

The Oil Import Appeals Board was established pursuant to Presidential Proclamation 3279 to consider petitions on appeals from persons affected by Oil Import Regulations No. 1 and No. 2 (Title 32A, Chapter 10 of the Code of Federal Regulations). The Board is empowered to take such action on petitions as it deems appropriate.

Board membership is composed of one representative from each of three Departments, namely, the Department of the Interior, the Department of Justice, and the Department of Commerce. It elects its Chairman and established its rules and procedures, which are set forth in Title 32A, Chapter 11 of the Code of Federal Regulations.

The Board receives, evaluates, investigates, and, where appropriate, conducts hearings in connection with petitions for relief. It is housed in and administered by the Department of the Interior. The present Chairman of the Board is the Interior member.

Program

Mandatory restrictions on the importation of petroleum products became effective March 11, 1959. To implement the operation of the program, the Secretary of the Interior was charged with its administration. Within the Department there has been a delegation of the program administration to an Oil Import Administrator. Assisted by a staff, he considers the needs of the industry and, where appropriate, makes allocations and grants licenses for the importation of crude oils, unfinished oils, and finished products. The length of the present allocation period is one year. Section 21(b) of Oil Import Regulation No. 1 mandates that the Appeals Board consider petitions of persons affected by the Regulation.

During calendar year 1970, there were 192 petitions. Of this number 76 demanded and were accorded hearings. The increased interest in the mandatory oil import program has, in turn, increased public interest in the nature and content of the petitions. Of the 192 petitions received during 1970, the Board granted 93, 15 were withdrawn, 12 were dismissed, 5 were redocketed, and 67 were denied. This number of petitions is approximately double the number received during calendar year 1969.

It should be recognized that not only the number of petitions has increased considerably, their complexity also has increased greatly due in part to new issues involving petrochemicals, finished products, residual fuels, No. 2 heating oil, asphalt and new limits.

Tabulated below are the number of petitions presented to the Board for each allocation period since the program's inception.

Allocation Period	Number of Petitions
March - June, 1959	81
July - December, 1959	24
January - June, 1960	55
July - December, 1960	26
January - December, 1961	57
January - December, 1962	82
January - December, 1963	47
January - December, 1964	46
January - December, 1965	55
January - December, 1966	39
January - December, 1967	53
January - December, 1968	80
January - December, 1969	81
January - December, 1970	192

Personnel Summary

	1970 actual	1971 estimate	1972 estimate
Total Number of permanent positions....	67	72	79
Full time equivalent of other positions.	1	1	1
Average number of all employees.....	59	64	76
Average GS grade.....	10.2	10.7	10.6
Average GS Salary.....$	14,591	$ 15,954	$ 16,154

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DEPARTMENT OF THE INTERIOR

Itemization of Estimate

Appropriation Title: Salaries and Expenses — Office of Oil and Gas

	Actual 1970	Estimate 1971	Estimate 1972	Increase (+) Decrease (-)
Program and Financing:				
Total obligations	1,083,114	1,238,000	1,495,000	+257,000
Unobligated balance lapsing	1,886			
Budget authority	1,085,000	1,238,000	1,495,000	+257,000
Budget authority:				
Appropriation				
Proposed supplemental for civilian pay act increases				
Object Classification:				
11 Personnel Compensation	794,200	939,000	1,139,000	+200,000
12 Personnel benefits	56,563	76,000	87,000	+ 11,000
21 Travel & transportation of persons	33,771	42,000	58,000	+ 16,000
22 Transportation of things				
23 Rent, Communications & Utilities	32,679	41,500	51,000	+ 9,500
24 Printing & Reproduction	20,416	30,000	30,000	---
25.1 Other Services	100,110	76,000	83,000	+ 7,000
26 Supplies & materials	9,223	12,500	15,000	+ 2,500
31 Equipment	36,152	21,000	32,000	+ 11,000
Total obligations	1,083,114	1,238,000	1,495,000	+257,000

Mrs. HANSEN. We have as the principal witness Dr. Laird, the Director. Dr. Laird, please introduce your staff. It is so strange to see a woman from the Department of the Interior that I want her particularly introduced.

Dr. LAIRD. Mrs. Hansen, on my immediate left is Mr. Vickers, our administrative officer.

Mr. VICKERS. Good morning.

Mrs. Hansen. Good morning.

Dr. LAIRD. And Mr. Snyder, the Oil Import Administration Acting Administrator; Mr. Oliver, who is an economist in our office; Mr. Ricca, my Deputy; Mr. Williams of our office; and Mr. Dell Perry. Would you introduce the lady?

Mr. PERRY. Mrs. Ronkovich of the Oil Import Administration.

Mrs. HANSEN. It is very nice to have all of you here this morning and I want to particularly welcome Mrs. Ronkovich from the Department of the Interior.

(Discussion off the record.)

GENERAL STATEMENT

Mrs. HANSEN. Mr. Laird, please insert your general statement in the record at this point and summarize it for us.

Dr. LAIRD. Thank you, Madam Chairman. I believe that this prepared statement has already been submitted for the record and I would like to request permission to file it, if I may.

Mrs. Hansen. Please do.

(The prepared statement follows:)

PREPARED STATEMENT
BY DIRECTOR OF THE OFFICE OF OIL AND GAS

The 1972 estimate of $1,495,000 is a net increase of $257,000 over the amount available for the current year. The proposed funding will be distributed as follows:

(1)	Coordination of oil and gas activities	$ 853,000
(2)	Administration of the Oil Import Program	$ 576,000
(3)	Administration of the Oil Import Appeals Board	$ 66,000
	Total	$1,495,000

This statement applies only to the Office of Oil and Gas and its responsibilities for coordination of oil and gas activities. One Administrative Office serves three offices. To save manpower and administrative costs, the budgets for the three activities are combined under the heading of the Office of Oil and Gas, and the administrative records are kept in one office. The three activities are individually managed and are separate entities under the Office of the Assistant Secretary for Mineral Resources.

The Office of Oil and Gas's share of the proposed Fiscal Year 1972 level of support is $853,000, an increase of $100,000 over the funds available for the current year.

The requested increased funding will provide for increased professional level staffing in oil and gas data analysis, consumer affairs and environmental affairs, increased funding of our Oklahoma University Research program, and increased general support expenses, such as travel and conference transcript costs.

DUAL MISSION OF OFFICE OF OIL AND GAS

The Office of Oil and Gas was established in 1946 in response to a request by President Truman for an office in Interior to serve as a focal point for leadership and information in petroleum matters in Federal government, and to be a channel of communication between Federal government and the oil industry and the oil producing states. Later this Office was delegated the oil and gas portions of the Secretary's responsibilities for emergency preparedness assigned under the Defense Production Act of 1950 as amended.

Thus, there is a broad two-part mission: (1) assist the Secretary to discharge his policy responsibilities for oil and gas matters; (2) provide the nation with capability to respond to emergencies affecting the nation's supply of oil and gas.

To support this dual mission this office provides advice and information on oil and gas matters to Congress and other agencies of Federal government, and responds to requests from individual citizens.

It also engages in a number of other activities such as: maintaining active exchange of information with oil and gas industry and oil producing states.

The functions of the office include:

(1) Fuels and energy data analysis, economic and logistics studies.

(2) Review and analysis of proposed legislation affecting oil and gas.

(3) Review and analysis of current domestic and worldwide government and industry development, trends and problems.

(4) Continuing review and evaluation of supply, demand, production/refinery/transportation/economic factors/price trends/research on oil, gas, petrochemical and associated fossil fuel resources and industry capabilities.

(5) Recommendation of programs which will permit or encourage needed private industry effort to adjust their programs to problem areas, research, meeting new or changed fossil fuel energy requirements--such as low sulfur fuels, oil from shale or tar sands, coal gasification and liquefication, offshore oil and gas production, tanker construction including cryogenic tankers for liquefied petroleum gas, pipeline construction including more crude lines from domestic production to refining areas and availability of Alaskan "North Slope" oil and gas to domestic U.S. marketing areas.

(6) Encourage cooperation between various segments of oil and gas industry to identify common problems and to work out solutions; participation in Federal Power Commission Natural Gas Survey; participation in any surveys of transportation resources (such as domestic natural gas transmission line systems).

(7) International activities. Including North Atlantic Treaty Organization, Organization for Economic Cooperation and Development, Petroleum Planning Committee and the like.

Examples of Programs

Early in September, the Director of the Office of Emergency Preparedness requested the Office of Oil and Gas to provide staffing and support assistance for the Region I (New England) Emergency Fuels and Energy Board. This emergency operation has required two of our OOG professional level Industrial Specialists on a full-time field assignment ever since. The Department has been recently advised that the OEP program for Emergency Fuels and Energy Boards will be made permanent not only for the New England and Middle Atlantic States but for the entire nation. Continued OOG participation is anticipated through Fiscal Year 1972.

Early in December the National Petroleum Council started its 18-month study of the "U.S. Energy Outlook Through 1985 and 2000." This very ambitious project for the Department will be a major joint program of NPC and this Office. OOG will provide committee participation and staff assistance in most of the individual "energy" task force groups (Oil Demand, Supply, Logistics and Capitalization, Gas Demand, Supply and Transportation, other energy resources - coal, shale, tar sands, nuclear and new energy forms and Government Policy). This type of joint government-industry study is a notable example of OOG's role in liaison and communication. All Department of Interior administrative contact with the NPC is handled by the Office of Oil and Gas.

This Office is also continuing its program of vulnerability studies of petroleum and natural gas systems, currently covering Louisiana, East Texas, West Mississippi and Gulf of Mexico offshore. We have developed preliminary national and area models and are now examining interfaces with the transportation, communications, electric power, manufacturing and other industries. These studies are being accomplished in coordination with the Office of Civil Defense.

In recent weeks the Office has been participating in a Task Force made up of representatives of several government departments which has been reviewing rapidly changing developments in the international oil production and supply situation. This has required the time of one or more OOG staff and support people on a 7-day-a-week basis, plus special trips representing the Department to the Organization for Economic Cooperation and Development conferences in Europe.

This office has made significant contributions to the Departmental Environmental Statement concerning the Alyeska (TAPS) pipeline report which is now being completed. We were involved in the writing and preparation of data indicating the needs for the pipeline to make "North Slope" crude oil resources available to our west coast and mid-Continent consumers.

Since 1956 the office has been the designated "focal agency" for implementing an Interagency Petroleum Statistics Program. Important progress has been made in designing data systems for petroleum resources, productive capacities, well drilling, expenditures and revenues, petroleum transportation, measurement techniques, definitions and standardization of terms in cooperation with other interested government departments.

Our office has continually reviewed many aspects of oil imports into the United States and their relation to national security and the balance of payments problem, etc. Since the Secretary of the Interior is a member of the Oil Policy Committee, we have been regularly required to provide data, analyses, position papers and interpretation of world and domestic oil matters to assist in policy determination.

Emergency Preparedness Program

Our civil emergency preparedness program for oil and gas is a vital element in our national security. In its domestic program and for wartime emergencies, OOG maintains the Emergency Petroleum and Gas Administration (EPGA) on standby basis. This is a standby organization, manned mostly by oil and gas industry executives on a voluntary basis. It consists of a national headquarters, eight regions, fifty State offices, with about 600 key jobs now filled with trained Executive Reservists. The EPGA can be activated in a national emergency by the Secretary, who is National Administrator. This organization using OOG as the nucleus is responsible for mobilizing and managing the nation's oil and gas resources.

OOG is the "command center" for the Federal Government in all oil emergencies, such as that resulting from the Arab-Israeli War in 1967. The Middle East Crisis of June 1967, which thoroughly tested our emergency planning and procedures, could be repeated at almost any time. Our Emergency Petroleum Supply Committees are in standby status and could be quickly reactivated if there is any major interruption of petroleum shipments from the Middle East to our NATO allies and other Free World countries.

International Activities

OOG also participates in oil matters of several international groups, including the Petroleum Planning Committee of NATO, the Organization for Economic Cooperation (OECD), and the Committee on Gas of the Economic Commission for Europe of the United Nations (ECE(UN)); it also does much staff work in the Department's relations with Canadian officials in joint emergency planning.

Implementation of Public Law 91-631
Mining and Minerals Policy Act of 1970

The Office is now developing the 1971 and 1972 requirements for compliance with the recently enacted Mining and Minerals Policy Act of 1970 and PL 91-512 dealing with the National Materials Policy Act. This Office is in a unique position to provide leadership, expert program participation, positive liaison with the oil and gas industries, and improved data and economic analysis in the fossil fuels energy phases of this significant Act. We welcome the assignment of additional policy and program responsibilities in the international and domestic oil and gas areas and we anticipate making substantial contributions to the Secretary's program and his annual report to Congress on this subject. Additional funding and staffing are needed for this major program addition and the Department will submit appropriate supplemental budget requests.

Need for Increase

The Office of Oil and Gas in its assigned mission and program urgently requires additional professional staff capabilities in three problem areas--Petroleum and Gas Industrial Specialists to handle the following areas of responsibility:

1. Economic and Energy Data Programs and Analysis, including forecasting domestic and worldwide supply, demand and logistics problems, trends, and programs.

2. Consumer data compilation, analysis, and liaison to provide coordination, distribution and reliable product availability of oil and gas information to the consumer; as well as recommendations to industry.

3. Environmental protection data compilation, analysis, and liaison to provide coordination, and distribution of oil and gas information to all concerned; as well as recommendations to industry.

For 1972 it is necessary to establish an additional professional level Industrial Specialist position for each of these three important program areas. The existing limited staffing of the Office of Oil and Gas will not permit the merited, full-time attention to these vital problem areas for the decade of the '70's. Assignments to this Office from the Secretary, Congressional inquiries, and the public have been delayed because of admitted lack of office staffing depth. Approval of the additional staffing requested (3 professional-level positions) is essential to enable the Director of the Office of Oil and Gas to discharge his expanded international and domestic responsibilities for energy, oil and gas data analysis, environmental matters, and consumer interests.

Dr. LAIRD. Then I would like to comment on a few of the items that are in this statement, and in addition I would like to make some other remarks that are relative to the energy situation. I have a statement here that I would like to go through with you, and then go through the charts, if I may.

Mrs. HANSEN. That would be fine.

Dr. LAIRD. Yes, ma'am. Madam Chairman, I will try to speak on your requested subjects, and I am sure, of course, you or other members of the committee will ask questions. Madam Chairman, for the record, I am Wilson M. Laird, Director of the Office of Oil and Gas in the Department of the Interior.

I would like to point out that I am speaking only for the Office of Oil and Gas. Mr. Ralph Snyder, Acting Administrator, will speak for the Oil Import Administration, and Mr. Vickers will speak for Mr. Flagg, Chairman of the Oil Import Appeals Board, who cannot be with us today.

The Office of Oil and Gas' share of the proposed fiscal year 1972 level of support is $853,000, an increase of $100,000 over the funds available for the current fiscal year. This increase will provide for urgently needed increased professional-level staffing in oil and gas data analysis, consumer affairs, and environmental affairs, continued funding of our Oklahoma University research program, and increased general support expenses, such as travel and conference transcript costs.

I would like to emphasize that we are requesting funds to fill three authorized professional positions now vacant. We now have 42 permanent positions filled—33 in Washington and nine in the OEP regional field offices. Next year we hope to add three essential permanent personnel to make a total of 45 in the Office of Oil and Gas.

I feel that our prepared statement and our budget justification amply describe the funding and staffing requirements needed for the Office of Oil and Gas to accomplish its mission, program objectives, and goals for 1972. In view of the interest in energy problems which this committee expressed to Secretary Morton a few weeks ago, and I believe to Mr. Dole last week, it might be useful for me to discuss matters about which the committee indicated some concern.

May I proceed, Madam Chairman?

Mrs. HANSEN. Please do.

GAP BETWEEN ENERGY AVAILABLE AND ENERGY REQUIRED

Dr. LAIRD. The United States is facing an energy gap of major proportions between its needs for energy and its developed domestic capacity to meet these needs. In substance, the problem has developed because the use of primary energy has been rising in recent years at rates surprising to even the most optimistic observer—averaging over 5 percent annually since 1965, as opposed to 2.8 percent per year in the decade of the fifties. At the same time, the supply of each major form of energy has been restricted by an extraordinary combination of events. Nuclear power development is running behind schedule; high-sulfur eastern coals are being forced out of major markets because they cannot meet community air quality standards; natural gas is encountering local deliverability problems because production no longer is fully supportable at current levels of proved reserves.

These unsatisfied demands for coal and natural gas have been translated into higher requirements for oil, and under the impact of sudden, increased demand, oil prices have risen and local shortages developed during the scramble last fall to cover winter requirements. And we find ourselves looking more and more to imported oil to cover what will be a very substantial part of our incremental demand for energy.

Madame Chairman, I wish I could state that we have passed the energy crisis, and that we are now in the process of returning to the abundance we enjoyed not so long ago. But the fact that a relatively mild winter and a momentary slackening in business activity have helped us through the current period should not obscure the true picture of our energy outlook.

Mrs. HANSEN. It hasn't been a mild winter all over the United States.

Dr. LAIRD. No, ma'am; that is true, but it has been in the early part of the winter in certain parts of the country, notably New England, where we had our greatest troubles.

Mrs. HANSEN. Since January New England has been covered with snow.

Dr. LAIRD. That is right, but normally the New England snows start a little bit earlier. It was fortunate it didn't happen that way this year.

In truth, our problems are just beginning, and our forecasts are not optimistic.

The Office of Oil and Gas must do its best to assist the policymaking people of the Department in responding to the growing complexities of our energy situation. Not only must the Nation contend with the hazards of increasing reliance on imports of petroleum if our economy is to continue to expand at acceptable rates, but the expansion of our indigenous supplies, difficult under any circumstances, must be done in ways which are consistent with our objectives for protection of the environment.

What we must strive for, as a matter of national policy, is the satisfactory performance of our minerals activities with minimum intrusion upon the environment. Safeguards must be developed to guarantee this. Perhaps just as important as the development of such safeguards is the working out of an information program to provide the public with the facts on pollution, facts on preservation of environment, and facts on industry and government efforts to protect for the people of this country what we have today and efforts to rectify those mistakes made yesterday. We must also make every effort to inform the public of the need for the development of our energy resources.

Incorporating environmental considerations into the cost of current and future energy supplies will greatly complicate our task of forecasting. Heretofore, estimates of future supply and demand were somewhat simplistic, and more often than not they were little more than extrapolations based on past trends. We must now contend with the possibility that consumer buying habits may well be affected by these newly accounted for costs which, in turn, would bring about perceptible shifts in demand for a particular form of energy.

Mrs. HANSEN. What has been the shift in demand?

Dr. LAIRD. In the past, Madam Chairman, there has been a shift from coal to gas or from oil to gas; but now that gas is no longer in

abundant supply and the shift is having to go back again. Now, it is conceivable that if the cost of oil were to rise in an astronomical manner people might go back to coal, I don't know.

Mrs. HANSEN. What are some of the ingredients aside from increased use that will increase the cost of oil?

INCREASED OIL PRICES

Dr. LAIRD. The international situation is very tenuous at best, as you are aware. Recently there has been a very marked increase in the cost of the oil coming from both Venezuela and the Middle East because of increased prices that the producing countries have demanded.

Mrs. HANSEN. In other words, it is increased production costs and increased royalties to those countries?

Dr. LAIRD. Well, it is increased taxes and royalties. As a matter of fact, at the present time in the Middle East there is an agreement recently signed with the Persian Gulf countries with a significant escalation clause in it. This is an agreement, as I understand, which was signed for 5 years and the first of the escalation points will take place either on July 1 of this year, or June 1. I forget which. After that date, it will increase every year at a stated rate. In addition to this, we have a very tight tanker market on a worldwide basis and the recent tanker rates have been little short of astronomic.

Mrs. HANSEN. Are those costs also increasing?

Dr. LAIRD. At the present time I understand there has been a slight decline from the high point in the tanker rates.

Mrs. HANSEN. What has caused this?

Dr. LAIRD. Well, I think it is due to somewhat lessened demand as the season got a little bit warmer, you see. The oil companies and other operators have to schedule several months in advance on their shipping and their storage.

Now, there are a number of things that can bring the tanker rates down. For example, the reopening of the Suez Canal would make a difference because it would allow the big tankers to go down in ballast through the Suez Canal even though they couldn't come back that way loaded, and this would decrease the time of the trip. Second, it would make more tankers available for the Mediterranean run. Third, the tankers are getting larger and so therefore unit shipping costs are cheaper.

LARGE CAPACITY TANKERS

Mrs. HANSEN. The larger the tanker, the larger is the potential spill.

Dr. LAIRD. Yes, ma'am, exactly. I read in the Oil Daily, I believe yesterday or the day before, where they are contemplating a 440,000-ton tanker at the moment in Japan. It is not built yet.

Mrs. HANSEN. What would be the draft depth of the tankers?

Dr. LAIRD. I don't know what the draft of those would be, but it would be in the order of magnitude of better than 70 feet.

Mrs. HANSEN. Would all the salt-water ports be able to accommodate these tankers?

Dr. LAIRD. There are relatively few ports in the world that can accommodate these big tankers.

Mrs. HANSEN. How many ports are there?

Dr. LAIRD. I can't give you that because I don't know it, but there are very few in the United States. As a matter of fact, one of the areas, Puget Sound in your own area, is one of the few west coast ports that can accommodate the giants.

Mrs. HANSEN. If you can't accommodate tankers from Alaska, then you could hardly accommodate tankers from the import countries. Isn't this true?

Dr. LAIRD. Well, it depends on how you are looking at it. If you are talking about the physical accommodation, I think some of the larger tankers could get into the Puget Sound area without any problem.

Mrs. HANSEN. It has been said, for example, on the Columbia River that all it is going to take is one spill and there will be no more tankers coming into the river.

Dr. LAIRD. The only other alternative is to anchor offshore on buoys and transport it either by barge or by pipeline from that point to the shore.

Mrs. HANSEN. That would be a difficult undertaking over such a bar as the Columbia River.

Dr. LAIRD. Yes, ma'am, it would be.

Mrs. HANSEN. Almost impossible.

Dr. LAIRD. So I presonally feel that these large tankers have pretty well reached the maximum when you consider the difficulties of the ports, the potential of the pollution.

Mrs. HANSEN. How many ports in Europe, for example, can accomodate a 70-foot tanker?

Dr. LAIRD. I can't give you the exact figure, but it is in the order of magnitude of five or six.

Mrs. HANSEN. Would these ports become distribution centers for oil?

Dr. LAIRD. I would assume so, but I think that more than likely they will continue to have relatively somewhat smaller tankers, so that they would be enabled to get alongside the pier because every time you transfer cargo obviously it costs money.

Mrs. HANSEN. What ports are there in the United States that can accommodate a 70-foot tanker?

Dr. LAIRD. Well, Puget Sound may be one. I do not believe you can get into New York Harbor or Philadelphia or the Chesapeake Bay and I don't think you can get into any of the gulf coast ports. You have another problem in the gulf coast ports, that in order to make a port big enough for these tankers to get in it would require a great deal of dredging, which persents two more problems. One of them is the spoil from the dredging operation, and, second, the problem of keeping them open due to ocean currents. I was talking to somebody yesterday who said to get one of these big tankers into, say, the mouth of the Mississippi River would require dredging some 30 or 40 miles, so the dredging costs are very large to do that and then to keep them open.

Mrs. HANSEN. Thank you.

PERSIAN GULF SETTLEMENT

Dr. LAIRD. You asked about the Persian Gulf settlement. In 1971 the producing country take, that is, all of these countries, is going to increase by $1.2 billion and by 1975 that year the increase is going to be $3.5 billion. In the next 5 years, as I understand, there will be over an $11 billion increase to these "PG" producing countries.

Mrs. HANSEN. That will be directly reflected in the consumer prices.

Dr. LAIRD. Not only here but also in Europe.

Mrs. HANSEN. Does Canada import oil?

Dr. LAIRD. Yes, ma'am; about 700,000 barrels a day.

Mrs. HANSEN. Then it will also be reflected in that country.

Dr. LAIRD. It will be reflected there because the great bulk of their oil comes from Venezuela but they also get a significant amount from the Middle East.

Mrs. HANSEN. Please continue with your general statement.

NEW REQUIREMENTS FOR POWER

Dr. LAIRD. Moreover, we should be aware of what might turn out to be a fundamental change in the long-term relationship between energy consumption and economic activity. Since 1966, our consumption of energy has been growing at a rate faster than our real gross national product. This is in decided contrast to the record of the past 50 years, when the consumption of energy in the United States grew at a rate constant with, or slower than, the gross national product.

Mrs. HANSEN. To what do you attribute that?

Dr. LAIRD. I think it is a problem of increased demand on the part of people for additional amenities of life. For example, you go into any kitchen in a modern home and you will find a toaster and a fry pan and no end of electrical gadgets, including electric ice crushers. All of these demand more power. This power is fueled by either atomic power or by fossil fuel.

Mrs. HANSEN. Hasn't the demand from American women to have laborsaving devices helped to increase the need for more power?

Dr. LAIRD. This is true, and then of course in addition there many people who have two automobiles who used to have one or none. The same thing is true in factories. There are more laborsaving devices being put in there to cut the labor cost.

Mrs. HANSEN. That is right. You are using more electricity every day in the average lumber mill.

Dr. LAIRD. That is correct.

Mrs. HANSEN. Please continue with your statement.

Dr. LAIRD. If this apparent shift in the use of energy per unit of economic output is more than a passing thing, then we must plan for more energy than generally accepted methodologies have implied.

Even at the rather conservative growth rate of 4-percent annually, which we have assumed for the period 1970–80, and taking into consideration the full production we expect from the North Slope of Alaska and full production from the "lower 48" as well, we shall be forced into becoming more and more dependent upon foreign oil—in particular, oil from countries of the Eastern Hemisphere.

I am submitting for the record a statement of projected sources of oil supply to the United States through 1985, which is this one, Madam Chairman. I have a few other copies here, too.

As you will note, even with North Slope production at 3 million barrels a day in 1985, the United States shall still be dependent on other sources—foreign or synthetic, for 45 percent of our oil supply.

Mrs. HANSEN. Yesterday we discussed with the Bureau of Mines about extracting oil from the waste products and the garbage in this country. What is the potential for this process and what is the potential for the development of the oil shale?

Dr. LAIRD. In answer to your first question, Madam Chairman, I don't believe that the processes for the development of oil out of waste products, garbage and so forth, are at a sufficient stage of development to include them in our forecasts, so we have not done that.

Mrs. HANSEN. Isn't it good oil?

Dr. LAIRD. Yes, it is.

Mrs. HANSEN. I would imagine that one of the problems involved is transporting enough garbage to a central point to provide for production. Is this correct?

PRODUCTION FROM OIL SHALE

Dr. LAIRD. This is certainly one of the problems, there is no doubt about that, but as I say, we can't get a handle on how much in quantity that would produce, so this has not been taken into our calculations. We have taken into our calculations any projections on the oil shale.

As you are aware, the Department of the Interior has a proposal relative to the leasing of the oil shale lands which I believe will be going out for comment to the Federal agencies in the near future, the environmental statement.

Mrs. HANSEN. The Department of the Interior testified yesterday that the technology was not yet sufficient to enable them to issue the kind of leases that they want. Was that not the implication, Mr. McDade?

Mr. MCDADE. Oh, yes; no question about it.

Mrs. HANSEN. The technology to protect the environment has also not been developed far enough.

Dr. LAIRD. This is correct. I am sure of the latter one, but we have not put any quantitative figure on what can be produced from oil shale into our calculations simply because we can't be sure of any at this time.

Mr. MCDADE. Madam Chairman, I have a question?

Mrs. HANSEN. Surely.

PRORATIONING OF OIL PRODUCTION

Mr. MCDADE. This is a most enlightening discussion and perhaps you could enlighten me further as you go along by focusing in on one item. Isn't it correct that the oil-producing States ration the amount of oil that may be produced?

Dr. LAIRD. You are talking about prorationing and this applies primarily to Texas and Louisiana, although there are other States that are enabled to do this and some of them do.

Mr. MCDADE. When you talk about Texas and Louisiana, isn't that the larger share of the ball game insofar as oil production is concerned?

Dr. LAIRD. As far as the domestic production is concerned, this is in excess of 6 million barrels a day.

Mr. MCDADE. What is that on a percentage basis?

Dr. LAIRD. Well, we produce about 10 million barrels a day; is that correct?

Mr. RICCA. Yes.

Dr. LAIRD. About 10 million barrels a day of crude, natural gas liquids.

Mr. MCDADE. Does your office consult with them about this prorationing formula?

Dr. LAIRD. No, sir; we do not.

Mr. MCDADE. What is the rationale for that? Can you tell me?

Dr. LAIRD. Yes, I think I can, because I come from North Dakota where we had market demand prorationing. Enabling legislation is on the books but we don't utilize it. The rationale for prorationing goes back a number of years. In the early thirties there were two large fields discovered, east Texas and Oklahoma City, and so they had such a glut of oil that they had oil stored in ponds on the ground. Oil was running down the creeks and it was being wasted unmercifully for a very valuable natural resource. So the Governors of those States as well as others got together and said that something had to be done. As a matter of fact, in both Oklahoma City and east Texas they even called out the National Guard to police this.

Now, you may ask why did they produce this at such a rate, and the answer is simply that the oil underground is what the lawyers—I always like this—call a fugacious substance. I don't know exactly what that means, except it simply means that oil will migrate underground.

Now, in the United States the surface owner owns also the minerals. This is not true in most foreign countries. If I own this 40-acre tract and you own that 40-acre tract, and I have a well or two or a dozen—it doesn't make any difference—on mine and I am producing it like mad. In order to protect your equity you also have to do the same thing, as a result of which you had much more oil than the market could absorb. As a matter of fact, I had a friend of mine tell me one time in Texas when he was caught in that, if you will excuse the expression, "Hell, I couldn't get anybody to steal my oil."

So they devised this system whereby they would limit the production to that which the market could be reasonably expected to absorb. Now, they did this, I think it is often thought, to restrict the price and keep the price up. That was not the entire reason. The reason is simply, first of all, that there was an unconscionable amount of physical waste taking place and, secondly, because of legal difficulties you couldn't just simply pro rate around the field and say this owner gets so much and that owner gets so much without relating it to some particular factor, which in this case was market demand.

In North Dakota we did this on, I would have much preferred to have called it, ratable take in which I would say this fellow gets this much and this fellow that much, and so on and so forth, on the basis

of his acreage. In this way everybody has an equal opportunity to share in the market, and that basically is what market demand proration does.

Mr. McDade. That is very informative and enlightening. Is that still the case today? The rationale doesn't seem to exist any longer in view of our needs unless somebody somewhere is making a judgment that we are going to hold that production down for whatever purpose.

Dr. Laird. The reason today that there is still pro rationing is the fact that the markets normally available for large quantities of oil, are particularly Texas and Louisiana. These are the two States that we are primarily talking about because these are the two States with the heaviest production of the whole 48 States. Our East Coast markets have taken, to a very considerable extent, cheaper foreign oil. Therefore if they had just allowed it to be produced free we would again have the situation not only that the price would have been depressed but we would have had waste taking place. It would have had to be stored in some other way to keep it from going down the creek.

Mr. Clawson. Would the gentleman yield at this point?

Mr. McDade. Yes.

Mr. Clawson. Isn't it true that most of the majors have already now leased the underground mineral rights on all of these private properties and they in turn are using these sub-surface leases with the individual owner of the surface properties?

Dr. Laird. No; I would say by virtue of their size and the large number of them that they do have a great amount of land under lease, but by no means are they the only ones. There are thousands of people and small corporations involved who still hold——

Mr. Clawson. Own the mineral rights as well as the property, but they lease the mineral rights?

Dr. Laird. They lease the mineral rights, yes, sir. When you take out an oil and gas lease you just lease the subsurface, not the surface.

Mr. Clawson. I understand that. So the majors are still in control then, through the leasing arrangement?

Dr. Laird. I don't know. I suppose you could say that.

Mr. Clawson. I mean in the production, and so on.

Dr. Laird. Yes; of course, the bigger companies are the ones that produce most of the oil, but there are a significant number of people and small companies that still produce a great deal of oil. Particularly is this true in some of the Eastern States like Pennsylvania where I would say the majors are not a factor at all because the production from these wells is very small, but they produce a very high quality oil which is used for lubricating purposes. In the case of East Texas, which is the largest field in the lower 48, there are many, many small producers in that area. The figures on that I can't give you because I don't know them.

Mr. Clawson. May I ask just one more question?

Mrs. Hansen. Surely.

Mr. Clawson. In connection with the tankers and the independents, I understand, at least out in our part of the country, there is developing a situation where the independents are having very severe problems in the importation of crudes because of the lack of tankers and their use by the majors to actually control the independents because they also control the tankers.

Dr. Laird. The world tanker fleet I can't give you the exact figures on. We do have some knowledge of it. The world tanker fleet is

controlled, I believe, ownership, by about—what is it 30 or 40 percent by the large companies? Dave, do you have that?

Mr. OLIVER. I don't have that figure. A higher percentage than that is either loaned or leased.

Dr. LAIRD. A much higher percentage than that is leased on long term.

Mr. CLAWSON. Leasing is as good as ownership.

Dr. LAIRD. As far as control is concerned it is every bit as good, there is no question about that. I am not personally familiar with the problems of the smaller independents in California on this particular problem. They may have a problem on oil import quotas which Mr. Snyder can answer better than I, but as far as the tankers are concerned I am not well aware of this problem.

Mr. CLAWSON. One man came to me just 3 weeks ago in California and said he was seriously considering purchasing his own tanker because he had these problems.

Dr. LAIRD. Probably because the tankers are in a scarce market and the more affluent owners can bid the charter price up and get it, whereas the smaller operator wouldn't have that leeway.

Mr. CLAWSON. He had an agreement with one of the majors and the company cancelled their arrangement. As a result, he was forced into a situation, which he didn't desire.

Dr. LAIRD. What may well have happened is he had a voyage or term charter, let's say a year or 6 months, or maybe one voyage. When the charter period expired, the tanker went to somebody else.

Mrs. HANSEN. Mr. Galifianakis?

INCREASING AMERICAN PRODUCTION

Mr. GALIFIANAKIS. I was looking at the map and wondering how that map would be affected by the production of oil from the North Slope in Alaska?

Dr. LAIRD. If I might ask, sir, may I wait until I finish the statement and then I am going to go through those charts?

Mrs. HANSEN. Bear in mind yesterday the Bureau of Mines testified that the oil production in the United States from the presently producing wells could be stepped up by better techniques of extracting more oil.

Dr. LAIRD. We are going to take that into consideration when I discuss it.

Mrs. HANSEN. Fine.

Dr. LAIRD. It is easy to define the major problem that lies ahead—restoration of reliability to our energy supply, to give us the means to meet our own growing requirements without dangerous dependence upon imports, and to give us the means of restoring the bargaining balance between buyer and seller of oil in the international marketplace. But solving the problem will not be done easily nor quickly. What we may initiate now may not offer positive results for years to come; but the sooner we begin, the earlier we can expect positive results.

Madam chairman, I cannot emphasize too strongly the necessity for a considerable leadtime, a minimum of 6 or 7 years to get some of these things done. This applies not only to the development of oil but it also involves the development of our oil shale resources, the gasification and

liquefaction of coal and lignite, and so forth. In other words, this is not something that you can do simply nor quickly.

Madam Chairman, at this point I might comment on the responsibilities of the Office of Oil and Gas in pursuing basic or fundamental programs dealing with the main issues of energy supply and demand. We do have a number of ongoing programs and studies, such as our involvement in the comprehensive energy study through 1985 and beyond being undertaken by the National Petroleum Council, and the broad effort to improve petroleum statistics for which our office has been given focal responsibility for the efforts of Federal agencies involved. But these are designed to sharpen those tools we use in fulfilling the first of our two major assignments, which is to provide advice and assistance to the Secretary of the Interior, and to other Government officials, on matters relating to oil and gas. Our second major assignment is emergency preparedness. That is, to provide our country with the means to respond to any threat to the security of its oil and gas supply.

MINING AND MINERALS POLICY ACT OF 1920

I submit that now we have a third major assignment—the development of a program to implement Public Law 91-631—"The Mining and Minerals Policy Act of 1970"—as it relates to oil and gas. We have undertaken to outline for the Office of Oil and Gas those steps which would set it on a more formal course than has been possible in the past and which would lead to the indicated end result of Public Law 91-631—to foster and encourage private enterprise in the exploration, development, and production of minerals. The Mining and Minerals Policy Act is the most important single piece of legislation in the mineral fuels field in many years. We welcome it and look forward to playing a significant role in its implementation.

In addition to the Mining and Minerals Policy Act, the National Materials Policy Act, also passed by the last Congress, will demand support and participation by appropriate departments and agencies in the executive branch.

SUMMARY

Madame Chairman, let me finish by summarizing that the outlook for both oil and gas in the United States is for steadily rising demand, coupled with steadily diminishing capability to meet this demand from domestic resources. The result will be the transfer to oil of demand which otherwise would be covered by natural gas, if it were available, and by coal, if burning it were permissible. In turn, oil from indigenous production will tend to lag further and further behind demand, pointing to a growing dependence upon imported oil.

There is no easy way out of our predicament. One thing we must do, I feel, is to work toward a coordinated energy development policy. The first important step in this direction is assuming our responsibilities in connection with the Mining and Minerals Policy Act. I firmly believe that our national resource base is of sufficient magnitude to allow us to regain our lost self-sufficiency. And I am confident that the Office of Oil and Gas, in the new role we envisage for it, will contribute in no small way toward meeting that goal.

I would like to now consider certain charts and statistical data which are pertinent to the foregoing discussion; our present or anticipated "energy crunch," options available, and some of the inexorable numbers which make energy data analysis an intriguing and, possibly, dangerous game.

(The attachments to Dr. Laird's statement follow:)

A PROJECTED U.S. PETROLEUM DEMAND/SUPPLY BALANCE
1970 - 1985
(Thousands of Barrels Daily)

	1970	1975	1980	1985
Domestic Demand*	14,860	18,000	22,000	26,800
Exports	240	300	300	300
Total Demand	15,100	18,300	22,300	27,100
Less Processing Gain	370	500	550	650
Stock Reduction	20	-	-	-
Required Petroleum Supplies	14,710	17,800	21,750	26,450
U.S. Production**				
Crude Oil	9,600	11,200	11,900	12,600
Natural Gas Liquids	1,680	1,900	2,000	2,000
Total	11,280	13,100	13,900	14,600
Required from Other Sources	3,430	4,700	7,850	11,850
As Percent of Required Supplies	23.3	26.4	36.1	44.8

*Projected at a 4 percent annual growth rate. Neither demand nor imports include U.S. military offshore procurements.

**Assuming production at approximately present capacity, plus production from the North Slope of Alaska estimated at 500,000 barrels per day in 1975, 2,000,000 barrels per day in 1980 and 3,000,000 barrels per day by 1985.

U.S. Energy Consumption in the 20th Century

Overall average annual rate of increase, 1970-2000 3.5%

Share of Energy Components:

	1970	2000
Nuclear	0.3%	22.7%
Oil	43.0	34.6
Gas	32.8	26.4
Coal	20.1	13.7
Hydro	3.8	2.6

1970 Regional Energy Use Pattern

Northwest:

Hydropower has been big in past, but supply prospects limited. Future growth must come from Canadian (and Alaskan) gas and oil. Nuclear will help in electric power.

West Coast:

Predominantly served by oil. Will need all of Trans Alaska's 2,000,000 B/D capacity and then some by 1980. To extent not served by North Slope, will have to import oil in large, foreign flag tankers -- Pollution hazard could well be worse.

East Coast:

Oil share, already large, will grow as gas becomes tighter and coal forced out of more and more markets over next few years. LNG to start in small volumes by 1974-75 period. LNG imports pose same hazards as oil imports. Also significant growth for nuclear power from many plants already programmed.

North Central:

Coal country, but growing pressure to use imported low-sulfur oil. Gas share will decline. Nuclear power significant in years ahead.

Southwest:

Gas country, but oil will gain here, too. Nuclear power not a factor yet.

Sources of U.S. Petroleum Supply

Stress that U.S. production figures are maximum given present rate of discoveries, and without North Slope.

By 1980, imports would be 44% of total supply. Currently 23%.

1970 U.S. Dependency on Oil Imports

Acknowledge that a small amount (about 1%) enters West Coast from overseas sources. This will show on World Flow charts to be presented later.

Note that Eastern Hemisphere imports would have been higher except for disruptions caused by Libyan cutbacks and TAPline closure. This made up by Texas and Louisiana spare capacity.

1985 U.S. Dependency on Oil Imports

Note that this could be changed for better if big oil discovered in Canadian Arctic, like North Slope. But it hasn't been, yet.

Note price escalation clauses in East. Hem. oil agreements.

United States Petroleum Self-Sufficiency 1954-1975

Crossover in 1967. Current deficit, 1.8 million B/D

Where the Oil Is

U.S. consumes 30% of World's oil, but has only 6% of reserves.

Stress that while North Slope reserves may exceed 20 billion barrels, they might as well be on the moon until we can clear a way to bring them to market.

Middle East and North Africa contain 80% of Free World's oil reserves.

Free World International Flow Charts (3 charts)

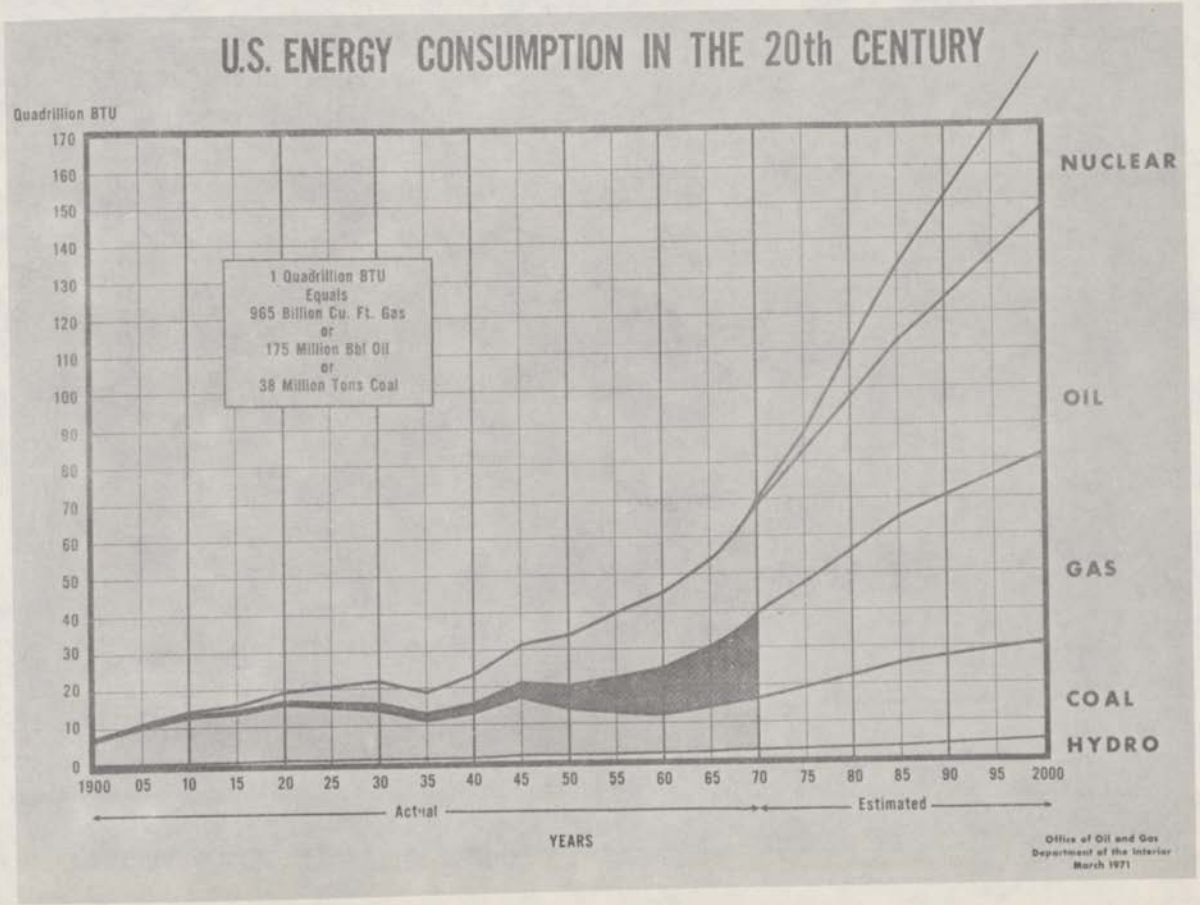
1967 vs. 1970 changes

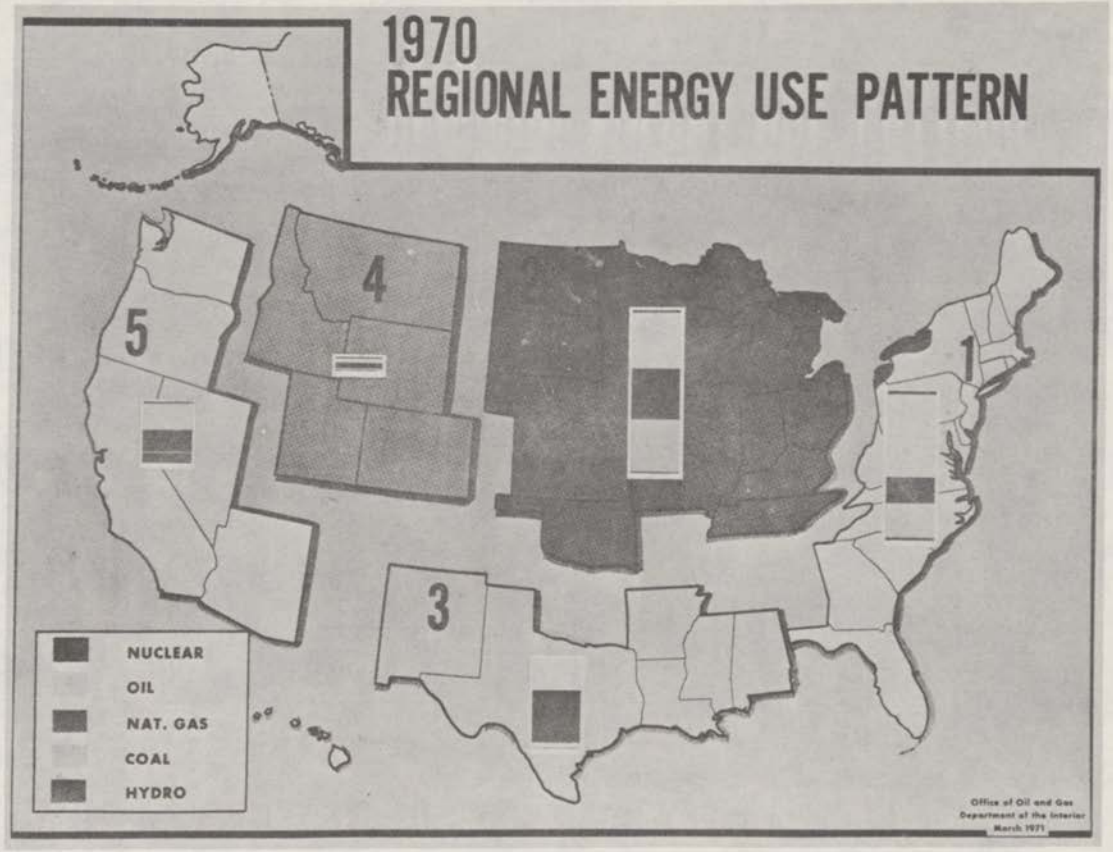
Soviet Exports to Free World virtually same.

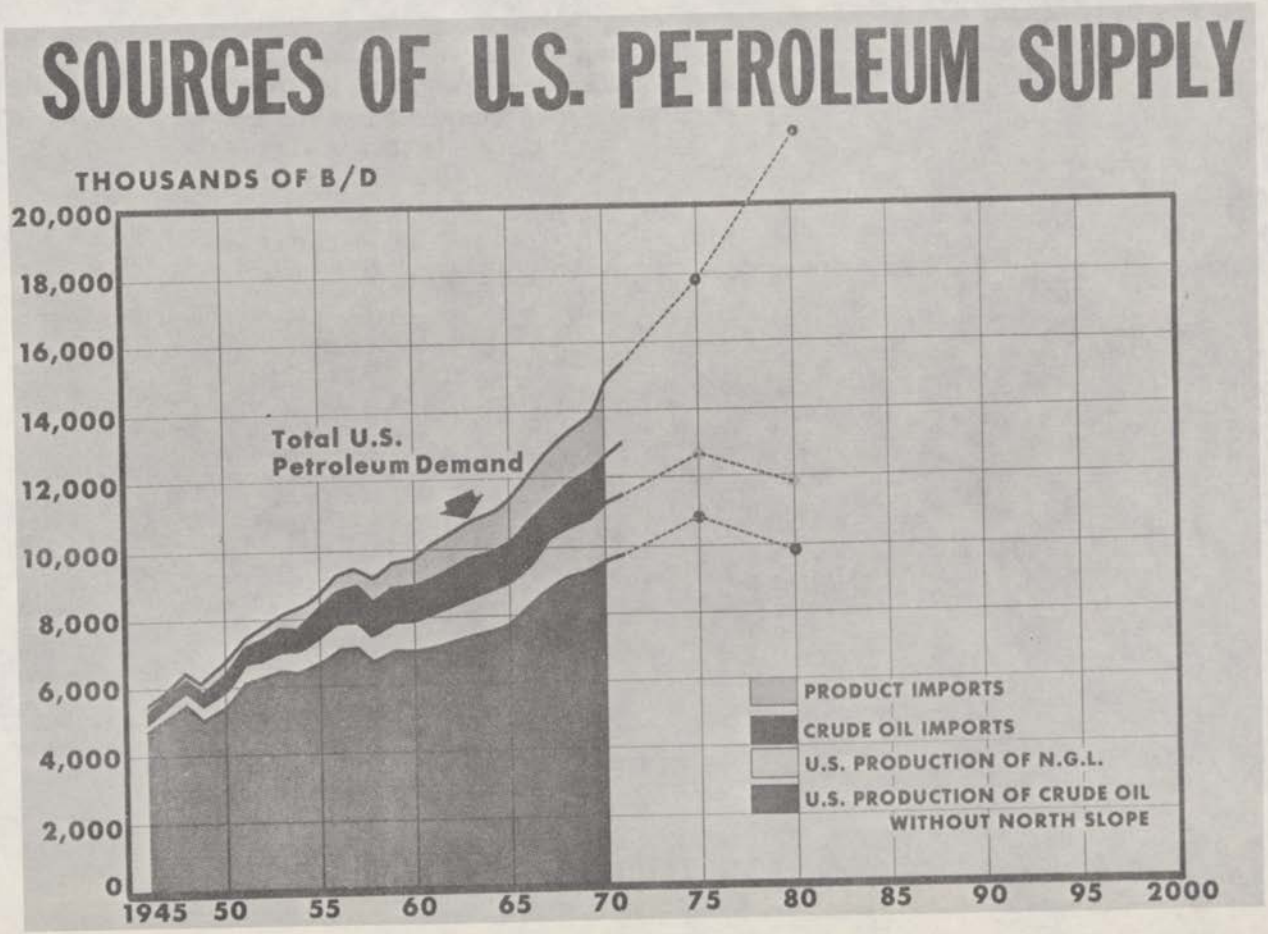
Very modest growth in "secure" Caribbean oil exports.

Very large growth in N. African & Middle East exports to both Europe and Japan.

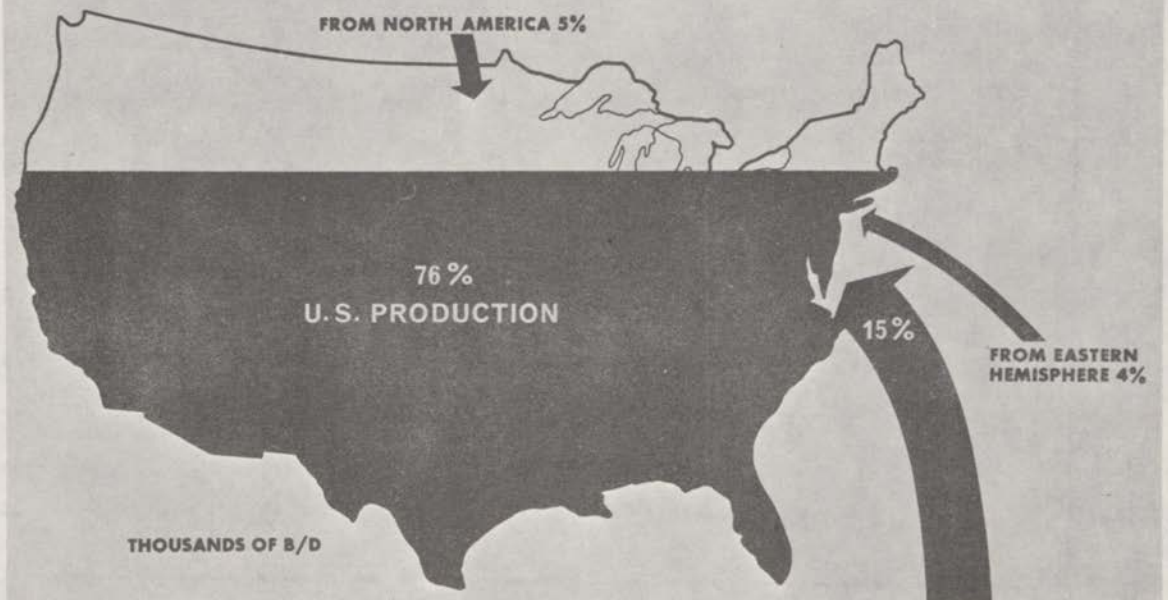
Europe still paying heavy cost in extra freight charges due to Suez closing.


U.S. ENERGY CONSUMPTION IN THE 20th CENTURY
Quadrillion BTU
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
1 Quadrillion BTU
Equals
965 Billion Cu. Ft. Gas
or
175 Million Bbl Oil
or
38 Million Tons Coal
NUCLEAR
OIL
GAS
COAL
HYDRO
1900 05 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 2000
Actual
Estimated
YEARS
Office of Oil and Gas
Department of the Interior
March 1971


1970
REGIONAL ENERGY USE PATTERN
1
2
3
4
5
NUCLEAR
OIL
NAT. GAS
COAL
HYDRO
Office of Oil and Gas
Department of the Interior
March 1971


SOURCES OF U.S. PETROLEUM SUPPLY
THOUSANDS OF B/D
20,000
18,000
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
Total U.S.
Petroleum Demand
PRODUCT IMPORTS
CRUDE OIL IMPORTS
U.S. PRODUCTION OF N.G.L.
U.S. PRODUCTION OF CRUDE OIL
WITHOUT NORTH SLOPE
1945
50
55
60
65
70
75
80
85
90
95
2000

1970 U.S. DEPENDENCY ON OIL IMPORTS

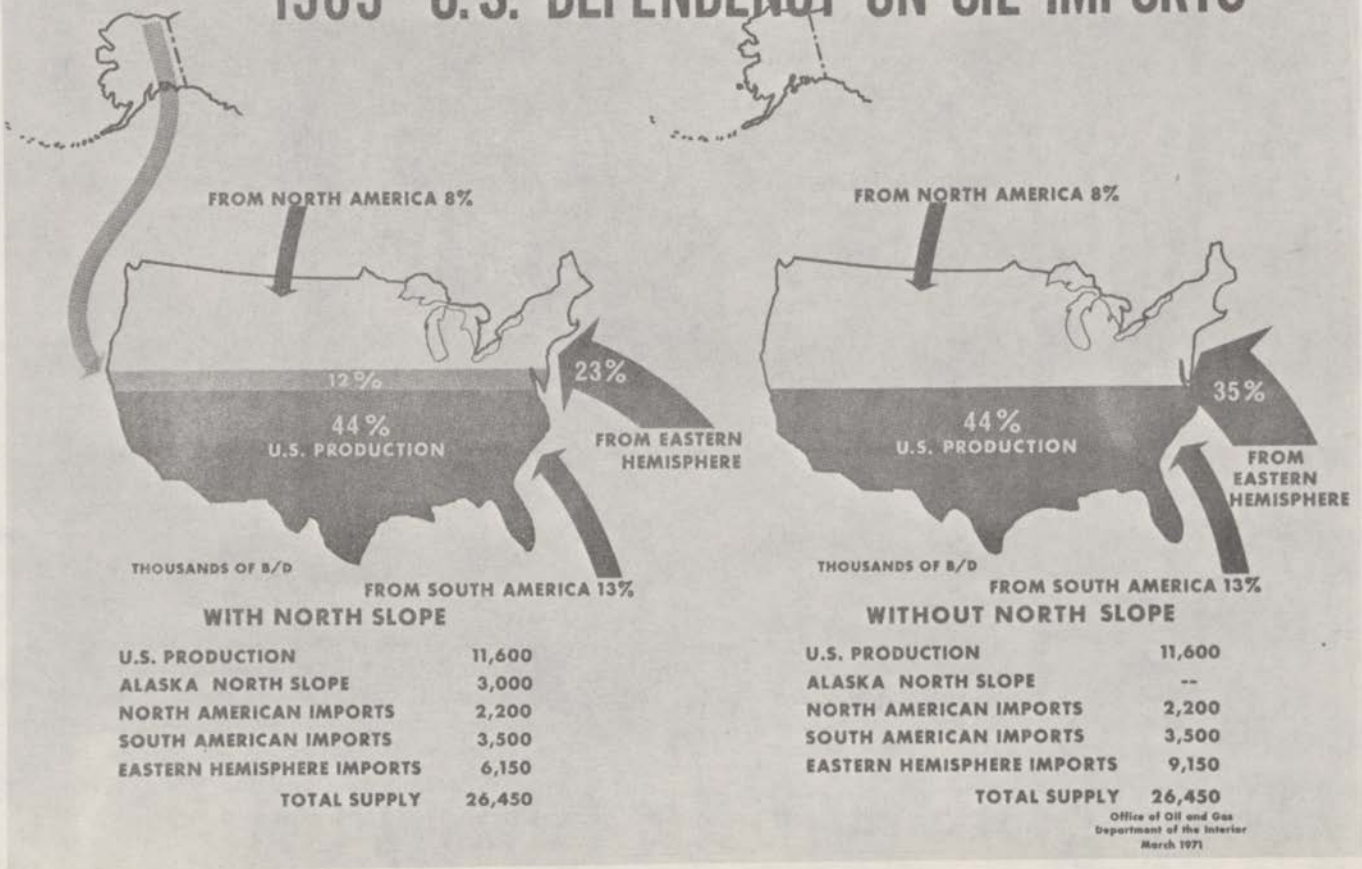


THOUSANDS OF B/D

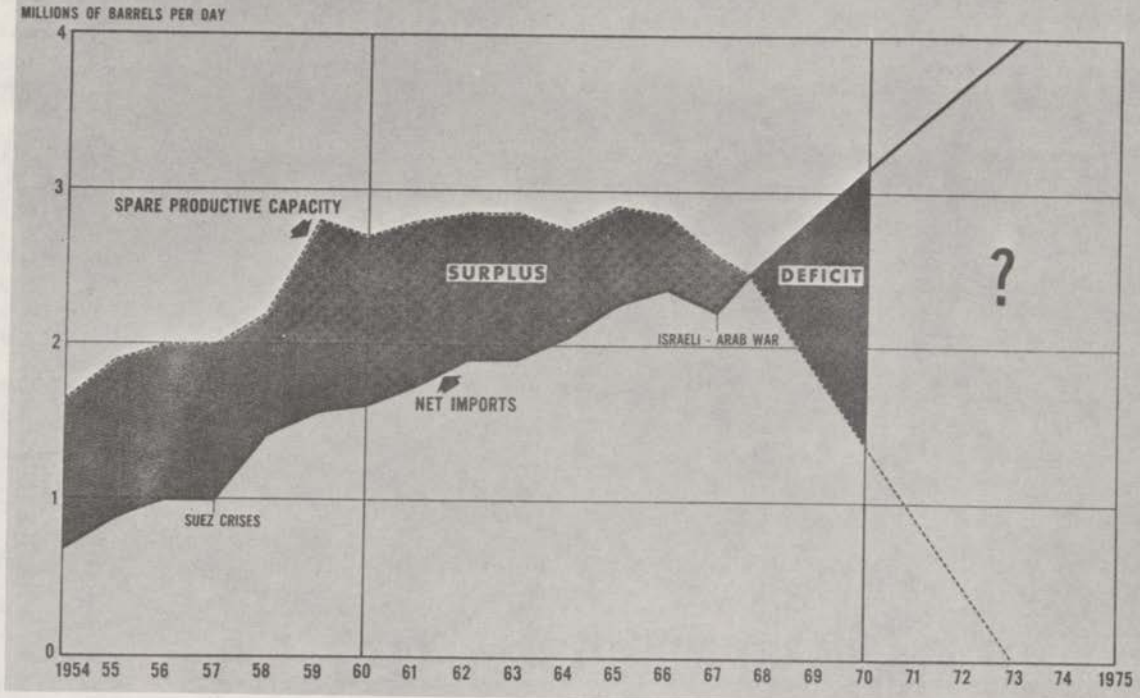
U.S. PRODUCTION	11,280
NORTH AMERICAN IMPORTS	700
SOUTH AMERICAN IMPORTS	2,200
EASTERN HEMISPHERE IMPORTS	530
TOTAL SUPPLY	14,710

Office of Oil and Gas
Department of the Interior
March 1971

1985 U.S. DEPENDENCY ON OIL IMPORTS

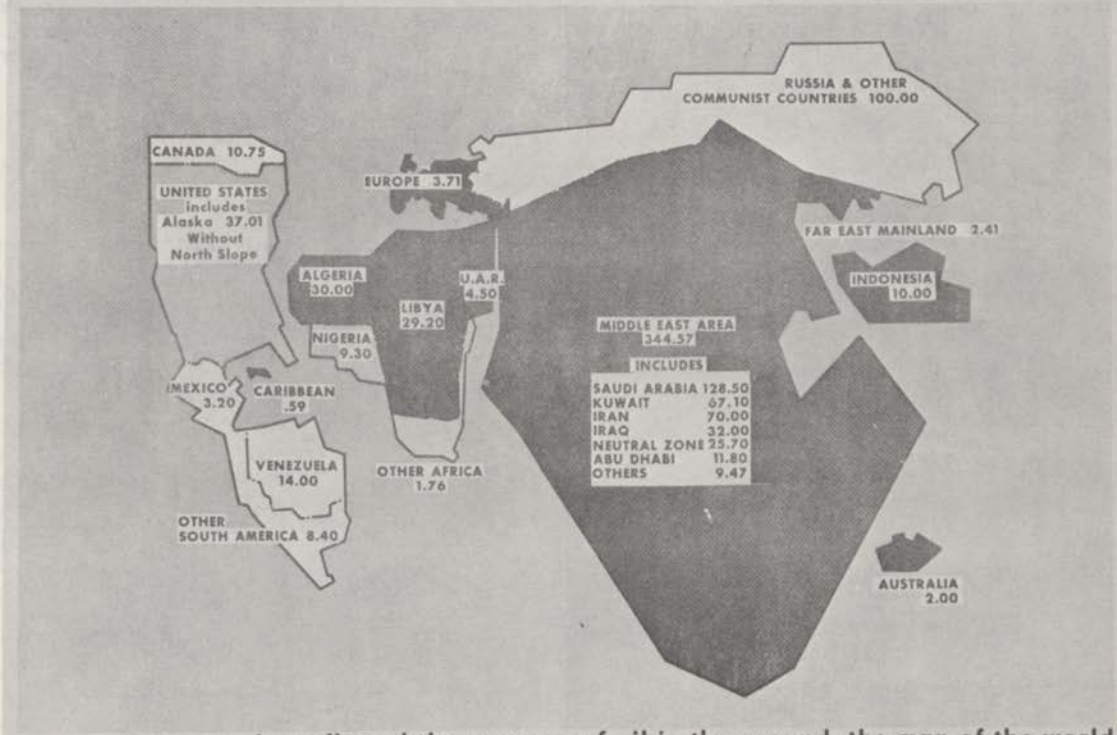


UNITED STATES PETROLEUM SELF SUFFICIENCY
1954 - 1975



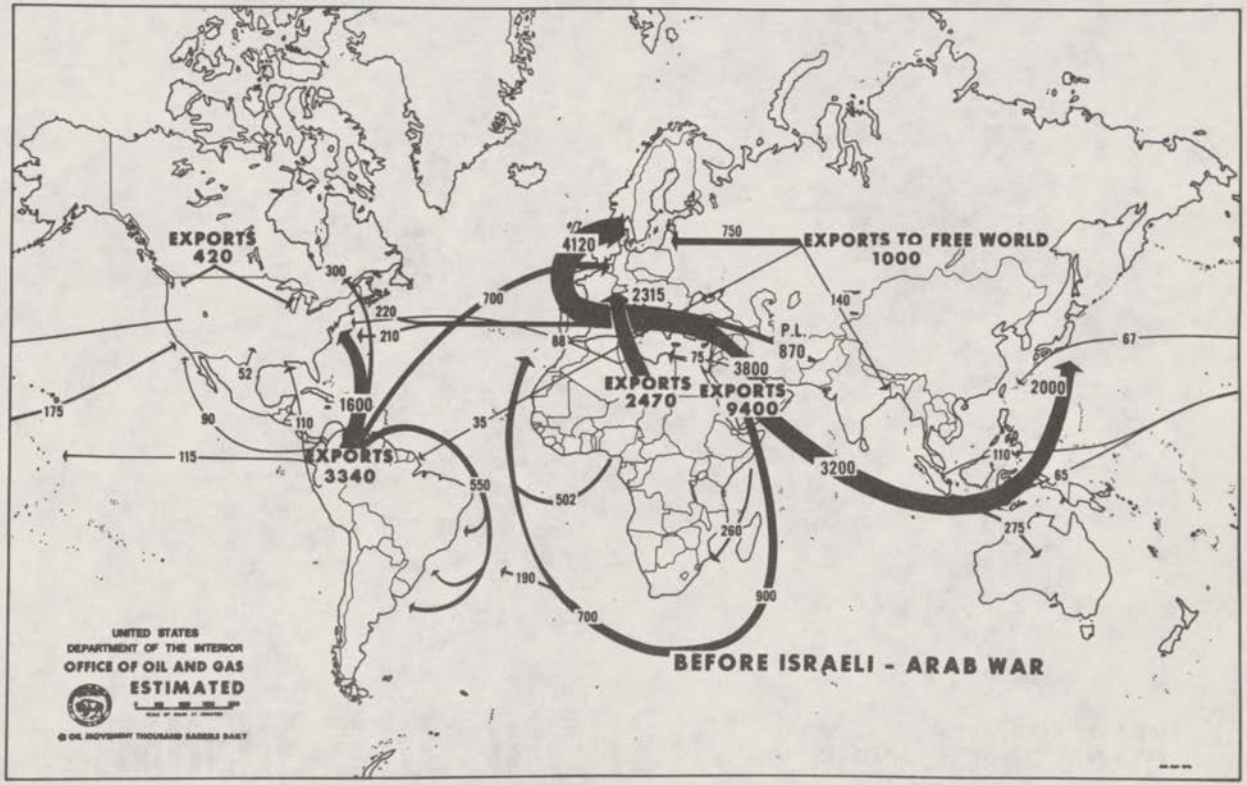
WHERE THE OIL IS—

WORLD TOTAL 611.40 BILLION BBLS.
AS OF JANUARY 1, 1971

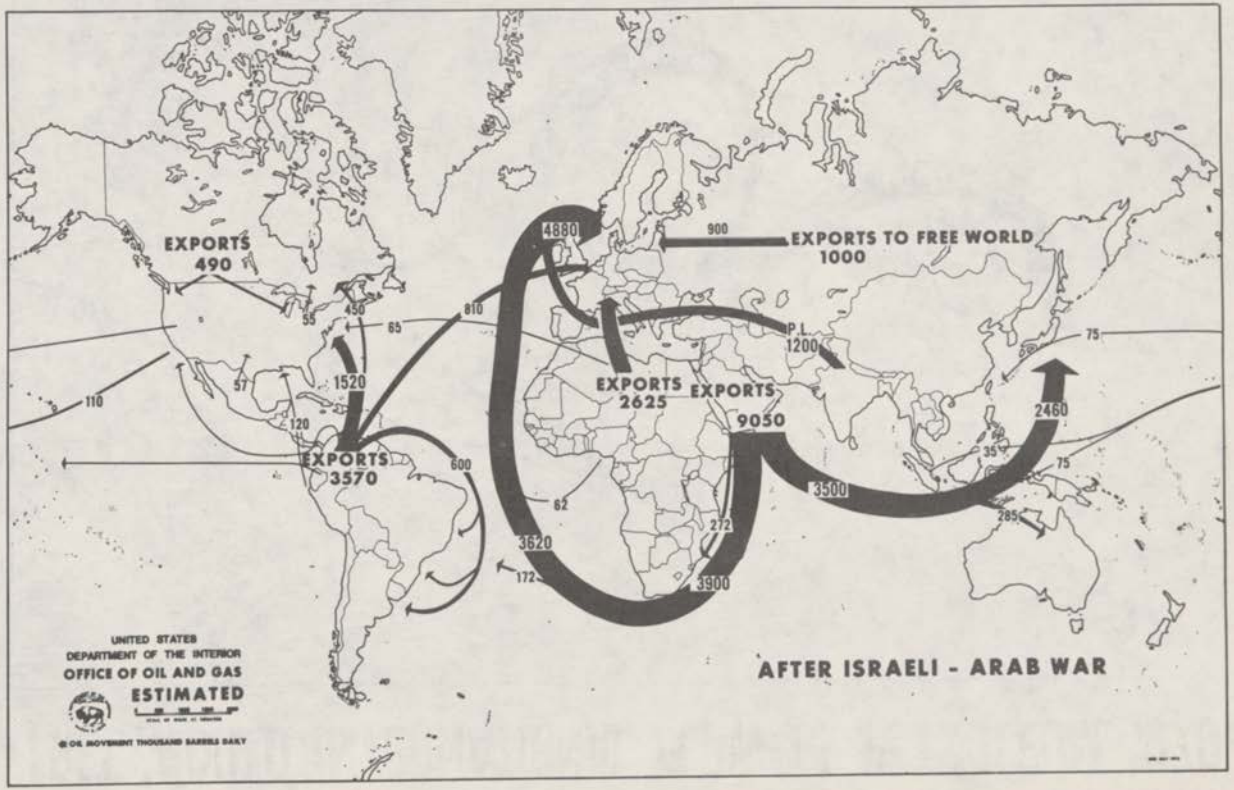


If geography reflected the reserves of oil in the ground, the map of the world would look like this.

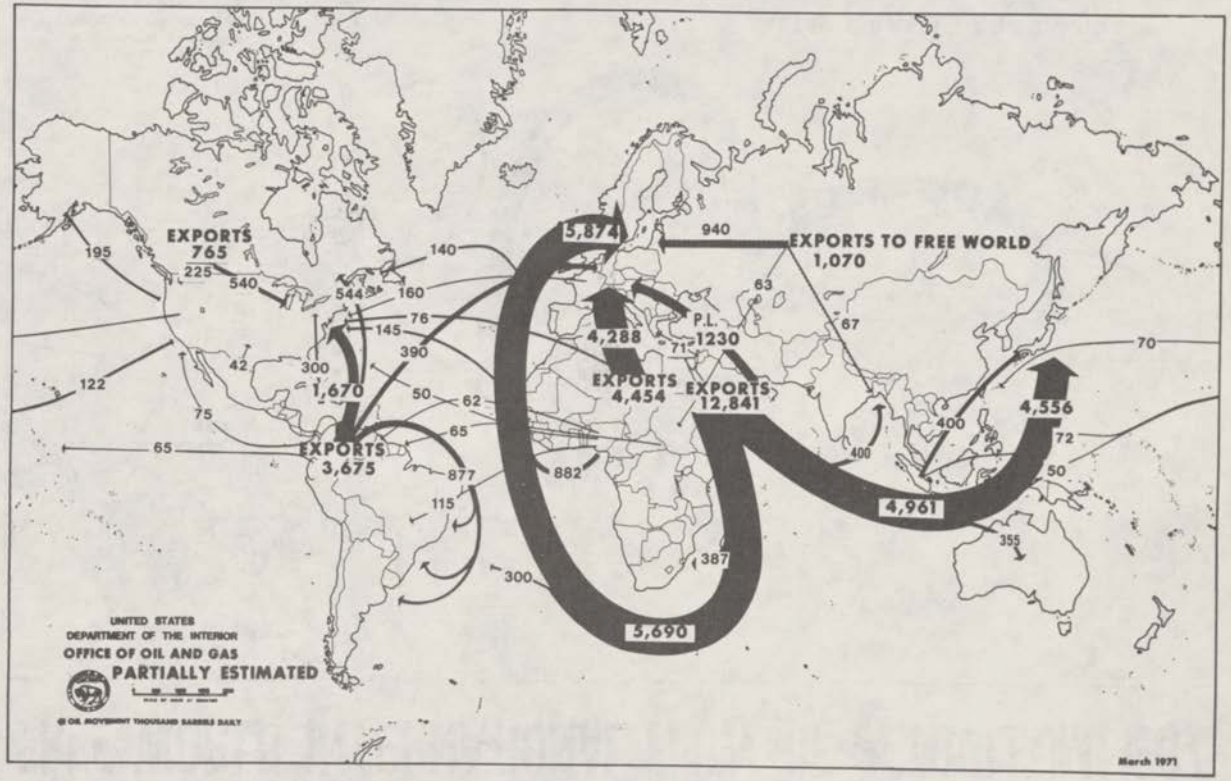
FREE WORLD INTERNATIONAL FLOW OF PETROLEUM 1967

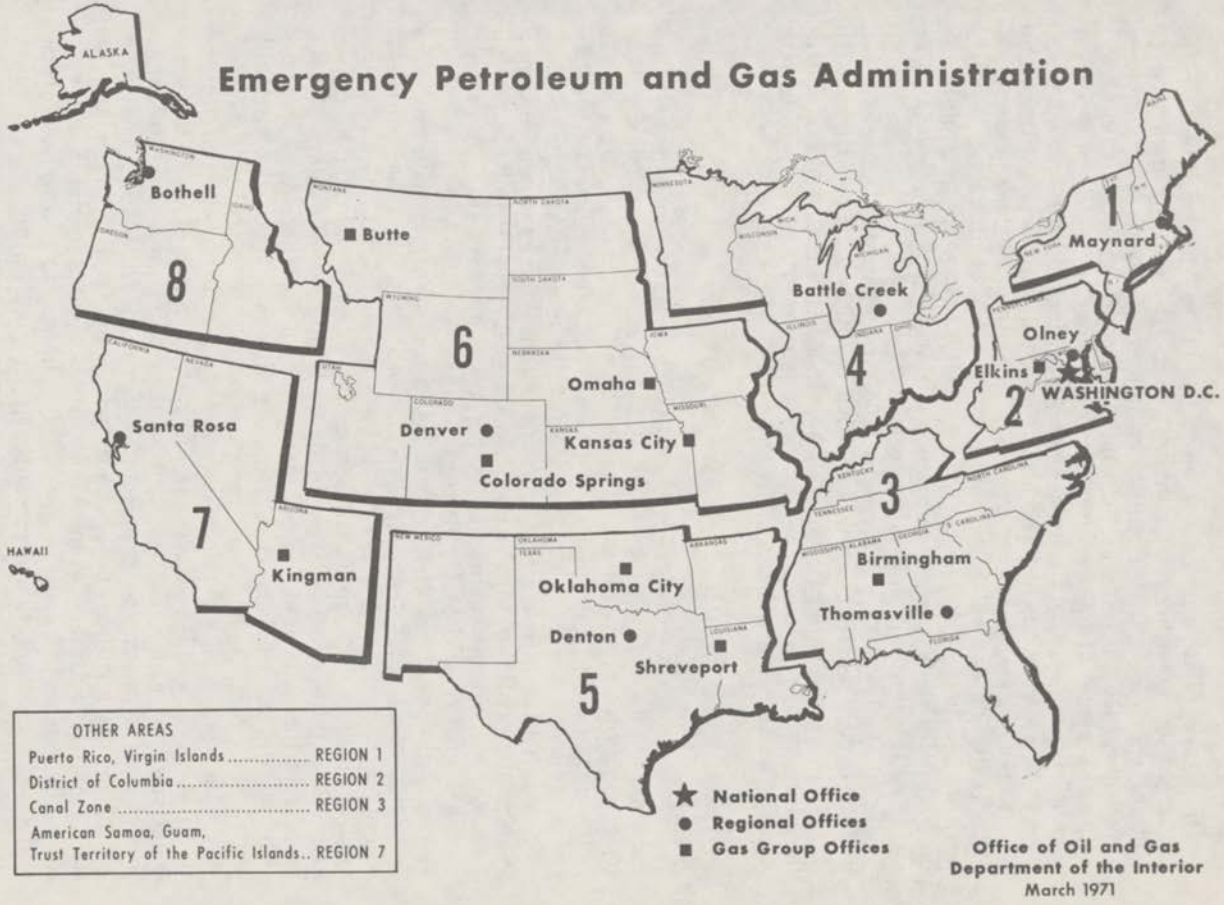


FREE WORLD INTERNATIONAL FLOW OF PETROLEUM 1967



FREE WORLD INTERNATIONAL FLOW OF PETROLEUM 1970




Emergency Petroleum and Gas Administration
ALASKA
HAWAII
Bothell
Butte
Maynard
Battle Creek
Olney
Elkins
WASHINGTON D.C.
Omaha
Santa Rosa
Denver
Kansas City
Colorado Springs
Kingman
Oklahoma City
Birmingham
Thomasville
Denton
Shreveport
1
2
3
4
5
6
7
8
OTHER AREAS
Puerto Rico, Virgin Islands ..... REGION 1
District of Columbia ..... REGION 2
Canal Zone ..... REGION 3
American Samoa, Guam,
Trust Territory of the Pacific Islands.. REGION 7
National Office
Regional Offices
Gas Group Offices
Office of Oil and Gas
Department of the Interior
March 1971

ENERGY CONSUMPTION IN THE 20TH CENTURY

Dr. LAIRD. This first chart shows the energy consumption in the 20th century. The figures for hydro, coal, gas, and oil are based on Bureau of Mines figures. The nuclear figures are based on AEC figures. You will notice that line at the top which represents the total energy demand is rising at an accelerated rate and has been since around the middle sixties. You will note also that the demand for oil and gas is increasing in toto but the percentage of their satisfaction of demand will decrease because of the projected increase in nuclear power.

In 1970, for example, nuclear power is .3 percent. In 2000 it is projected to be 22.7 percent. Oil in 1970 is 43 percent. In 2000 it will be 34.6 percent. Notice it is declining in total percentage but is rising as far as the total amount is concerned.

Gas in 1970 was 32.8 percent. In 2000 it will be 26.4 percent. Coal in 1970 is 20.1 percent. In the year 2000 it will be 13.7 percent. Hydro in 1970 is 3.8 percent. In 2000 it is 2.6 percent. This is based in quadrillion B.t.u.'s so you can see that we have a very great problem to satisfy the energy demands in front of us.

U.S. REGIONAL ENERGY USE

Now we will go to the next chart which is the regional energy use pattern. On this particular chart you will notice the legend at the bottom. Hydro is sort of an olive color; coal is green; natural gas is blue; oil is yellow; and nuclear is black. Now, these districts that we have broken down here are what are known as P.A.D. districts; I might add that in some of the packets that you have another map (not related to this) that deals with our Emergency Petroleum and Gas Administration which are OEP districts that do not exactly coincide with these P.A.D. districts.

You will notice that the great demand for energy is primarily concentrated in districts 1 and 2, the east coast and the upper Midwest, where the people and industry are. You will note that the amount of nuclear there is very small. Oil is very large, as is gas, particularly in figure 2, and also coal is larger in figure 2 than it is in figure 1. Very little, relatively speaking, of the percentage is hydropower.

In district 3, which is of course the gulf coast primarily, you will notice the great dependence there on gas. In the Rocky Mountain area which is 4, you will notice because of the relatively small population the energy use is relatively small. But when you come to the west coast you will notice that we begin to pick up again and I think that probably if we were to project this forward from 1970 that the energy use pattern because of the growing population, particularly in California, would increase markedly. We feel that in the Northwest the hydropower has been a great thing in the past but the future hydro supply prospects are currently limited and future growth must come from Canadian and Alaskan gas and oil, as well as some nuclear power.

Mrs. HANSEN. Doesn't this depend on whether or not you develop some answers on the effect of nuclear energy on the environment?

Dr. LAIRD. This is correct. I mean, the long-term development of nuclear depends upon the development of a breeder reactor and fusion reactor, and the technologies for these are not yet here; but I am confident from what I read that it will be here within this century.

Mrs. HANSEN. Every time you discuss the problem of thermo nuclear power development you have people interested in our environment who are desperately afraid of the waste.

Dr. LAIRD. That is correct.

Mrs. HANSEN. They are desperately afraid of what changes it will bring in the environment, such as warming of the water. It has been testified by the Bureau of Sport Fisheries and Wildlife, for example, that on the lower Chesapeake, it has been good for fish, and yet what it will do on the Columbia River is another matter because you have the interrelated problems of the dams there which cause a different pattern of waterflow.

In Mr. Wyatt's State a year ago there was a referendum on a thermo nuclear plant, which was voted down. The problem on the introduction of the thermo nuclear power is raised continually in the Northwest. The agencies that have testified before us say that there must be more answers and they all give a different time as to when those answers are going to be available, but in the meantime legislation can pass which may limit the use of nuclear power.

The Hanford Reactor is being closed, as you are well aware, and this brings about a tremendous shortage of power in the Northwest. What do you replace it with? At the same time I was very intrigued by an editorial in one of the Washington papers that said that Puget Sound must not allow any oil tankers because of a possibility of an oil spill.

There is also another problem in the Northwest. The Washington Water Power Co. built a new plant at a cost of several million dollars in another area of the Northwest, and they are proposing to use strip mining. Not too long ago legislation was introduced to abolish all strip mining.

I am just using this area as an example because I am familiar with the problems.

Dr. LAIRD. Madam Chairman, I have obviously thought of all these problems and what you say relative to the Northwest is true to a greater or lesser degree everywhere in the country. And so basically the citizens of this country, in my opinion, are faced with a choice of either reducing their standard of living materially and their level of economic activity or allowing the development of these resources with a minimum of disturbance to the environment. Now, there is no mineral product that can be utilized or can be won from the earth without some disturbance of the environment. I do feel that in many places it can be minimized over what we have done in the past but it cannot be done away with altogether.

Mrs. HANSEN. Please continue with your discussion of the charts.

SOURCES OF U.S. PETROLEUM SUPPLY

Dr. LAIRD. Now, our next chart shows the sources of U.S. petroleum supply. The red at the bottom is U.S. production of crude oil without North Slope. You may ask why do I leave North Slope out of there. Well, I simply don't know when the North Slope is going to be available to the rest of the world for usage. I might add also that we have in these charts, particularly both for the production of crude and natural gas liquid, used the maximum figures that we think can be obtained.

Mrs. HANSEN. Did you take into consideration the development of new techniques to extract more oil?

Dr. LAIRD. No, we did not. One of the problems in connection with that is that many of the easily floodable fields for secondary recovery are already in that process and, of course, we have allowed for that in our calculations. It is becoming much more expensive to do this in less desirable fields. It is conceivable, and being a geologist I hope that somebody is going to find another East Texas or a Prudhoe Bay oil province or something of that magnitude in the lower 48, and they might.

Mrs. HANSEN. You will still have trouble from the conservation groups.

Dr. LAIRD. Oh, there is no question about that.

Mrs. HANSEN. This is a built-in ingredient that you have to face.

Dr. LAIRD. This is correct. By 1980 if our figures are correct on that table—and I want to emphasize that those are little better than educated guesses because we just cannot evaluate all of the things that come in—by 1980 we figure imports will be approximately 44 percent of the total supply. They are currently 23 percent.

Now let's get to the next chart, Dave.

Mr. MCDADE. Could you stop right there?

Dr. LAIRD. Surely.

Mr. MCDADE. Just a question for my education, if you will. The statute under which this money is appropriated to you reads for expenses to enable the Secretary, and I am not reading it verbatim, to discharge his responsibilities with respect to oil and gas, including cooperation with the petroleum industry and State authorities in the production, processing, utilization of petroleum and its products, and natural gas.

What, for example, do you do insofar as advising the Secretary on the matter of production, which is what this chart points to? What do you do? What does the Office of Oil and Gas do?

Dr. LAIRD. We have prepared any number of papers for the Secretary's perusal, setting forth this information or any information that he may ask along this line. I would like to emphasize that the Office of Oil and Gas is not a primary data gathering agency. We utilize the data for the preparation of reports that we derive from the Bureau of Mines, the Oil Import Administration, the industry figures, whatever we can get.

Mr. MCDADE. Mr. Laird, do you act only as the Secretary requests, or do you have certain defined areas other than the gathering of specific data that delineates your responsibilities?

Dr. LAIRD. No; we do make studies on our own because we try to anticipate to a degree what the Secretary is going to be asked.

Mr. MCDADE. What, for example, would you anticipate the Secretary would be asked about the production of oil?

Dr. LAIRD. Now, this chart is a very good example.

Mr. MCDADE. Yes; that is why I raise the question.

Dr. LAIRD. The Secretary has to make decisions relative to the leasing of offshore areas as well as other Federal lands on shore, but the offshore areas are the most attractive at the moment, particularly for gas. He has to know what are our projections for the future on this, what is the need for it, can it be delayed or should it be accelerated.

Mr. McDade. And your office gathers the data from the other agencies to provide this kind of a chart?

Dr. Laird. Yes, sir.

Mr. McDade. Anything else?

Dr. Laird. Well, other than our Emergency Petroleum and Gas Administration, which is another function altogether from this.

Mr. McDade. On the issue of production, anything else?

Dr. Laird. Show him some of these studies that we have made. Maybe these will answer his question. These are studies that we have done in connection with the National Petroleum Council or independently. We get on deliverability. We have considered the problem of tankers, the provinces of the United States for oil and gas, where they are found, and things of this kind. We have not personally done all of these studies, I want to emphasize that, but we have cooperated extensively with the National Petroleum Council. This last one with the purple cover here is one we get out every year.

(Discussion off the record.)

PARTICIPATION IN NORTH SLOPE OIL STUDY

Mrs. Hansen. What advice or counsel have you given on the problem of the north slope?

Dr. Laird. Madam Chairman, we were active in preparation of part of the departmental environmental statement, the 102 statement.

Mrs. Hansen. Is this the statement the Defense Department criticized?

Dr. Laird. Yes, ma'am, as well as numerous conservation bodies.

The part, the input on that we dealt with was the need of this oil and also what we considered the alternative means of moving this oil from the North Slope. Those were our two parts of that study.

U.S. DEPENDENCE ON OIL IMPORTS

If I might go to the next chart, this indicates graphically at the present time in 1970 our dependence upon oil imports and the source of them.

You notice from North America we import 5 percent; most of that is Canada. The amount coming from Mexico is small, maybe 40,000 or 50,000 barrels a day at the most.

Mrs. Hansen. Do they have a larger potential?

Dr. Laird. I think Mexico's potential is somewhat limited.

Mrs. Hansen. How about their offshore lands?

Dr. Laird. They are doing some on the Gulf I understand. I don't know what their potential is. I don't know they have been fully explored. Canada has large potential, but again all of their resources haven't been discovered as yet.

Mrs. Hansen. Are they exploring this?

Dr. Laird. Yes, ma'am, up in the Arctic Islands.

Mrs. Hansen. Won't they have the same problem environmentally as the United States has?

Dr. Laird. Yes, indeed. In 1970 we imported 5 percent from North America, 15 percent from South America and mostly Venezuela, very little from others, 4 percent from the Eastern Hemisphere.

I would like to point out this chart indicates Middle East oil is all coming into the east coast. This is not quite true; it comes into the west coast, too. About 1 percent or maybe a fourth of the imports from the Eastern Hemisphere go into the west coast. Our later chart will show the route.

The next chart shows what we figure will happen in 1985 without and with the North Slope.

In this particular chart we have indicated in the lighter blue the percentage of our total production that would come from Alaska, about 12 percent. North slope mainly. You will notice we figure 23 percent from the Eastern Hemisphere, 13 percent from South America, and underneath that it gives the production figures for the various areas mentioned.

Without the North Slope, over on the right-hand side of the chart, you notice the figures are the same as far as North America and South America is concerned, as far as the domestic production is concerned, but note that the imports from the Eastern Hemisphere go from 23 to 35 percent.

Mrs. HANSEN. Supposing somebody disrupts further imports of oil by tankers? What is going to happen?

Dr. LAIRD. Madam Chairman, we are in a bad way if that happens, or if they interrupt that oil for any reason, we are in a bad way.

Mrs. HANSEN. Isn't the interruption of oil shipments always possible?

Dr. LAIRD. That is correct.

Mrs. HANSEN. In a variety of ways.

Dr. LAIRD. We have had this case in point this last year relative to the Libyan production and the Tapline and so forth.

Mrs. HANSEN. West Germany, Austria, Belgium, Italy, and France have signed a gas line contract with the Soviet Union. This is fine, but I think anybody realizes that the economics of any country is determined by the source of energy. Is this correct?

Dr. LAIRD. This is correct.

Mrs. HANSEN. Therefore, if there comes a turn of events between West and East, you will have the continent of Europe forced by the source of energy supplies to move into the orbit of the Soviet Union. Is this correct?

Dr. LAIRD. It is correct.

Mrs. HANSEN. I have the suspicion that the United States isn't concerned enough about this matter.

Dr. LAIRD. Madam Chairman, I can assure you, speaking as one U.S. citizen, I do care very much and this whole matter concerns me.

Mrs. HANSEN. We are going to have to supply ourselves.

Dr. LAIRD. This is right.

Mrs. HANSEN. What do you think the response of the American citizen is going to be when he finds himself with a lower wage scale than the Soviet Union in the years ahead or a lower standard of living? The survival of this country may be wrapped up in the distribution of the energy supply.

Dr. LAIRD. I agree with you, Madam Chairman. I couldn't say it better myself. The problem here is not only the gas coming directly from the Soviet Union but their control of the sealanes in the Middle East.

Mrs. HANSEN. This is right.

Dr. LAIRD. This is why I personally fear the dominance of the Middle East countries as far as the oil supply is concerned.

In connection with that, it goes again to a statement you made previously relative to the matter, they want to cut down on the oil tankers coming into Puget Sound, people don't want the nuclear reactors, they don't want strip mining for coal. These things are accumulating to put us in a worse position that we would be otherwise.

Mrs. HANSEN. This is why I ask, because Members of the U.S. Congress can't be thinking in terms of only today, but thinking in terms of 9 years or 19 years from now.

Dr. LAIRD. I would like to go again into the problem of leadtime. In other words, things that must happen in 1975 or 1980 have to be started now and that is why the urgency for these things is so apparent right now to me at least.

Mrs. HANSEN. This is the reason we want a complete discussion.

Dr. LAIRD. I am happy to discuss it because I have thought a lot about this myself.

U.S. PETROLEUM SELF-SUFFICIENCY

This is our picture of the U.S. petroleum's sufficiency, again, without Alaska. You will notice we crossed the line between the demand and the surplus capacity in the latter part of 1967. In other words, we have been a net deficient country since 1967.

Just to give you some rough figures, we use approximately 15 million barrels of oil and products a day. We import about 3 million. The rest is made up from our own sources.

We show a spare productive capacity which in my opinion is most optimistic when we tell you it is 1½ million barrels a day. It means we have a net deficiency of at least 1½ million barrels a day in our demands right now.

Mrs. HANSEN. Will this increase?

Dr. LAIRD. It will increase as indicated by that chart. This line there where the end of the red is, on the right-hand side, is 1970. You can see where we have projected those lines.

Mr. GALIFIANAKIS. How do you treat that information when you take up this matter with the Secretary of Interior? Do you make recommendations in the light of your findings or do you let him make those decisions?

Dr. LAIRD. We present the information to the Secretary, and the Secretary is a very intelligent man and I am sure he can make his own conclusions decisions from this; although if he asks us, we will tell him.

Mr. GALIFIANAKIS. What do you recommend in the light of that chart—increased imports?

Dr. LAIRD. I don't know exactly how to answer this question. I know how I would like to answer, but I don't know exactly what I should say. Personally I feel we should proceed apace with the bringing Alaskan oil to the rest of the United States as soon as possible, taking into due consideration environmental considerations.

Mrs. HANSEN. What is the time frame for building the Alaskan pipeline if there were no environmental questions involved?

Dr. LAIRD. At least 2 years I would say.

Mr. GALIFIANAKIS. Have you recommended to the Secretary the establishment of that pipeline?

Dr. LAIRD. We feel that the environmental statement that was prepared by the Alaska Task Force of which we were a part has indicated in that this is a very desirable thing.

Mr. GALIFIANAKIS. The impact study has been completed then?

Dr. LAIRD. It has.

Mr. GALIFIANAKIS. And evaluated?

Dr. LAIRD. It is in the process of additional evaluation now as a result of the written testimony that was presented and the hearings that were held both here and in Anchorage. I might add this is not an inconsiderable job in itself because there are over 7,000 pages of material.

Mrs. HANSEN. Are you taking into consideration the criticisms made by the Department of Defense?

Dr. LAIRD. Yes, ma'am.

Mrs. HANSEN. One further problem is complicating the U.S. oil picture and that is the offshore leasing. There are many people who have said there should be an end to all leasing in the future, because they do not want a pattern of oil spills, oil fires, or the degradation of our shorelines.

So you can conceivably look forward to legislation in the future that would halt all offshore exploration.

What is the contribution made by your offshore oil lands and what would happen if all of your offshore oil lands are not allowed to be productive?

Dr. LAIRD. We have two alternatives. One would be to reduce our use, the other one to increase our imports. Of these two I assume the latter would be the program to be followed.

Mrs. HANSEN. Every time we have to increase our imports, those import countries are able to extract a higher price?

Dr. LAIRD. Certainly; they are in a seller's market.

There is one other point I would like to make. I did mention getting Alaska oil. I think there is another way possibly we could decrease our reliance on foreign oil. That would be to stimulate by some means the domestic exploration and development in the lower 48. This can be done I think, too.

Mrs. HANSEN. Again you have the environmental question.

Dr. LAIRD. Yes, ma'am.

Mrs. HANSEN. Because the oil shale which has a potential of a sizable reserve is deeply imbedded with the destruction of the ecology as it exists today.

Dr. LAIRD. That is correct.

Mrs. HANSEN. This presents tremendous problems in those areas of the West.

Dr. LAIRD. That is true.

WHERE THE OIL IS

The next chart is a very distorted picture and it is done so deliberately. This particular chart shows where the oil is as far as reserves are concerned. The United States consumes about 30 percent of the world oil, but has only about 6 percent of the reserves.

Mr. MCDADE. How do you define "reserves" there?

Dr. LAIRD. This is oil in the ground that is producible.

Mr. MCDADE. Discovered and producible?

Dr. LAIRD. Yes. In other words, we know there are at least so many million barrels in the United States. That is what we use in this type of figure.

Mr. MCDADE. If you took that figure a few short years ago before Prudhoe Bay, it would be even worse.

Dr. LAIRD. This chart does not include Prudhoe Bay. It includes Alaska without the North Slope. In these calculations is the oil at Cook Inlet but not North Slope.

Mr. MCDADE. You are talking about proven producible reserves?

Dr. LAIRD. That is correct. It is our opinion that the Middle East figures are understatements. As somebody once said, this is what they will admit to. It doesn't mean there isn't more.

Mrs. HANSEN. Who are the major explorers of oil in the Middle East?

Dr. LAIRD. You mean the companies?

Mrs. HANSEN. Companies and countries?

Dr. LAIRD. First of all, the United States is paramount, second, Britain, third, France, Italy. Japan has an increasing interest. There are, of course, minor interests held by some of the other countries.

Mrs. HANSEN. Does Russia have any exploratory work going on?

Dr. LAIRD. They have technicians in a number of these countries, notably Iraq and Nigeria and Libya and I guess in Egypt. I don't think they have gone in in the sense we have in having a company to do this. You know they have a bank in London. Strictly a capitalistic enterprise I might add.

You will notice this is what we know now. If I were to show you a similar chart 5 years from now, the situation might be markedly different.

In the first place we would be able by that time to put something on the North slope. I don't know what the North slope reserves are. In about a week or two the American Petroleum Institute will release their figures on what they feel are proven reserves.

Personally I have used a figure—I must admit I pulled it out of the air—of 20 billion barrels as a known reserve in Alaska. That is a guess.

Mrs. HANSEN. What is Canada's oil reserves?

Dr. LAIRD. Canada has pretty nearly 11 billion barrels.

Mrs. HANSEN. The charge has been made that we are in the war in Vietnam for oil.

Dr. LAIRD. I am well aware of that.

Mrs. HANSEN. Please discuss that for us.

Dr. LAIRD. I personally do not feel there is anything to that. I would like to point out that is not to say there is not a great deal of exploration going on in Indonesia and Malaysia.

Mrs. HANSEN. Who is doing the exploration?

Dr. LAIRD. The American companies are strong in there, the British companies, the French, and the Japanese technically. They have great need for this oil. I might add Japan is in a tougher position for oil than any country in the world because they import over 99 percent, most of which comes out of the Middle East where they have their own companies.

Mr. McDade. What is Europe's percentage out of the Middle East?

Dr. Laird. Not the Middle East alone but to talk about imported oil, Europe imports about 95 percent or so of its oil mostly from the Middle East. We are going to get to the chart requirements showing you the amount imported in 1970.

I would like to emphasize this map is obviously a distorted map, but gives you a picture as to where in the world the oil is, and most of the oil reserves in the world are primarily in the Middle East.

SOVIET BLOC OIL RESERVES

Mr. Galifianakis. How about oil in Russia. Do we know anything about that?

Dr. Laird. We don't know enough about that. They have been extremely secretive on their figures. I am confident in my own mind oil in Russia is a very important resource, particularly in Siberia, but this is a very inaccessible area.

But I am equally confident the conditions we find in Prudhoe Bay and Northern Canada prevail on the other side of the Arctic Ocean in Russia and Siberia.

Mrs. Hansen. Russia does have a pipeline across Siberia.

Dr. Laird. Not all the way.

Mrs. Hansen. Part of the way.

Dr. Laird. They have gas pipelines—let me see now.

Mr. McDade. There is a map there.

Dr. Laird. Yes. Like all of these maps, the map projections based on the Western Hemisphere. Russia has big gas reserves up in the Lapland area and have pipelines out of there, and that area is also where part of the oil is going to come from.

Mr. McDade. What degree of latitude?

Dr. Laird. This is about 62° N. or thereabouts. Here is 75° N. up there.

Then these other reserves are over in this region in here and in here. There is also gas on Sakalin Island here, which is controlled by Russia. They are talking about putting a pipeline down to Japan now because Japan is an extremely energy-deficient country which must go to great lengths all over the world to procure not only oil and gas but coal and other minerals as well.

They are even talking about taking some of the gas from some of the areas up in here in Russia, liquefying it, and taking it down to Japan, but as yet that hasn't been done.

Mr. Galifianakis. Do we know what the percentage of Russia's own oil production is?

Dr. Laird. I don't believe we do have firm figures on that. Most of the figures we have given deal with what we call free-world sources, because we just don't know enough about the Russians. The Soviets don't release figures like we do. They know a great deal more about us than we know about them.

Mrs. Hansen. Their newspapers don't publish the stories.

Mr. Galifianakis. A problem of free society, I guess.

Dr. Laird. Russia does export oil. As a matter of fact, we have imported some oil from Russia into the United States, on the east coast particularly, residual fuel oil out of the Black Sea and also Rumania I might add.

INTERNATIONAL FLOW CHARTS

Let's go to the next three charts. These are somewhat historical. This is the free-world international flow of petroleum in 1967 prior to the Arab-Israel war. You will notice the width of these lines are more or less proportional to the amount of oil transported. You notice the quantity of oil is going through the Suez Canal up to Europe and to a certain extent over to the United States.

The next chart shows also in 1967 after the Arab-Israel war. You notice that the Suez Canal is cut off. You also notice that this chart really was prepared for the figures for the last half of 1967 whereas the previous chart was for the first half of 1967. In the latter part of 1967 there was an increasing flow of oil to Japan, and also the oil for the Western World had to come around the Cape of Good Hope in the large tankers.

The next chart shows you the figures as of 1970. Notice again the Suez Canal is still closed, but notice the tremendous increase in the width of the bands.

Madam Chairman, that more or less completes my testimony. I believe we have given you all of these charts in black and white.

Mrs. HANSEN. I do want to express the committee's appreciation for a very excellent review of our energy and oil situation. It is the best the committee has ever received.

Mr. MCDADE. I concur, Madam Chairman. It was very enlightening and well done.

Dr. LAIRD. Thank you.

Mrs. HANSEN. What is the current policy recommendation of the Office of Oil and Gas with regard to oil import quotas?

Dr. LAIRD. I wouldn't say we have made any recommendation, Madam Chairman, on that. We have simply pointed out to the Secretary and through him to the Oil Policy Committee the U.S. supply/demand situation. The Oil Policy Committee is the one that makes these decisions.

Mr. MCDADE. Who is on the Oil Policy Committee?

Dr. LAIRD. The Secretary of Interior is represented, as are Commerce, Treasury, the White House—General Lincoln of OEP is Chairman; and other members are the Federal Power Commission, Department of Defense, the Attorney Geneeral.

Mr. GALIFIANAKIS. Do you envision through any of your research there will be a substitute source of energy, or is that not in the foreseeable future?

Dr. LAIRD. The only significant substitute form of energy in my opinion is nuclear power. We are going to get energy more from geothermal. I don't regard oil shale and gasoline, and so forth, from coal as substitutes because they are all fossil fuel hydrocarbons.

But the alternate energy sources are geothermal, nuclear power, possibly solar energy at sometime in the future. Beyond that I don't envision much.

Mr. GALIFIANAKIS. Who is doing the solar industry research?

Dr. LAIRD. I don't know of any being done by the Government at this time.

Mr. MCDADE. Suppose we stop using internal combustion engines?

Dr. LAIRD. Will that increase the radiation you mean?

Mr. MCDADE. No, it would have a negative impact.

Mrs. HANSEN. Supposing you halted the use of cars in the United States today, what would happen?

Dr. LAIRD. In other words, no gasoline used?

Mrs. HANSEN. Yes.

Dr. LAIRD. You would save an awful lot of oil because about 50 percent or better of every barrel of crude goes into gasoline. There would also be reductions in transportation and everything else we consume.

Mrs. HANSEN. Supposing it were compulsory because of an emergency situation. What would happen?

Dr. LAIRD. It would certainly reduce the amount of crude oil being used for gasoline. There is no question about it.

ALTERNATIVES TO INTERNAL COMBUSTION ENGINES

Mr. MCDADE. There is conversation about developing an alternate to the internal combustion engine. Is that presumed to use the same amount and same source of energy?

Dr. LAIRD. I am not fully cognizant of that. I can't answer that question. There are other types of engines such as the Wankel engine being proposed.

Mrs. HANSEN. What will that engine use?

Dr. LAIRD. It will use gasoline but use less of it.

I notice since I came to Washington there are a lot more small cars in Washington than North Dakota. A lot of good reasons. One is you can't find a place to park. The point I am making is the use of small cars will reduce the amount of gasoline used.

ELECTRIC CARS

Mr. GALIFIANAKIS. Have you heard about the development of the silver cell automobile which is battery operated?

Dr. LAIRD. I am not familiar with it. I do know, of course, they have had battery-operated automobiles. I remember as a boy in Erie, Pa., a lot of little old ladies ran around in these boxy-like affairs. The problem with that is, of course, the Americans are very impatient people and electric cars don't go fast enough and don't accelerate fast enough.

More important is the fact they can only go so far without being recharged, and second, the batteries take up so much space you don't have much left for passengers.

ADEQUACY OF NATURAL GAS SUPPLY

Mrs. HANSEN. Japan's housing starts are over a million per year for a population half the size of ours. I believe our housing starts should be at least over 2 million a year to keep up with the demand.

Mr. MCDADE. That is the prediction for this year.

Mrs. HANSEN. If 2 million houses are added per year until our housing deficiencies are met, then our energy supply must also increase. Isn't that correct?

Dr. LAIRD. This is correct.

Mrs. HANSEN. What is the adequacy of our natural gas supply?

Dr. LAIRD. Our gas supply right now is quite inadequate for any expansion. As a matter of fact, as you probably know there was a

year ago a real crunch on this in the Midwest, particularly in the Ohio area where they had to cut off industrial consumers for gas for about a week or 10 days.

Second, there have been a lot of statements made, and I guess this is true, where the gas distributing companies simply refuse to furnish gas to additional homes because the gas is not available. This is a very complex subject, Madam Chairman, because gas supply is tied up with price and Government regulations.

Mrs. HANSEN. What is the reserve?

Dr. LAIRD. The level is about 275 trillion cubic feet as of the beginning of last year.

Mr. OLIVER. We might add we have been producing for the last 2 years more gas than we have added to reserves.

Dr. LAIRD. As a result our reserves to production ratio has gone down.

Mrs. HANSEN. At the top of page 5 of your statement you mention work in connection with the Mining and Minerals Policy Act of 1970 and the National Materials Policy Act.

Will you please give us a detailed description as to what your responsibilities are in connection with each of these acts?

Dr. LAIRD. In the first place, Madam Chairman, the National Materials Policy Act is an act in which there is a time range of 2 years. The end result of this I understand is the production of a report similar to the Paley Report done some years ago. At the end of that time that particular agency goes out of existence.

Mrs. HANSEN. What is the goal of the National Materials Policy Act?

Dr. LAIRD. The National Materials Policy Act as I understand it, Madam Chairman, is primarily an assessment of our situation, in this case, of materials as they call it, but what they are really talking about are natural resources. We have "X" barrels of oil in sight, we have "X" tons of coal and so on.

In other words, I would regard it as an inventory type thing. The National Minerals Policy Act on the other hand will cover a considerable amount of the same ground, but it is a continuing assessment where the various bureaus in the Interior will have to make yearly assessments. In fact, in the National Minerals Policy Act there is a requirement that the Secretary submit to the Congress each year a report on this assessment.

Mrs. HANSEN. Doesn't the Bartlesville Institute do a great deal of work that is available to your office?

Dr. LAIRD. The Bartlesville Industrial Station is a Bureau of Mines station and therefore I am not fully able to discuss that with you. Their objective, however, as I understand it is primarily that of petroleum research.

Mrs. HANSEN. That is right.

ADDITIONAL STAFFING REQUEST

Justify your requested increase of $100,000 and three additional positions.

Dr. LAIRD. We have in mind in that three different areas. We feel we should increase our work that Mr. Oliver and several of his associates do in this matter of preparing better data than we are able to do at the moment. We surely haven't got the staff to do it.

Secondly, a great number of requests have come to our office relative to information from consumers on the prices they are charged, the availability of the necessary energy source they are interested in and so forth.

The third area is one that we call environmental data compilation. I am somewhat hesitant to use this word "environment" because everybody is preaching on this, I know it is an overused popular word, but I have heard it so much; frankly, I am a little bit tired of it, to be blunt with you.

Mrs. HANSEN. Congress loves that word.

Dr. LAIRD. I know they do and I am sorry I mentioned it.

Anyway we feel that in these considerations of environment there are cost factors that will increase the cost of the energy. We feel that much more investigation, particularly as far as oil and gas, is needed in this area.

Mrs. HANSEN. I will give you a classic example. When the first programing on the north slope began, there wasn't any provision fundwise for the protection of the ecology, the terrain, or the permafrost areas.

The same is also true in the areas on the Gulf of Mexico and the California coast.

Dr. LAIRD. A company such as those which are on the north slope now is faced with the increased costs, and I don't say they are wrong, but they have to be accounted for. They have to be explained to the consumer to say why this barrel of oil is costing $1 more than it used to cost. And a very large part of this is due to increased environmental restrictions that have been placed upon the companies and other operators. By the requirements to take care of the environment.

Mrs. HANSEN. I think that this cost has to be translated to the public, otherwise they will not understand the reasons for the rising costs of materials.

Dr. LAIRD. This is right. The consumer ultimately is going to pay for this whether he does it by increased costs in the product or by taxes. It is the same person in any event.

OKLAHOMA UNIVERSITY RESEARCH INSTITUTE STUDY

Mrs. HANSEN. Who assessed the Office of Oil and Gas $15,000 as their share of the computerized joint Federal agency national petroleum production statistics program conducted by Oklahoma University Research Institute?

Dr. LAIRD. This is a study the Office of Oil and Gas has been participating with other Federal agencies—started and initiated.

This is the type of thing I guess you would call an inventory of the oil and gas fields in the United States. Our project is intended to find out where the oil is, how much there is there, what is the nature of the reservoirs, are they amenable to secondary recovery and similar facts of this nature.

I might add that we started this particular project, and 1972 will be the third year for it. It is well along and its very comprehensive data is stored on computer tape.

Mrs. Hansen. Thank you very much for your presentation, Mr. Laird, we appreciate it.

Dr. LAIRD. Thank you very much.

TUESDAY, MARCH 23, 1971.

OIL IMPORT ADMINISTRATION

WITNESSES

RALPH W. SNYDER, ACTING ADMINISTRATOR
DELL V. PERRY, ASSISTANT ADMINISTRATOR
MRS. OLGA T. RONKOVICH, ADMINISTRATIVE ASSISTANT

Mrs. HANSEN. Now we have the Oil Import Administration, and the principal witness is Mr. Ralph Snyder, the Acting Administrator.

Mr. SNYDER. Please insert your general statement in the record and summarize it for us.

(The statement follows:)

FUNDS REQUESTED

In our budget request for fiscal year 1972 we are asking for $576,000, an increase of $117,000 over fiscal year 1971.

PURPOSE AND NECESSITY FOR INCREASE IN FUNDS

The entire amount of $117,000 will be used in the expansion of a compliance inspection and surveillance program. The need for such a comprehensive program has been documented in our justification and in prior appearances before this committee, but I would like briefly to review the circumstances requiring a verification program. Allocations of oil imports are made on the basis of certified statements of eligibility and compliance by importers.

Each applicant for a crude and unfinished oil allocation must file a certification stating that it is eligible for an allocation. Although brief, this statement implies (1) applicant has refinery capacity or a petrochemical plant in the particular district, (2) that the applicant has a certain volume of refinery or petrochemical inputs to the particular refinery or plant.

The first requirement is technical and is contained in the definitions in the regulations. Because the petrochemical area is slightly more complicated than the refining, the petrochemical plant definition best illustrates the difficulty involved in verification.

A petrochemical plant is defined as a facility or plant complex—

(1) Which includes equipment for converting hydrocarbons to petrochemicals by chemical reaction;

(2) Which manufactures for plant use or sale one or more separate and distinct petrochemicals by chemical conversion of each separate petrochemical plant input feedstock stream which is claimed by an applicant as a basis for obtaining an allocation; and

(3) In which more than 50 percent by weight of each separate feedstock stream is converted by chemical reaction into petrochemicals or in which over 75 percent by weight of recovered product output of each separate feedstock stream consists of petrochemicals which were converted by chemical reaction from such inputs.

The second requirement is primarily a matter of accounting for a volume of material. The verification is a matter of record review.

To present a view of the technical and quantitative matters to be verified we have prepared and included with this statement schematic drawings showing, in generalities, the possible inputs, conversion requirements, and some possible outputs for both petrochemical plants and refineries.

It is very difficult to give any description of the technical verification, because, depending upon the plant, such a verification can vary from a mere plant walk through to inspection of engineering drawings, operating records, engineering calculations and records. Accounting for quantities of inputs or products can involve checks of accounting and operating records from the time the raw material enters the plant until the product is shipped.

At the present time we are in a learning phase. During fiscal year 1971 we have made a substantial number cursory inspections. We found discrepancies in a very high proportion of instances; however, many of the discrepancies did not affect eligibility. We have only scratched the surface. To give you an indication of the

size of the job, consider the fact that in 1971 there are a total of 589 refineries and petrochemical plants which by their operations from the basis for making allocations. Of this number 80 were newcomer plants which the regulations require to be inspected prior to an allocation being granted. Refiners alone claimed more than 11 million barrels per day of inputs in their applications for allocations during 1971.

Sometime it appears each plant is different from every other plant, but we will develop from experience standard approaches and methods. As we gain more experience we hope to make the task of verification considerably more efficient and thorough and to require the keeping of certain records to assist in verification.

Our experience to this point has been almost exclusively with refiners and petrochemical plants. We, also, have an obligation to verify terminal operators applications and inputs of materials and quantities reported to us as imported. These areas are virtually unexplored at this point.

PROPOSED PROGRAM IMPLEMENTATION

In order to implement a national surveillance, compliance, inspection program, we have established an office in Houston, Tex., which is now in operation. The location of an office in Houston provides easy access to a sizable cluster of plants to be inspected (275). This office also reduces traveltime and expense compared to our Washington location.

The other two field offices will be located in Chicago, Ill., and Los Angeles, Calif. We propose to establish the office in Chicago during fiscal year 1972—this Chicago office will have the responsibility of inspection and surveillance for 176 refinery and petrochemical plants in the Midwest. We also plan to open a Los Angeles field office to provide similar services for 118 refinery and petrochemical plants on the west coast.

SUMMARY

Approval and support of the requested fiscal year 1972 estimate of $576,000 an increase of $117,000 for six additional permanent positions and the related support costs in establishing two more inspection and surveillance offices, is considered urgent, and indispensable to the future successful management of our highly controversial program.

OIL IMPORT ADMINISTRATION

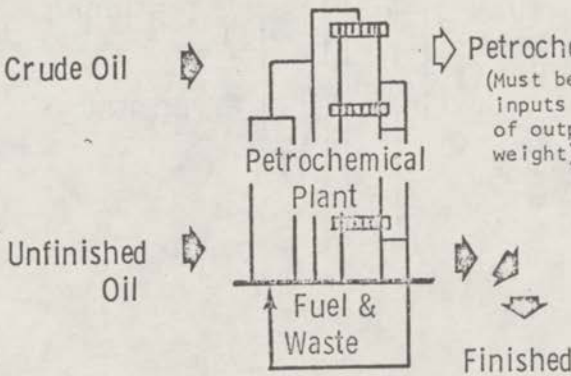
INPUTS

ELIGIBLE

Domestic Crude Oil
Domestic Unfinished Oils
Domestic Natural Gas Products
Foreign Oils Imported pursuant to an allocation (except overland imports)

INELIGIBLE

Canadian Natural Gas Liquids
Ethane, Propane, and Butane
From Western Hemisphere



OUTPUTS

Polyethlene
Ethylene Oxide
Styrene
Vinyl Chloride
Ethanol
Polypropylene
Acrylonitrile
Propylene Oxide
Isopropanol
Oxo Alcohols (approx.1C
Cumene
Benzene
Toluene
Xylenes (3)
Carbon Black
Butadiene
Phenol Derivatives (approx.2(
Tetraethyl Lead
Synthetic Rubber (approx. 5

OIL IMPORT ADMINISTRATION

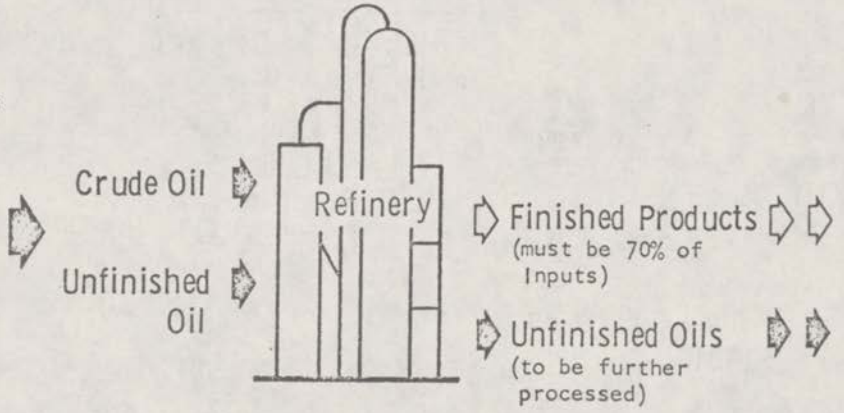
INPUTS

ELIGIBLE

Domestic Crude Oil
Domestic Natural Gas Products
Foreign Crude and Unfinished Oils imported pursuant to an allocation

INELEGIBLE

Domestic Unfinished Oils
Mexican Crude and Unfinished Oils
Canadian Natural Gas Liquids
Ethane, Propane, and Butane From Western Hemisphere



OUTPUTS

Gasoline
Jet Fuel
Heating Oil
Lube Oil
Asphalt

HISTORY OF IMPORT PROGRAM

Mr. SNYDER. To save you time I propose to elaborate a little bit on what we do. I would like to describe the legal basis of the program for a moment.

Mrs. HANSEN. Please do.

Mr. SNYDER. The legal document that provides the basis for the program is Presidental Proclamation 3279, as amended, which was authorized by section 2 of the Trade Expansion Act of July 1, 1954, as amended. This act, in substance, gives the President authority to limit importation of any commodity if such commodity has been imported in such a manner as to threaten the national security.

As a result of the study required by that act Mr. Leo A. Hoegh, I believe it was, Director of the Office of Civil and Defense Mobilization,—made a recommendation in 1959 to the President, to limit imports of petroleum. The President accepted the recommendation, and limited imports by Proclamation No. 3279.

Over the years there have been various debates with respect to whether we should or should not continue to limit imports, and as to whether we should or should not use imports and conserve our own resources.

In early spring of 1969 the President established a Cabinet committee to study this problem and placed the then Secretary of Labor, Mr. Shultz, as chairman of this study.

After 6 or 8 months of study it was determined that indeed imports should be restricted but in the final report the majority of the committee were leaning toward limiting imports by a tariff system rather than a quota system.

There was a separate report by the Department of the Interior, the Department of Commerce and the Chairman of the Federal Power Commission. This separate report warned against the tariff system and recommended that the quota system should be continued, but it should be refined and improved.

Because of these differences of opinion, the President, recognizing that reasonable men differ, on February 20, 1970, established an Oil Policy Committee and placed General Lincoln, who is Director of the Office of Emergency Preparedness, as Chairman of that Committee. Representatives from the Departments of Justice, Commerce, Defense, Interior, State, and Treasury with a representative from the Council of Economic Advisers constitute the balance of the Committee. This Committee recommends policy actions to the President upon all issues in respect to oil imports.

At the outset it appeared to me the Committee would attempt to implement a tariff system rather than the quota system, but on August 13, 1970, the Committee advised the President that it appeared the quota system was the better in view of all the various worldwide interruptions of supply that had occured.

DESCRIPTON OF OIL IMPORT CONTROL PROGRAM

So we are in fact continuing the quota system. We are improving it all along. Our particular portion of the program is that of administering the proclamation by virtue of regulations that the Secretary issued to implement the proclamation.

At the present time we have a regulation that is called oil import regulation 1. It is revision 5, with 33 amendments. There are 31 or 32 sections, depending upon how you count, in this regulation which we have responsibility of administering.

In fiscal year 1972 we are here to request an increase of $117,000. This requested increase will be devoted to expanding our inspection and compliance capabilities to assure that the allocation holders who receive varying degrees of economic benefit from this quota will receive a correct and proper distribution of quota. We feel, and have felt since October 1 of 1963, that in administering a program of this size, that we need more assurance of accuracy than just a mere certification from applicants.

We will use these charts to illustrate our explanation of the program. First of all let me explain. We administer the program by PAD districts, district I, districts II through IV, district V and one part of the program is for the whole of districts I through IV.

Dr. Laird showed you a moment ago the breakdown of these districts on the chart, but for simplicity districts I through IV include all the States east of the Rocky Mountains. In districts I through IV the latest Proclamation No. 4025 actually establishes the level in legal terms, but we have broken this down on these charts in simple figures so you won't be confused by the figures of 3.5 million to 4 million Dr. Laird gave you on imports.

RESIDUAL FUEL OIL IN DISTRICT I

In district I there is a residual fuel oil program. In district I we are about 94 percent dependent upon the imported residual fuel oil to be used as fuel. This is the heavy residuum fuel that industry, apartment houses, and institutions use.

These imports are under a licensing and allocation system, but are virtually free of restriction in respect to quantity. At the present time imports into that area amount to something on the average of 1.5 million or 1.45 million.

Mrs. HANSEN. Where is District I?

Mr. SNYDER. The 17 States that begin at the top from Maine and go all the way to Florida on the East Coast and, additionally, includes the District of Columbia and West Virginia.

ALLOCATIONS OF CANADIAN OIL

For crude oil, unfinished oils and finished products in Districts I through IV, the proclamation permits 1,450,000 barrels a day to be imported. 450,000 barrels a day of this is pinpointed to be imported from Canada, under a section of the regulations which is distinct and different from the other part of the regulations.

Mrs. HANSEN. Why?

Mr. SNYDER. Because the relevant regulations have certain limitations with respect to how far Canadian oil may penetrate into the United States and restricts allocation grants to those who can actually run the oil.

PIPELINE ACROSS CANADA

Mrs. HANSEN. That is very interesting in view of the fact they propose to haul the oil across from the North Slope. Could they limit that oil coming in if it comes from the North Slope across Canada?

Mr. SNYDER. If it comes from the Alaskan North Slope across Canada, that would be U.S. oil exported and returned. Therefore, there would be a customs problem.

But in respect to our problem, if it is——

Mrs. HANSEN. I am intrigued as to who has the determination on control of the pipeline, if certain problems arose.

Mr. SNYDER. You are talking about the pipeline control?

Mrs. HANSEN. That is right.

Mr. SNYDER. I should not for the record say anything about this because I believe these are some of the problems involved in respect to the route of that pipeline.

Mrs. HANSEN. This is what I want the answers to.

Mr. SNYDER. I am not in that particular area to give you the answers.

Mrs. HANSEN. Who is in the area?

Mr. SNYDER. At the present time I would imagine the State Department would be very highly interested.

Mrs. HANSEN. I have been trying to get the State Department to have a meeting of the countries around the Pacific rim on the conservation of fish. I started asking 8 years ago and nothing has happened to date.

UNLIMITED OIL IMPORT RESULTS

Supposing it became the policy of this country to use imports exclusively, to save our resources for the future.

What does that do to the economy?

Mr. SNYDER. First of all, if you have a cheap source of foreign oil and you allow that source to be used without restriction, I don't think anybody would have to guess that as soon as the dependence on that source became great, the price would go up and then we would begin to pay a higher and higher price for that oil.

In the meantime we would have lost our capability to explore and develop in this country.

Mrs. HANSEN. Why?

Mr. SNYDER. For the simple reason no one, in my opinion, would invest money here when they could get a better return on investment somewhere else.

Mrs. HANSEN. The result would be that the price would go up and the balance of payments would be adversely affected.

Mr. SNYDER. Very definitely so.

Mrs. HANSEN. Also our investments and technology would be lost to foreign countries.

Mr. SNYDER. Very definitely so.

Another thing, you see in Districts I through IV the policymakers are looking at all of this. What we are attempting to do in this area where you do have some production is to balance the imports. What we are trying to do is to use as much imported oil as we can but at the same time not become so dependent, or open the gates so wide, that we lose the incentive to develop our own resources.

(Discussion off the record.)

DESCRIPTION OF OIL IMPORT PROGRAM

Mr. SNYDER. This first chart, Madam Chairman, is to give you an indication of how these controlled imports are broken down in respect

to the various different areas. I don't want to get any more involved in this than you want.

Mrs. HANSEN. Please continue.

PUERTO RICO AND VIRGIN ISLANDS

Mr. SNYDER. First of all, you see Puerto Rico is in the customs territory of the United States. It is 100 percent oil deficient, therefore 100 percent dependent upon foreign oil or oil shipped from the United States by domestic tanker.

The Proclamation, recognizing this, has allowed certain plants to be built in Puerto Rico to aid industrial expansion.

Mrs. HANSEN. How do you determine which plants are to be built?

Mr. SNYDER. They are negotiated contracts, Madam Chairman. I might add for the record they have been made by people other than myself.

Mrs. HANSEN. Who negotiates the contracts?

Mr. SNYDER. The Secretary of the Interior by virtue of a proclamation that allows him to do so and by virtue of a regulation, specifically section 15 of the regulations, which provides that applications for allocations for plants in Puerto Rico may be entertained under certain specific guidelines and that allocations to import oil into Puerto Rico may be granted which permit a certain amount of product shipments from Puerto Rico to the United States.

To obtain this allocation the allocation holders have been obligated to engage in certain industrial expansion functions in Puerto Rico, to make certain investments, and in certain cases to make contributions to the conservation fund there.

Mrs. HANSEN. Please insert in the record what contributions are made to the conservation fund and what industrial development there has been.

Mr. SNYDER. I will place in the record, with your permission, the allocations that were granted under this particular section and which outlines the requirements. These will be allocations for Phillips petrochemical plant, the Commonwealth petrochemical facility and Sun Oil.

(Information follows:)

AMENDMENT TO AMENDED ALLOCATION TO SUN OIL CO. OF IMPORTS OF CRUDE OIL INTO PUERTO RICO

Paragraphs (h) and (i) of the Amended Allocation to Sun Oil Co., of Imports of Crude Oil into Puerto Rico, dated December 12, 1968, are amended to read as follows:

(h) (l) Except as provided in paragraph (i), Sun shall not ship, or sell for shipment, into districts I–IV and district V an aggregate quantity of unfinished oils and finished products produced in the facilities described in paragraph (b) from imports of crude oil into Puerto Rico under this allocation in excess of 29,500 average barrels daily per calendar year, adjusted to the last full tanker load in a calendar year. During the initial period beginning with the day on which Sun's core crude unit comes on stream through the end of the calendar year, Sun shall not ship, or sell for shipment, into districts I–IV and district V in excess of 29,500 average barrels daily of unfinished oils and finished products, adjusted to the last tanker load in the initial period. If, by reason of such an adjustment, the aggregate of such shipments during the initial period or during a calendar year exceeds 29,500 average barrels daily, the quantity of such shipments which Sun may make during the following calendar year shall be reduced by the amount of the excess. Under

this subparagraph (1), Sun shall ship, or sell for shipment, into districts I–IV and district V only unfinished oils and finished products in the categories on the following list, and during any calendar year the shipments of unfinished oils or finished products in any particular category shall not exceed the quantity stated in the list, except as may be required to permit shipment of a full tanker load:

No. 2 fuel oil (desulphurized) or fuel oil components—15,000 average barrels daily per calendar year.

Jet fuel components—10,000 average barrels daily per calendar year.

Unfinished gas oil (cracking stock)—15,000 average barrels daily per calendar year.

Lubricating oils—5,000 average barrels daily per calendar year.

During the initial period mentioned above, the quantities stated with respect to the first three items in the list shall be deemed to be expressed in average barrels daily for the initial period, and during the period beginning with the day on which Sun's lubricating oil facility comes on stream through the end of the calendar year, the quantity stated with respect to lubricating oils shall be deemed to be expressed in average barrels daily for the latter period. If restrictions upon the entry or withdrawal for consumption of any finished product or unfinished oil in the categories listed in this subparagraph (1) are removed, the limitations imposed by this subparagraph as to that product or oil shall no longer apply unless and until restrictions are reimposed. For the purposes of this subparagraph (1), the terms "unfinished oils" and "finished products" have the meaning ascribed to them in Proclamation 3279, as amended, as of the date on which this allocation was last amended. This subparagraph (1) has no application to, and imposes no restrictions upon, shipments by Sun into district I of residual fuel oil to be used as fuel.

(2) During the calendar year 1972 and each calendar year thereafter, Sun shall offer from the facilities described in paragraph (b) to independent deepwater terminal operators in district I who are not refiners, at no more than the posted prices in effect at the terminal locations in that district, 1 million barrels of No. 2 fuel oil (desulphurized). If, during any calendar year, Sun should ship, or sell for shipment, to districts I–IV and district V, a quantity of No. 2 fuel oil (desulphurized) in excess of 2 million barrels, at least half of the excess shall be sold or offered to the operators, and under the conditions, mentioned in the first sentence of this paragraph. To the fullest extent practicable, Sun shall ship No. 2 fuel oil (desulphurized), or sell such oil for shipment, during the period comprising the months November through March.

(3) During the term of this allocation, Sun shall not ship, or sell for shipment, from Puerto Rico to districts I–IV or district V for use as motor fuel or components of motor fuel any uncontrolled materials produced in the facilities described in paragraph (b) regardless of whether such materials are uncontrolled as of the date on which this allocation was amended or subsequently become uncontrolled.

(4) Except as provided in subparagraph (3) of this paragraph, during the term of this allocation Sun may ship, or sell for shipment, from Puerto Rico to districts I–IV and district V uncontrolled materials produced in the facilities described in paragraph (b) so long, but only so long, as such materials remain uncontrolled.

(5) For the purposes of this paragraph (h), the term "uncontrolled materials" means any materials derived from crude oil or unfinished oils that are neither finished products nor unfinished oils within the meaning of Proclamation 3279, as amended, as of the date on which this allocation was last amended or as the proclamation may be amended thereafter.

(i) In addition to the unfinished oils and finished products described in subparagraph (l) of paragraph (h), Sun may also ship, or sell for shipment, to districts I–IV within each 12-month period a quantity not to exceed 1,500 average barrels daily of aromatic extract materials which represent byproducts from the lubrication oil facility mentioned in paragraph (b). During the period beginning with the day on which Sun's core crude unit comes on stream through December 31, 1971, Sun may also ship, or sell for shipment, to districts I–IV, 10,500 average barrels daily of naphtha produced in the facilities described in paragraph (b), except that if the olefin plant under construction by Union Carbide Corp. at Penuelas, P.R., for which Sun is obligated to provide naphtha feedstock under paragraph (d) of this allocation, comes on stream before December 31, 1971, no shipments of naphtha shall be made after that plant comes on stream.

FEBRUARY 4, 1971.

(Signed) FRED J. RUSSELL,
Acting Secretary of the Interior.

AMENDED ALLOCATION TO SUN OIL CO. OF IMPORTS OF CRUDE OIL INTO PUERTO RICO

The allocation made to Sun Oil Co. on April 18, 1968, is amended in its entirety to read as follows:

In accordance with Proclamation 3279, as amended, and oil import regulation 1, as revised and amended, an allocation effective April 18, 1968, is hereby made to the Sun Oil Co. of up to 66,000 average barrels daily (b/d) per [calendar] year of imports into Puerto Rico of crude oil for use as feedstock for a core crude unit to sustain petroleum and petrochemical facilities to be constructed and operated in the Yabucoa Valley of Puerto Rico, pursuant to the terms of the memorandum of understanding, dated April 14, 1967, between Sun Oil Co. and the Commonwealth of Puerto Rico. A copy of the memorandum, as amended and supplemented, is attached to this allocation. This allocation shall remain in effect until the expiration of a period of 10 years from the startup and operation of the core crude unit as determined by the Administrator of the Oil Import Administration and shall be subject to the following conditions:

(*a*) Sun shall comply with the memorandum of understanding, as amended, in a letter dated November 21, 1967, signed by Chalmer G. Kirkbride, vice president of Sun, accepted December 16, 1967, by Rafael Durand for the Commonwealth of Puerto Rico, and as supplemented in a letter dated February 28, 1968, signed by Rafael Durand and accepted February 28, 1968, by Robert G. Dunlop for Sun and in a letter dated April 1, 1968, signed by Robert G. Dunlop for Sun and addressed to Mr. Sergio Camero, administrator, Economic Development Administration of Puerto Rico and in a letter dated November 29, 1968, signed by Robert G. Dunlop for Sun and accepted December 2, 1968, by Sergio Camero for the Commonwealth of Puerto Rico. However, where the provisions of the memorandum of understanding are inconsistent with the provisions of this allocation, the provisions of this allocation shall prevail over the memorandum of understanding.

(*b*) Sun Oil Co. shall invest a total of $125 million in a core crude unit, a lubricating oil facility and other employment generating facilities in Puerto Rico as complementing Sun's existing facilities on the U.S. mainland, as provided in section II of the memorandum of understanding of April 14, 1967. Within 42 months from the date on which this allocation was amended, Sun shall have made an initial investment of approximately $115–125 million in the core crude unit and in the lubricating oil facility. Any balance remaining from the total of $125 million shall be actually expended or firmly committed for additional related facilities within 4 years of the startup of the core crude unit.

(*c*) With the cooperation and approval of and subject to reimbursement by the Commonwealth of Puerto Rico, Sun, in addition to the facilities referred to in paragraph (b), shall construct a multipurpose harbor at the plant site. Title to the harbor facilities will be transferred to the Commonwealth within 60 days after completion of construction. Expenditures for the acquisition of land, dock and harbor facilities estimated to be approximately $10 to $12 million, are not included in the $125 million commitment referred to in paragraph (b). In accordance with Sun's undertaking to EDA as set forth in Mr. Dunlop's letter to Mr. Camero, dated April 1, 1968, Sun will make annual rental payments for at least 20 years equivalent to 10 percent of the capital cost of the marine facilities, but not to exceed $1,200,000 per year, in order to allow the Puerto Rico Ports Authority to operate the facilities on a break-even basis including maintenance cost, interest on loans, and amortization of debt. In the event that additional users of the marine facilities are contracted for by the ports authority, it is understood that Sun's rental commitment would be reduced by an amount proportionate to the fair rental charge to other users of the facilities.

(*d*) From its core crude unit or other on island sources, Sun shall make available per calendar year 13,000 average b./d. of low-cost residual fuel oil to the Puerto Rico Water Resources Authority and 10,500 average b./d. of naphtha as feedstock for Union Carbide's plant at Penuelas, P.R.

(*e*) Sun shall employ legal residents of Puerto Rico to the maximum extent feasible.

(*f*) Sun shall assure that all operations related to the facilities are conducted in accordance with sound business principles. The Secretary, or his authorized representative, shall be given access upon request to all records pertaining to construction of facilities and to transactions pertaining to the operations of the facilities, including the purchase of feedstocks for, and the sale and shipment of, finished products, unfinished oils, and petrochemicals produced by the facilities.

(*g*) All feedstocks imported under licenses issued pursuant to this allocation

shall be crude oils produced in the Western Hemisphere (North America, Central America, South America, and the West Indies) except in those instances in which this requirement is waived by the Secretary.

(*h*)(1) Except as hereinafter provided in paragraph (i) of the unfinished oils and finished products produced in the facilities described in paragraph (b) above from imports of crude oil made under this allocation, in addition to shipments to district I of residual fuel oil to be used as fuel, Sun may ship from Puerto Rico to districts I–IV and district V within each 12-month period, November 1 through October 31, an aggregate of not to exceed 29,500 average barrels daily composed only of jet fuel components, number 2 fuel oil, unfinished gas oil, and lubricating oils and only in accordance with the following tables:

During the 5-month period, November 1 through March 31, Sun may ship:

9,000 to 9,500 b./d. jet fuel components; 12,000 b./d. maximum number 2 fuel oil (desulphurized); 3,000 to 4,000 b./d. unfinished gas oil (cracking stock); 4,000 to 5,000 b./d. lubricating oils.

During the 7-month period, April 1 through October 31, Sun may ship:

15,000 b./d. maximum unfinished gas oil (cracking stock); 9,500 to 10,000 b./d. jet fuel components; 4,000 to 5,000 b./d. lubricating oils.

If restrictions upon the entry or withdrawal for consumption of any finished product or unfinished oil listed in the tables are removed, the limitations imposed by this subparagraph as to that product or oil shall no longer apply unless and until restrictions are reimposed. For the purposes of this subparagraph (1), the terms "unfinished oils" and "finished products" have the meaning ascribed to them in Proclamation 3279 as amended as of the date on which this allocation was amended.

(2) During each of the months of November, December, January, February, and March of each year, Sun shall offer to independent deep-water terminal operators in district I who are not refiners, at no more than posted prices in effect at the terminal locations in this district, one-half of the number 2 fuel oil which it is authorized to ship under subparagraph (1) of this paragraph.

(3) During the term of this allocation Sun shall not ship from Puerto Rico to districts I–IV or district V for use as motor fuel or components of motor fuel any uncontolled materials produced in the facilities described in paragraph (*b*) regardless of whether such materials are uncontrolled as of the date on which this allocation was amended or subsequently become uncontrolled.

(4) Except as provided in subparagraph (3) of this paragraph, during the term of this allocation Sun may ship from Puerto Rico to districts I–IV and district V uncontrolled materials produced in the facilities described in paragraph (*b*) so long, but only so long, as such materials remain uncontrolled.

(5) For the purposes of this paragraph (*h*) the term "uncontrolled materials" means any materials derived from crude oil or unfinished oils that are neither finished products nor unfinished oils within the meaning of proclamation 3279 as amended as of the date on which this allocation was amended or as it may be amended thereafter.

(*i*) In addition to the unfinished oils and finished products described in subparagraph (1) of paragraph (*h*) Sun may also ship to districts I–IV within each 12 month period not to exceed 1,500 b./d. of aromatic extract materials which represent byproducts from the lubrication oil facility mentioned in paragraph (*b*).

(*j*) Sun's facilities shall be operated in a manner to prevent environmental pollution. For example, fuel burned for in-plant use will be desulphurized gas oil until new devices such as stack gas treaters become economically feasible.

(*k*) Sun shall pay into a conservation trust, to be established for purposes mutually agreeable to Sun, the Commonwealth of Puerto Rico, and the Department of the Interior, a contribution of 10 cents per barrel for each barrel of unfinished oils or finished products, other than residual fuel oil to be used as fuel, as described above in subparagraph (*h*)(1), which is shipped to districts I–IV and district V. Payment shall be made quarterly. On December 16, 1968, or on the third business day following the issuance of this amended oil import allocation, whichever is later, Sun shall cause a deposit of $2 million to be made in an escrow account. The condition of the escrow account shall be that any interest or earnings on said deposit less lawful charges shall inure to the Puerto Rico Conservation Trust. The $2 million principal of the escrow account shall become the property of the Puerto Rico Conservation Trust and shall be credited against the payments required by the first sentence of this paragraph to be made to the Puerto Rico Conservation Trust unless Sun shall certify on or before September 1, 1969 that the

conditions precedent to Sun's performance under the Memorandum of Understanding of April 14, 1967, as amended, as those conditions are stated in paragraph numbered 3 of the letter dated November 29, 1968 signed by Robert G. Dunlop have not been met.

(*l*) No licenses will be issued pursuant to this allocation except in such amounts as may be required for starting and testing the core crude unit until the unit is ready to go on stream. Thereafter, licenses will be issued to Sun Oil Co. or its designated subsidiary only upon a certification by the Sun Oil Co. or such subsidiary to the Administrator of the Oil Import Administration of the amount of feedstocks that will be used directly by the core crude unit during a particular calendar year and only in the amount so certified. All imports made under such a license must be used directly by the core crude unit and any imports in storage at the end of a calendar year shall be taken into account by the Administrator in issuing licenses for the next succeeding allocation period.

(*m*) By the letter of Robert G. Dunlop to Sergio Camero dated November 29, 1968, Sun has confirmed the economic and technical feasibility of the core crude unit and the lubricating oil facility within the extended time for such confirmation and, therefore, the conditions of section II.A.1 of the Memorandum of Understanding have been met.

(*n*) Sun will contribute $5 million to the Puerto Rico Conservation Trust if after the conditions set forth in paragraph numbered 3 of the letter from Robert G. Dunlop to Sergio Camero of November 29, 1968, are met, Sun nevertheless, fails and neglects within 8 months to proceed with actual construction of the core crude unit and lubricating oil facility contemplated in this allocation, provided, however, that Sun's obligation to make said contribution of $5 million is subject to the provisions of section II.C.2 of the Memorandum of Understanding.

(*o*) Sun will commence actual construction of the core crude unit and lubricating facility no later than October 1, 1969, and will complete construction within 36 months thereafter.

STEWART L. UDALL,
Secretary of the Interior.

Dated December 12, 1968.

ALLOCATION TO SUN OIL CO. OF IMPORTS OF CRUDE OIL INTO PUERTO RICO

In accordance with proclamation 3279, as amended, and oil import regulation 1, as revised and amended, an allocation effective April 18, 1968, is hereby made to the Sun Oil Co. of up to 60,000 average barrels daily (b./d.) per calendar year of imports into Puerto Rico of crude oil for use as feedstock for a core crude unit to sustain petroleum and petrochemical facilities to be constructed and operated in the Yabucoa Valley of Puerto Rico, pursuant to the terms of the memorandum of understanding, dated April 14, 1967, between Sun Oil Co. and the Commonwealth of Puerto Rico. A copy of the memorandum, as amended and supplemented, is attached to this allocation. This allocation shall remain in effect until the expiration of a period of 10 years from the startup and operation of the core crude unit as determined by the Administrator of the Oil Import Administration and shall be subject to the following conditions:

(*a*) Sun shall comply with the memorandum of understanding, as amended in a letter dated November 21, 1967, signed by Chalmer G. Kirkbride, vice president of Sun, accepted December 16, 1967, by Rafael Durand for the Commonwealth of Puerto Rico, and as supplemented in a letter dated February 28, 1968, signed by Rafael Durand and accepted February 28, 1968, by Robert G. Dunlop for Sun and in a letter dated April 1, 1968, signed by Robert G. Dunlop for Sun and addressed to Mr. Sergio Camero, Administrator, Economic Development Administration of Puerto Rico. However, where the provisions of the memorandum of understanding are inconsistent with the provisions of this allocation, the provisions of this allocation shall prevail over the memorandum of understanding.

(*b*) Sun Oil Co. shall invest a total of $125 million in a core crude unit, a lubricating oil facility and other employment generating facilities in Puerto Rico as complementing Sun's existing facilities on the U.S. mainland, as provided in section II of the memorandum of understanding of April 14, 1967. Within 42 months from the effective date of this allocation, Sun shall have made an initial investment of approximately $30 million in the core crude unit and approximately $50 million in the lubricating oil facility. The remainder of the total of $125 million estimated to approximate $45 million, shall be actually expended or firmly committed for additional related facilities within 4 years of the startup of the core crude unit.

(*c*) With the cooperation and approval of and subject to reimbursement by the Commonwealth of Puerto Rico, Sun, in addition to the facilities referred to in paragraph (*b*), shall construct a multipurpose harbor at the plantsite. Title to the harbor facilities will be transferred to the Commonwealth within sixty days after completion of construction. Expenditures for the acquisition of land, dock and harbor facilities estimated to be approximately $10 to $12 million, are not included in the $125 million commitment referred to in paragraph (*b*). In accordance with Sun's undertaking to EDA as set forth in Mr. Dunlop's letter to Mr. Camero, dated April 1, 1968, Sun will make annual rental payments for at least 20 years equivalent to 10 percent of the capital cost of the marine facilities, but not to exceed $1,200,000 per year, in order to allow the Puerto Rico Ports Authority to operate the facilities on a break-even basis including maintenance cost, interest on loans, and amortization of debt. In the event that additional users of the marine facilities are contracted for by the ports authority, it is understood that Sun's rental commitment would be reduced by an amount proportionate to the fair rental charge to other users of the facilities.

(*d*) From its core crude unit or other onisland sources, Sun shall make available per calendar year 13,000 average b/d of low-cost residual fuel oil to the Puerto Rico Resources Authority and 10,500 average b/d of naphtha as feedstock for Union Carbide's plant at Penuelas, Puerto Rico.

(*e*) Sun shall employ legal residents of Puerto Rico to the maximum extent feasible.

(*f*) Sun shall assure that all operations related to the facilities are conducted in accordance with sound business principles. The Secretary, or his authorized representative, shall be given access upon request to all records pertaining to construction of facilities and to transactions pertaining to the operations of the facilities, including the purchase of feedstocks for, and the sale and shipment of finished products, unfinished oils, and petrochemicals produced by the facilities.

(*g*) All feedstocks imported under licenses issued pursuant to this allocation shall be crude oils produced in the Western Hemisphere (North America, Central America, South America, and the West Indies) except in those instances in which this requirement is waived by the Secretary.

(*h*)(1) Of the unfinished oils and finished products produced in the facilities described in paragraph (*b*) above from imports of crude oil made under this allocation, in addition to shipments to district I of residual fuel oil to be used as fuel Sun may ship from Puerto Rico to districts I–IV and district V within each 12-month period, November 1 through October 31, an aggregate of not to exceed 29,500 average barrels daily composed only of jet fuel components, No. 2 fuel oil, unfinished gas oil, and lubricating oils and only in accordance with the following tables:

During the 5-month period, November 1 through March 31, Sun may ship:

9,000 to 9,500 b./d. jet fuel components
12,000 b./d. maximum No. 2 fuel oil (desulphurized)
3,000 to 4,000 b./d. unfinished gas oil (cracking stock)
4,000 to 5,000 b./d. lubricating oils

During the 7-month period, April 1 through October 31, Sun may ship:

15,000 b./d. maximum unfinished gas oil (cracking stock)
9,500 to 10,000 b./d. jet fuel components
4,000 to 5,000 b./d. lubricating oils

If restrictions upon the entry or withdrawal for consumption of any finished product or unfinished oil listed in the tables are removed, the limitations imposed by this subparagraph as to that product or oil shall no longer apply unless and until restrictions are reimposed. For the purposes of this subparagraph (1), the terms "unfinished oils" and "finished products" have the meaning ascribed to them in proclamation 3279 as amended as of the date of this allocation.

(2) During each of the months of November, December, January, February, and March of each year, Sun shall offer to independent deepwater terminal operators in district I who are not refiners, at no more than posted prices in effect at the terminal locations in this district, one-half of the No. 2 fuel oil which it is authorized to ship under subparagraph (1) of this paragraph.

(3) During the term of this allocation Sun shall not ship from Puerto Rico to districts I–IV or district V for use as motor fuel or components of motor fuel any uncontrolled materials produced in the facilities described in paragraph (*b*) regardless of whether such materials are uncontrolled as of the date of this allocation or subsequently become uncontrolled.

(4) Except as provided in subparagraph (3) of this paragraph, during the term of this allocation Sun may ship from Puerto Rico to districts I–IV and district V uncontrolled materials produced in the facilities described in paragraph (*b*) so long, but only so long, as such materials remain uncontrolled.

(5) For the purposes of this paragraph (*h*) the term "uncontrolled materials" means any materials derived from crude oil or unfinished oils that are neither finished products nor unfinished oils within the meaning of proclamation 3279 as amended as of the date of this allocation or as it may be amended thereafter.

(*i*) Sun's facilities shall be operated in a manner to prevent environmental pollution. For example, fuel burned for in-plant use will be desulphurized gas oil until new devices such as stack gas treaters become economically feasible.

(*j*) Sun shall pay into a conservation fund, to be established for purposes mutually agreeable to Sun, the Commonwealth of Puerto Rico, and the Department of the Interior, a contribution of 25 cents per barrel for each barrel of unfinished oils or finished products, other than residual fuel oil to be used as fuel, as described above in paragraph (*h*), which is shipped to districts I–IV and district V. Payment shall be made quarterly.

(*k*) No licenses will be issued pursuant to this allocation except in such amounts as may be required for starting and testing the core crude unit until the unit is ready to go on stream. Thereafter, licenses will be issued to Sun Oil Co. or its designated subsidiary only upon a certification by the Sun Oil Co. or such subsidiary to the Administrator of the Oil Import Administration of the amount of feedstocks that will be used directly by the core crude unit during a particular calendar year and only in the amount so certified. All imports made under such a license must be used directly by the core crude unit and any imports in storage at the end of a calendar year shall be taken into account by the Administrator in issuing licenses for the next succeeding allocation period.

(*l*) If the economic and technical feasibility of the core crude unit and the lubricants unit are not confirmed by the definitive engineering studies and construction is not immediately undertaken within 6 months of the date of this allocation, pursuant to section II. A. 1 and 2 of the memorandum of understanding, this allocation shall become void.

STEWART UDALL,
Secretary of the Interior.

AMENDMENT OF ALLOCATION TO COMMONWEALTH OIL REFINING CO., INC., OF IMPORTS OF CRUDE AND UNFINISHED OILS INTO PUERTO RICO

The allocation to Commonwealth Oil Refining Co., Inc., as amended December 5, 1969, of imports of crude and unfinished oils into Puerto Rico is further amended as follows:

1. The second sentence of subparagraph (a) of paragraph 5 is amended to read as follows:

For the calendar year 1970, CORCO is authorized to ship from the core chemical facility only into districts I–IV not to exceed 10,000 barrels per day of raffinate, and for the period January 1, 1971, through September 30, 1971. CORCO is authorized to ship from the core chemical facility only into districts I–IV not to exceed 10,000 barrels per day of raffinate, except that, if the olefins plant referred to in CORCO's letter of December 8, 1970, to the Acting Secretary comes on stream before September 30, 1971, no shipments of raffinate shall be made after that plant comes on stream.

2. The schedule of contributions set forth in paragraph 7 is revised to read as follows:

A payment of $100,000 on or before January 1, 1970.
A payment of $150,000 on or before January 1, 1971.
A payment of $150,000 on or before January 1, 1972.
The balance in five annual installments of $200,000 in the years 1973 through 1977.

FRED J. RUSSELL,
Acting Secretary of the Interior.

DECEMBER 23, 1970.

ALLOCATION TO COMMONWEALTH OIL REFINING COMPANY, INC., AS AMENDED, OF IMPORTS OF CRUDE AND UNFINISHED OILS INTO PUERTO RICO

The "Allocation to Commonwealth Oil Refining Co., Inc., of Imports of Crude and Unfinished Oils Into Puerto Rico," dated May 10, 1968, is amended to read as follows:

In accordance with Proclamation 3279, as amended, and Oil Import Regulation 1, as revised and amended, an allocation for a period of 10 years, effective January 1, 1968, is hereby made to Commonwealth Oil Refining Co., Inc., (CORCO) of imports into Puerto Rico of crude and unfinished oils for use as feedstocks for its core chemical facility located at Penuelas, Puerto Rico. Pursuant to this allocation CORCO is authorized to import not to exceed 30,000 barrles per day of crude and unfinished oils during the calendar years 1968 and 1969. For the calendar years 1970 through 1977 CORCO is authorized to import not in excess of 60,000 barrels per day per calendar year of crude oil and unfinished oils. This allocation is subject to the following terms and conditions, and the terms and conditions set forth in an attachment, signed on behalf of CORCO and the Commonwealth of Puerto Rico, to a letter dated April 19, 1967, from the Commonwealth of Puerto Rico to the Secretary of the Interior, provided, however, that insofar as any provision of that attachment is inconsistent with the provisions of this allocation, the provisions of this allocation shall prevail:

1. CORCO shall invest in satellite plants and related facilities, acceptable to the Economic Development Administration, a sum equal to the net profits of the core chemical facility for a period of 10 years subsequent to the effective date of this allocation. Investments by CORCO in satellite plants and related facilities of the core chemical facility prior to the grant of this allocation, which total $24,332,000, shall be deemed credits against CORCO's obligation to reinvest profits. If within 9 years from the effective date of this allocation net profits and such credits have not together totaled $55 million, then within the remaining year of this allocation CORCO shall invest sufficient additional sums to total $55 million.

2. CORCO will use all reasonable efforts to secure long term sales contracts for products from its core chemical facility and satellites to customers in Puerto Rico. To insure the availability of product for customers in Puerto Rico, CORCO will continue its policy of including in its contracts for petrochemical sales outside Puerto Rico, insofar as practicable, clauses permitting CORCO to cancel portions of such sales in order to make the products available at competitive prices in Puerto Rico for further manufacturing on the island.

To the extent that the cancellable portion of any such contract for off-island sale is insufficient to meet the requirements (at competitive prices) of a Puerto Rico manufacturer, CORCO will undertake to furnish the requisite materials at world-market competitive prices.

3. CORCO shall assure that all operations related to the core chemical facility are conducted in accordance with sound business principles in order to provide maximum funds within the 10-year period for investment in satellite plants and the Secretary, or his authorized representative, shall be given access upon request to all records of transactions pertaining to the operation of the core chemical facility, including the purchase of feedstocks for, and the sale and shipment of motor fuel or other finished products, unfinished oils, and petrochemicals produced by the core chemical facility. Any information so obtained shall be solely for the confidential use of the Secretary and the Department of the Interior.

4. All feedstocks imported under any license issued to CORCO under this allocation shall be derived from crude oils produced in the Western Hemisphere (North America, Central America, South America, and the West Indies) except in those instances where this requirement is waived by the Secretary.

5. (*a*) During any calendar year CORCO is authorized to ship from the core chemical facility only to districts I–IV not to exceed 10,000 barrels per day of unfinished oils or finished products other than residual fuel oil to be used as fuel. For the calendar year 1970 only, CORCO is authorized to ship from the core chemical facility only into Districts I–IV not to exceed 10,000 barrels per day of raffinate. All raffinate shipped from the core chemical facility must be disposed of in districts I–IV for the predominant purpose of manufacturing chemical intermediates such as ethylene, propylene and butylene which are to be used for producing such materials as synthetic fibers, synthetic rubbers, plastic, resins, surface coatings, detergents, explosives, insecticides, solvents, dyes, and plasticizers and none is to be sold as motor fuel or as components of motor fuel or to be further manufactured into motor fuel. For the purposes of this subparagraph (*a*), the terms "unfinished oils" and "finished products" have the meaning ascribed to them in Proclamation 3279, as amended, as of the date of this allocation, except insofar as any such materials subsequently become uncontrolled materials as defined in subparagraph (*d*) below.

(*b*) During the term of this allocation Corco shall not itself ship or enter into sales for shipment from Puerto Rico to districts I–IV or district V for use as

motor fuel or components of motor fuel any uncontrolled materials regardless of whether such materials are uncontrolled as of the date of this allocation or subsequently become uncontrolled. In the event of the sale or transfer by Corco of any such materials or of the 10,000 b./d. of raffinate produced in the core chemical facility to third parties, Corco shall be deemed to have complied with this subparagraph (b) by obtaining from such third parties an undertaking that the materials will not be used as motor fuel or as components of motor fuel.

(c) Except as provided in subparagraph (b) of this paragraph, during the term of this allocation Corco may ship from Puerto Rico to districts I–IV and district V uncontrolled materials so long, but only so long, as such materials remain uncontrolled.

(d) For the purposes of this allocation the term "uncontrolled materials" means any materials derived from crude oil or unfinished oils that are neither finished products nor unfinished oils within the meaning of Proclamation 3279 as amended as of the date of this allocation or as it may be amended thereafter.

6. Licenses will be issued only upon a certification by Corco to the Administrator of the Oil Import Administration of the amount of feedstocks that will be used for the core chemical facility during a particular calendar year and only in the amount so certified. All imports made under such a license must be used for the core chemical facility and any imports in storage at the end of a calendar year shall be taken into account by the Administrator in issuing licenses for the next succeeding allocation period.

7. Corco shall contribute or donate to a conservation fund to be established for purposes mutually agreeable to the Commonwealth of Puerto Rico and the Department of the Interior and to be wholly utilized for the public benefit, $1,400,000 to be contributed or donated as follows:

A payment of $100,000 on or before December 31, 1968;

A payment of $150,000 on or before December 31, 1969; and

A payment of $150,000 on or before December 31, 1970.

The balance in five annual installments of $200,000 in the years 1973 through 1977.

8. Corco shall comply with all applicable laws and regulations relating to the prevention of environmental pollution.

9. For the purposes of this allocation the term "core chemical facility" means the aromatics installation constructed and operated by Corco since July 1965, and which was brought onstream in that month and dedicated on October 14, 1965, and identified as CPI plant No. 1, and the aromatics installation which went onstream on or about November 1, 1969, identified as CPI plant No. 2.

10. For the purposes of paragraphs numbered 1 through 11 of this allocation, the term "Corco" means Commonwealth Oil Refining Co., Inc., and its subsidiares.

11. For the purpose of this allocation, the term "raffinate" means paraffinic or light petroleum fractions produced in the aromatics installation identified as the core chemical facility.

WALTER J. HICKEL,
Secretary of the Interior.

DECEMBER 5, 1969.

ALLOCATION TO COMMONWEALTH OIL REFINING CO., INC. OF IMPORTS OF CRUDE AND UNFINISHED OILS INTO PUERTO RICO

In accordance with Proclamation No. 3279, as amended, and oil import regulation 1, as revised and amended, an allocation effective Janaury 1, 1968, is hereby made to Commonwealth Oil Refining Co., Inc. (Corco), of up to 30,000 b./d. per calendar year of imports into Puerto Rico of crude and unfinished oils for use as feedstocks for its core chemical facility located at Penuelas, P.R. This allocation shall remain in effect for a period of 10 years from the effective date subject to the following terms and conditions, and the terms and conditions set forth in an attachment, signed on behalf of Corco and the Commonwealth of Puerto Rico, to a letter dated April 19, 1967, from the Commonwealth of Puerto Rico to the Secretary of the Interior, provided, however, that insofar as any provision of that attachment is inconsistent with the provisions of this allocation, the provisions of this allocation shall prevail:

1. Corco shall invest in satellite plants and related facilities, acceptable to the Economic Development Administration, a sum equal to the net profits of the core chemical facility for a period of 10 years subsequent to the effective date of this allocation. Investment by Corco in satellite plants and related facilities of

the core chemical facility prior to the grant of this allocation, which total $24,332,000, shall be deemed credits against Corco's obligation to reinvest profits. If within 9 years from the effective date of this allocation net profits and such credits have not together totaled $55 million, then within the remaining year of this allocation, Corco shall invest sufficient additional sums to total $55 million.

2. Corco will use all reasonable efforts to secure long term sales contracts for products from its core chemical facility and satellites to customers in Puerto Rico. To insure the availability of product for customers in Puerto Rico, Corco will continue its policy of including in its contracts for petrochemical sales outside Puerto Rico, insofar as practicable, clauses permitting Corco to cancel portions such sales in order to make the products available at competitive prices in Puerto Rico for further manufacturing on the island.

To the extent that the cancelable portion of any such contract for off-island sale is insufficient to meet the requirements (at competitive prices) of a Puerto Rico manufacturer, Corco will undertake to furnish the requisite materials at world-market competitive prices.

3. Corco shall assure that all operations related to the core chemical facility are conducted in accordance with sound business principles in order to provide maximum funds within the 10-year period for investment in satellite plants and the Secretary, or his authorized representative, shall be given access upon request to all records of transactions pertaining to the operation of the core chemical facility, including the purchase of feedstocks for, and the sale and shipment of motor fuel or other finished products, unfinished oils, and petrochemicals produced by, the core chemical facility. Any information so obtained shall be solely for the confidential use of the Secretary and the Department of the Interior.

4. All feedstocks imported under any licenses issued to Corco under this allocation shall be derived from crude oils produced in the Western Hemisphere (North America, Central America, South America, and the West Indies) except in those instances where this requirement is waived by the Secretary.

5. (*a*) During any calendar year Corco is authorized to ship from the core chemical facility only to districts I–IV not to exceed 10,000 b./d. of unfinished oils or finished products other than residual fuel oil to be used as fuel. For the purposes of this subparagraph (a), he terms "unfinished oils" and "finished products" have the meaning ascribed to them in Proclamation 3279 as amended as of the date of this allocation, except insofar as any such materials subsequently became uncontrolled materials as defined in subparagraph (d) below.

(*b*) During the term of this allocation Corco shall not itself ship or enter into sales for shipment from Puerto Rico to districts I–IV or district V for use as motor fuel or components of motor fuel any uncontrolled materials regardless of whether such materials are uncontrolled as of the date of this allocation or subsequently become uncontrolled. In the event of the sale or transfer by Corco of any such materials to third parties Corco shall be deemed to have compiled with his subparagraph (b) by obtaining from such third parties an undertaking that the materials will not be used as motor fuel or as components of motor fuel.

(*c*) Except as provided in subparagraph (b) of this paragraph, during the term of this allocation Corco may ship from Puerto Rico to districts I–IV and district V uncontrolled materials so long, but only so long, as such materials remain uncontrolled.

(*d*) For the purposes of this allocation the term "uncontrolled materials" means any materials derived from crude oil or unfinished oils that are neither finished products nor unfinished oils within the meaning of Proclamation 3279 as amended as of the date of this allocation or as it may be amended thereafter.

6. Licenses will be issued only upon a certification by CORCO to the Administrator of the Oil Import Administration of the amount of feedstocks that will be used for the core chemical facility during a particular calendar year and only in the amount so certified. All imports made under such a license must be used for the core chemical facility and any imports in storage at the end of a calendar year shall be taken into account by the Administrator in issuing licenses for the next succeeding allocation period.

7. CORCO shall contribute or donate to a conservation fund to be established for purposes mutually agreeable to the Commonwealth of Puerto Rico and the Department of the Interior and to be wholly utilized for the public benefit $1,400,000 to be contributed or donated as follows:

A payment of $100,000 on or before December 31, 1968.

A payment of $150,000 on or before December 31, 1969.

A payment of $150,000 on or before December 31, 1970.

The balance in five annual installments of $200,000 in the years 1973 through 1977.

8. CORCO shall comply with all applicable laws and regulations relating to the prevention of environmental pollution.

9. For the purposes of this allocation the term "core chemical facility" means the installation constructed and operated by CORCO since July 1965, and which was brought on stream in that month and dedicated on October 14, 1965.

10. For the purposes of paragraphs Nos. 1 through 11 of this allocation the term "CORCO" means Commonwealth Oil Refining Co., Inc., and its subsidiaries.

11. The allocation to CORCO of 142,488 b.p.d. of imports of crude oil and unfinished oils into Puerto Rico under paragraph (a) of section 15 of Oil Import Regulation 1 (revision 5), as amended, for the allocation period April 1, 1968, through March 31, 1969, is hereby reduced by 30,000 b.p.d.

STEWART UDALL,
Secretary of the Interior.

MAY 10, 19—.

ALLOCATION TO PHILLIPS PETROLEUM CO., AS AMENDED, OF IMPORTS OF CRUDE OIL AND UNFINISHED OILS INTO PUERTO RICO

The "Allocation to Phillips Petroleum Co. of imports of unfinsihed oils into Puerto Rico" dated December 23, 1965, is amended to read as follows:

In accordance with Proclamation No. 3279, as amended, and Oil Import Regulation I, as revised and amended, an allocation effective January 1, 1966, is hereby made to the Phillips Petroleum Co. of up to 50,000 b.p.b. per calendar year of imports into Puerto Rico of unfinished oils for use as feedstocks for a core chemical facility constructed and operated pursuant to the terms of the agreement, dated May 27, 1965, between Phillips Petroleum Co. and the Commonwealth of Puerto Rico. A copy of the agreement is attached to this allocation. Pursuant to this allocation, Phillips Petroleum Co. is authorized to import either unfinished oils or crude oil, and in the event that Phillips Petroleum Co. elects to import any portion or all of this allocation in the form of crude oil, then each barrel of crude oil shall be deemed to be the equivalent of two-thirds (2/3) of a barrel of unfinished oil, and not to exceed 75,000 b.p.d. of crude oil per calendar year may be substituted for unfinished oils under this allocation. All of such imported crude oil must be used exclusively as feedstocks for a naphtha-producing facility to be constructed and operated in Puerto Rico for the primary purpose of supplying, separately or in combination with imports of unfinished oils, up to 50,000 b.p.d. per calendar year of unfinished oils (naphtha) to the core chemical facility. This allocation shall remain in effect for a period of 10 years from February 1, 1968, the date of startup and operation of the core chemical facility, and shall be subject to the following conditions:

(*a*) Phillips Petroleum Co. and the subsidiary corporation formed pursuant to paragraph (a) of section 1 of the agreement shall make investments in the amounts, in the manner, and for the purposes specified in the agreement. In further consideration of the provisions of this amended allocation which authorize the importation of crude oil, in addition to the total amount of investments of Phillips Petroleum Co. provided for under paragraph (c) of section 1 of the agreement, Phillips Petroleum Co. shall invest the further sum of $10 million in satellite plants.

(*b*) The core chemical facility shall be completed not later than 25 months from the date of this allocation. In the event that construction of the naphtha-producing facility has not been commenced by or before January 1, 1972, the provisions of this allocation authorizing the importation of crude oil for use as a feedstock for the naphtha-producing facility shall become null and void and the allocation shall be valid only for up to 50,000 b.p.d. per calendar year of imports into Puerto Rico of unfinished oils for use as feedstocks for the core chemical facility.

(*c*) Phillips Petroleum Co. shall assure that all operations related to the core chemical facility are conducted in accordance with sound business principles in order to provide maximum funds for investment in satellite plants within the 10-year period. The Secretary or his authorized representative shall be given access upon request to all records of transactions pertaining to the operations of the core chemical facility and the naphtha-producing facility, including the purchase of feedstocks for, and the sale and shipment of motor fuel or other finished products, unfinished oils and petrochemicals produced by, the core chemical facility and the naphtha-producing facility.

(*d*) All unfinished oils imported under licenses issued pursuant to this allocation shall be derived from crude oils produced in the Western Hemisphere (North America, Central America, South America, and the West Indies) except in those instances where this requirement is waived by the Secretary. Crude oil which is authorized to be imported under licenses issued pursuant to this allocation may be imported from any country from which the importation into Puerto Rico is not prohibited under statutes, treaties, or agreements of the United States and regulations of the Bureau of Customs.

(*e*) The provisions of subsection (f) of section 1 and subsection (f) of section 2 of the agreement shall be observed with respect to sales of products produced by the core chemical facility.

(*f*) In any calendar year the core chemical facility shall not produce motor fuel in excess of 49.6 percent of the quantity of feedstocks charged to the facility and in any event not in excess of 24,800 b.p.d. per year. In the event that crude oil is imported pursuant to this allocation and charged to the naphtha-producing facility, not less than 66⅔ percent of the hydrocarbon fractions produced from crude oil imported pursuant to this allocation by the naphtha-producing facility must be supplied to the core chemical facility as feedstocks for the facility. The balance of the hydrocarbon fractions produced from crude oil imported pursuant to this allocation may be utilized as fuel in the core chemical facility, the naptha-producing facility and satellite plants or blended into motor fuel for shipment to districts I–IV and district V as provided in paragraph (g) below, and any portion thereof, not so used, shall be offered for petrochemical manufacture in Puerto Rico. However, in the event that any hydrocarbon fractions are sold for the manufacture and production of petrochemicals in Puerto Rico, Phillips Petroleum Co. shall obtain from the purchaser a certification that any byproducts of such manufacture which can be classed as finished products or unfinished oils will not be shipped to districts I–IV or district V and Phillips Petroleum Co. shall be held responsible for compliance with this requirement prohibiting such shipments. All unfinished oils and finished products and all components of motor fuel regardless of whether such components are uncontrolled materials produced from the remaining portion of this balance of the hydrocarbons must be exported.

(*g*) During any calendar year of this allocation, total shipments to districts I–IV and to district V of unfinished oils or finished products produced by the core chemical facility and the naphtha-producing facility shall not exceed 49.6 percent of the quantity of feedstocks charged to the core chemical facility and in any event total shipments shall not exceed 24,800 b.p.d. per year.

(*h*)(1) During the term of this allocation, Phillips Petroleum Co. shall not ship from Puerto Rico to districts I–IV or district V for use as a motor fuel or as components of motor fuel any uncontrolled materials produced in the naphtha-producing facility regardless of whether such materials are uncontrolled as of the date of this allocation or subsequently become uncontrolled. In the event of the sale or transfer by Phillips Petroleum Co. of any such materials to third parties, Phillips Petroleum Co. shall be deemed to have complied with this subdivision (1) by obtaining from such third parties a certification that the materials will not be used as motor fuel or as components of motor fuel.

(2) Except as provided in subdivision (1) of this subparagraph (*h*), during the term of this allocation Phillips Petroleum Co. may ship from Puerto Rico to districts I–IV and district V uncontrolled materials produced in the naphtha-producing facility so long, but only so long, as such materials remain uncontrolled.

(3) For the purpose of this subparagraph (*p*), the term "uncontrolled materials" means any materials derived from crude oil or unfinished oils that are neither finished products nor unfinished oils within the meaning of Proclamation No. 3279, as amended, as of the date of this amended allocation or as the proclamation may be amended thereafter.

(*i*) Licenses will be issued pursuant to this allocation only upon certification by Philips Petroleum Co. to the Administrator of the Oil Import Administration of the amount of unfinished oils, not in excess of 50,000 b/d per calendar year, that will be used directly by the core chemical facility during a particular allocation period and not in excess of the amounts so certified. All crude oil imported under such licenses must be used directly by the naphtha-producing facility and all imports of unfinished oils made under such licenses must be used directly by the core chemical facility, and any imports in storage at the end of any allocation period shall be taken into account by the Administrator in issuing licenses for the next succeeding allocation period.

(*j*) For the purposes of this allocation, "core chemical facility" means the installation constructed and operated pursuant to the terms of the agreement dated

May 27, 1965, between Phillips Petroleum Co. and the Commonwealth of Puerto Rico. "Naphtha-producing facility" means a facility consisting of a crude still, heavy oil fluid catalytic cracker and auxiliary equipment, designed to produce from crude oil feedstocks of 75,000 b./d. per calendar year at least 50,000 b./d. per calendar year of naphtha, suitable for use as feedstocks into the core chemical facility.

(*k*) Phillips Petroleum Co. shall pay into a conservation fund to be established for purposes mutually agreeable to Phillips Petroleum Co., the Commonwealth of Puerto Rico, and the Department of the Interior, sums as follows:

(1) A sum of $500,000 to be paid within 3 years from the start-up and operation of the core chemical facility; and

(2) A sum of $1.5 million to be paid within 3 years from the start-up and operation of the naphtha-producing facility.

STEWART UDALL,
Secretary of the Interior.

DECEMBER 5, 1968.

JUNE 18, 1969.

INDEFINITE EXTENSION OF ADDENDUM TO ALLOCATION TO PHILLIPS PETROLEUM CO., AS AMENDED, OF IMPORTS OF CRUDE AND UNFINISHED OILS INTO PUERTO RICO

The addendum to the allocation to Phillips Petroleum Co., as amended, of imports of crude and unfinished oils into Puerto Rico, issued by the Secretary of Interior on January 19, 1969, suspended certain identified provisions of the allocation as amended for a period of 90 days from that date. The suspension of the identified provisions was extended for a further period of 60 days from April 19, 1969. The suspension of the identified provisions is hereby indefinitely extended, and they shall not be operative until further notice.

WALTER J. HICKEL,
Secretary of the Interior.

EXTENSION OF ADDENDUM TO ALLOCATION TO PHILLIPS PETROLEUM CO., AS AMENDED, OF IMPORT OF CRUDE AND UNFINISHED OILS INTO PUERTO RICO

The addendum to the allocation to Phillips Petroleum Co., as amended, of imports of crude and unfinished oils into Puerto Rico, issued by the Secretary of Interior on January 19, 1969, suspended certain identified provisions of the allocation as amended for a period of 90 days from that date. In order to afford further time for review, the suspension of the identified provisions is hereby extended, and they shall not be operative, for a period of 60 days from April 19 1969.

WALTER J. HICKEL,
Secretary of the Interior.

JUNE 18, 1969.

ADDENDUM TO ALLOCATION TO PHILLIPS PETROLEUM CO., AS AMENDED, OF IMPORTS OF CRUDE AND UNFINISHED OILS INTO PUERTO RICO

In order to afford time for a review of the effects of the allocation to Phillips Petroleum Co., as amended, of imports of crude oil and unfinished oils into Puerto Rico on national security and our interest in hemisphere defense and a coordinated approach to the problem of oil as it relates to these matters, the provisions in its first paragraph of the allocation to Phillips Petroleum Co., as amended, of imports of crude oil and unfinished oils into Puerto Rico" dated December 5, 1968, authorizing Phillips Petroleum Co. to import up to 75,000 barrels per day of crude oil per calendar year into Puerto Rico, the provision in paragraph (*a*) relating to investment of $10 million in satellite plants, the provision in paragraph (*b*) relating to construction of a "naphtha-producing facility," the provisions in paragraphs (*d*) and (*f*) relating to imports of crude oil and the disposition of products produced from such imports, the provision of paragraph (*h*) relating to materials produced in the "naphtha-producing facility," the provision of paragraph (*i*) relating to crude oil and the "naphtha-producing facility" and the provisions of paragraph (*k*) are all suspended and shall not be operative for a period of 90 days from the date of this addendum.

STEWART UDALL,
Secretary of the Interior.

JANUARY 19, 1969.

ALLOCATIONS TO HESS OIL & CHEMICAL CORP. OF IMPORTS OF FINISHED PETROLEUM PRODUCTS INTO DISTRICTS I TO IV

In accordance with proclamation 3279, as amended, and subject to all of the applicable provisions of oil import regulation 1, as revised and amended, an allocation effective January 1, 1968, is hereby made to the Hess Oil & Chemical Corp. (hereinafter referred to as Hess) of 15,000 barrels per day per calendar year of imports into districts I to IV of finished products. This allocation shall remain in effect for a period of 10 years from its effective date subject to the following terms and conditions:

I. Subject to the provisions of article 7 of the agreement dated September 1, 1965 (the agreement) between the government of the Virgin Islands (the government) and Hess Oil Virgin Islands Corp. (HOVIC), HOVIC shall, in accordance with the terms and conditions of a certain supplemental agreement dated September 13, 1966 (the supplemental agreement), between the government and HOVIC, pay to the government a royalty of $7,500 per day. Notwithstanding the time for payment specified in the supplemental agreement royalties accruing for each semiannual period ending June 30 and December 31, respectively, shall be paid within 2 weeks thereafter into the special Virgin Islands conservation fund authorized by Act No. 2036, dated August 7, 1967, of the Seventh Legislature of the Virgin Islands of the United States, third special session. HOVIC shall have no right of offset under paragraph 3(d) of the supplemental agreement, as amended. However, offsets may be made as provided in paragraphs 3(b) and 3(c) and the provisions respecting renegotiation and/or arbitration as provided in paragraph 5 of the supplemental agreement shall remain in effect. Any adjustment in royalty payments resulting from renegotiation under article 5 of the supplement shall be subject to the approval of the Secretary. The Secretary also may participate in arbitrations pursuant to article No. 11 of the agreement.

2. The provisions of article 3 of said agreement of September 1, 1965, to the contrary notwithstanding, Hovic, together with its affiliates, (as defined in paragraph 2(A) of the agreement) shall, subsequent to the effective date of the allocation, employ not less than the following percentage of legal residents of the Virgin Islands in the operation and maintenance of its oil refinery and related facilities, including petrochemical facilities: 75 percent during the first 2 years, 80 percent during the third year, 85 percent during the fourth year, 90 percent during the fifth and all years thereafter.

3. Within 12 months from the effective date of the allocation, Hovic, together with its affiliates, shall have no fewer than 400 people, exclusive of construction personnel, in permanent employment and within 36 months from the effective date Hovic, together with its affiliates, shall have no fewer than 500 people, exclusive of construction personnel, in permanent employment.

4. Within 12 months from the effective date of the allocation, Hovic, together with its affiliates, shall have expended or obligated, or caused to be expended or obligated, sums sufficient to provide a total investment of not less than $70 million in oil refinery, petrochemical and related facilities in the Virgin Islands which shall include a 30,000 barrels per day vacuum gas oil desulfurization plant and an 18,000 barrels per day benzene, toluene, xylene plant. Within 36 months from the effective date of the allocation, Hovic, together with its affiliates, shall have expended or obligated, or caused to be expended of obligated, additional sums of not less than $30 million which additional sums shall be for petrochemical and related facilities in the Virgin Islands of types which will afford maximum employment on the Islands. In addition, Hess and Hovic shall use their best efforts to promote the establishment in the Virgin Islands of additional petrochemical facilities and, particularly, of facilities for the production of consumer goods from petrochemicals in furtherance of the objective of increasing and upgrading opportunities for employment in the Virgin Islands by the development of a major petrochemical complex therein.

5. For so long as importation of No. 2 heating oil is restricted and, unless otherwise waived by the Secretary, Hess shall ship into district I No. 2 heating oil at the rate of 15,000 barrels per day during the months of January, February, and December of each year after the effective date of the allocation.

6. The Secretary or his authorized representative shall be given access, upon request, to inspect Hovic's Virgin Islands refinery and petrochemical facilities and all records of transactions pertaining to construction thereof, purchase of feedstocks and purchases and sales of finished products, unfinished oils, and petrochemicals produced by such refinery and petrochemical facilities. Any information

so obtained shall be solely for the confidential use of the Secretary and Department of the Interior.

7. Feedstock produced by Hovic for the development of a petrochemical and petrochemical conversion industry in the Virgin Islands, which is in excess of the needs of Hess, Hovic or its affiliates, shall be made available at competitive prices to any person, for local Virgin Islands manufacturing purposes, who is otherwise ready, willing, able, and qualified to utilize such feedstock for conversion purposes in the Virgin Islands on a first right of refusal and a firm noninterruptable basis.

8. Hovic and its affiliates shall in the operation of their plant on the Virgin Islands comply with all applicable laws, regulations and lawful requirements of the Virgin Islands Government including those relating to the prevention of environmental pollution.

9. Subsequent to the effective date of the allocation Hess shall claim no exemption under Headnote 3 (a) of the Tariff Schedules of the United States (19 U.S.C. 1202 (1964 edition)) from duties which would otherwise be owing to the United States on imports of finished or unfinished oils produced by it in the Virgin Islands which may move into the U.S. customs territory.

10. Hovic shall utilize (other than for processing for others) in its Virgin Islands facilities Western Hemisphere (North America, South America, Central America and the West Indies) petroleum feedstocks to the maximum extent compatible with the continued production of low sulfur residual fuel oil meeting existing or future maximum sulfur content requirements into the U.S. markets provided that in no event shall such utilization be less than one-half of the petroleum feedstocks of its Virgin Islands plant or 50,000 barrels per day, whichever is greater. Hovic also, on a best efforts basis, shall supplement its refinery petroleum feedstocks with low sulfur crude from the Western Hemisphere if and when the same is available at competitive prices.

11. Hovic shall, from time to time, review with the appropriate Bureaus and Offices of the Department of the Interior the developing techniques and technology for desulfurization of petroleum feedstocks or its products or the removal of surfur in stack gases and shall, to the extent that it is mutually agreed that they are technically sound and economically feasible, make use of such techniques and technology in the operation of its Virgin Islands plant.

12. Hess guarantees the performance by Hovic of all the terms and conditions of this allocation.

STEWART L. UDALL,
Secretary of the Interior.

DECEMBER 12, 1967.

ALLOCATION TO UNION CARBIDE CORP. OF IMPORTS OF CRUDE OIL AND UNFINISHED OILS INTO PUERTO RICO

1. In accordance with Proclamation 3279, as amended, and Oil Import Regulation 1, as revised and amended, an allocation effective April 19, 1968, is hereby made to Union Carbide Corp. of up to 45,000 average barrels daily (b./d.) per calendar year of imports into Puerto Rico of crude oil for use as feedstock for a core facility to be constructed and operated at Penuelas, Puerto Rico, pursuant to the terms of the Memorandum of Understanding between the Commonwealth of Puerto Rico and Union Carbide Caribe, Inc., dated February 28, 1967, except insofar as that memorandum is inconsistent with the terms of this allocation in which event the terms of this allocation shall control. A copy of the memorandum is attached to this allocation. Pursuant to this allocation Union Carbide Corp. is authorized to import the 45,000 barrels daily (or any increase made pursuant to subparagraph (*h*) of paragraph 2 of this allocation) in the form of either crude oil or unfinished oils. However, in the event that Union Carbide elects to import any portion or all of this allocation in the form of unfinished oils, then each barrel of unfinished oil shall be deemed to be the equivalent of 1.154 barrels of crude oil.

2. This allocation shall remain in effect until the expiration of a period of 10 years from the startup and operation of the core facility as determined by the Administrator of the Oil Import Administration and shall be subject to the following conditions:

(*a*) Union Carbide Corp., will make the investments in the amounts, in the manner and for the purposes specified in the memorandum.

(*b*) The core facility will be completed and started up no later than 36 months from the effective date of this allocation.

(*c*) The provisions of section 1(B) of the memorandum relating to sales of the core facility's production shall be observed.

(*d*) The Secretary or his authorized representative shall be given access, upon request, to inspect the core facility and all records of transactions pertaining to construction thereof, purchase of feedstocks, purchases and sales of finished products, unfinished oils, and petrochemicals produced by such core facility. Any information so obtained shall be solely for the confidential use of the Secretary and Department of the Interior.

(*e*) Union Carbide Corp. shall not ship from Puerto Rico to districts I–IV or district V any unfinished oils or finished products (other than residual fuel to be used as fuel) except as the Secretary may permit shipments of basic olefinic products, such as ethylene, propylene and butylene, in order to enable Union Carbide Corp. to relieve temporary production imbalances in Puerto Rico. Any such basic olefinic products so shipped shall be used only for the manufacture of petrochemicals.

(*f*) All feedstocks imported under licenses issued pursuant to this allocation shall be crude oil, or derivatives thereof, produced in the Western Hemisphere (North, Central and South America and the West Indies), except in those instances where this requirement is waived by the Secretary.

(*g*)(1) During the term of this allocation, Union Carbide Corp. shall not ship from Puerto Rico to districts I–IV or district V for use as a motor fuel or as components of motor fuel any uncontrolled materials produced in the core facility regardless of whether such materials are uncontrolled as of the date of this allocation or sebsequently become uncontrolled. In the event of the sale or transfer by Union Carbide Corp. of any such materials to third parties Union Carbide Corp. shall be deemed to have complied with this subdivision (1) by obtaining from such third parties a certification that the materials will not be used as motor fuel or as components of motor fuel.

(2) Except as provided in subdivision (1) of this subparagraph (*g*), during the term of this allocation Union Carbide Corp. may ship from Puerto Rico to districts I–IV and district V uncontrolled materials produced in the core facility so long, but only so long, as such materials remain uncontrolled.

(3) For the purposes of this subparagraph (*g*), the term "uncontrolled materials" means any materials derived from crude oil or unfinished oils that are neither finished products nor unfinished oils within the meaning of Proclamation 3279 as amended as of the date of this allocation or as it may be amended thereafter.

(*h*) If, with respect to a particular calendar year, Union Carbide Corp. demonstrates to the satisfaction of the Secretary that feedstocks in excess of the quantity of imports provided for in paragraph 1 of this allocation are needed to meet the requirements of the core facility and that sufficient locally produced feedstocks are not competitively available, the Secretary may for the particular year by a written supplement to this allocation increase this allocation to an amount not in excess of 57,700 b./d. of imports of crude oil.

(*i*) No licenses will be issued pursuant to this allocation except in such amounts as may be required for starting and testing the core facility until the core facility has started up and is in operation. Thereafter licenses will be issued only upon a certification by Union Carbide Corp. to the Administrator of the Oil Import Administration of the quantity of feedstocks which will be used directly by the core facility during a particular year and only in the quantity so certified. All imports made under such a license must be used directly in the core facility operated by Union Carbide Corp., in Puerto Rico, and any imports in storage at the end of a calendar year shall be taken into account by the Administrator in issuing the licenses in the next succeeding allocation period.

(*j*) Union Carbide Corp. shall pay into a conservation fund to be established for purposes mutually agreeable to Union Carbide Corp., the Commonwealth of Puerto Rico, and the Department of the Interior, a total contribution of $2 million payable in two equal payments as follows:

(1) The first payment to be made within 3 years from the start up and operation of the core facility; and

(2) The second payment to be made within 3 years thereafter.

(*k*) Union Carbide Corp. shall in the operation of its core facility comply with all lawful regulations and requirements relating to the prevention of environmental pollution.

(*l*) The term "Union Carbide Corp." as used in paragraph 2 of this allocation shall mean Union Carbide Corp. and its subsidiaries and affiliates.

STEWART L. UDALL,
Secretary of the Interior.

APRIL 19, 1968.

The reason Union Carbide does not appear on the chart is that at the present time there are no shipments by Union Carbide that are destined to come from Puerto Rico back to the United States in the form of controlled products.

Therefore, shipments by Union Carbide are not a deductible item. These figures are all expressed in barrels per day, and what we are starting with is 1,450,000 up there and going down and showing you first what is deducted off the top before we get down to the nitty-gritty of how we really allocate to the refiners and petrochemical people.

Mr. McDade. You also have a plant in the Virgin Islands.

Mr. Snyder. The Virgin Islands are outside the customs territory of the United States but a proclamation of the President authorized the Secretary of the Interior to make allocations for finished products of 15,000 barrels a day to refineries in the Virgin Islands and the particular allocation which was granted was to Hess Oil Co. Hess has to contribute certain funds to a conservation fund.

DESCRIPTION OF OIL IMPORT PROGRAM, DISTRICTS I–IV

We also set aside 45,000 barrels a day to the Oil Import Appeals Board. Mr. Vickers will express the remarks of Mr. Flagg who is Chairman.

We have a reserve for contingencies. This is the first year we have had this. Because of the study and the new Oil Policy Committee we have been forced to somewhat piecemeal our 1971 program, and there were certain decisions not made at the time we started allocating oil.

As an example a Presidential proclamation has been issued that has given Mexico a country-of-origin oil input quota for 30,000 barrels a day subject to readjustment.

Since the proclamation does not allow us to exceed a maximum quantity we had to provide for possible upward adjustments and for the petrochemical program that was undecided at the time.

Under the proclamation the Department of the Interior is authorized to grant to the Department of Defense an allocation of finished products. That leaves us 1,237,000 barrels a day we have to allocate in other ways. We set 626,000 barrels aside for refiners regular and startup allocations. We will show in a moment how we do this.

Mrs. Hansen. The committee will adjourn until 1 p.m.

AFTERNOON SESSION

Mrs. Hansen. The committee will come to order again. Mr. Snyder, please continue.

Mr. Snyder. Thank you, Madam Chairman.

May I for the record identify the people who are with me? Mrs. Olga Ronkovich, who is my assistant administrative officer, and Mr. Dell Perry, who is the assistant administrator.

Mrs. Hansen. Very good.

Mr. Snyder. We were endeavoring to show you how the quota is broken down, and who are the recipients of this quota, and how we allocate it. We are now at the refiners.

There are two methods of allocating to the refiners, first, those that have been in business for some time, and, second, those that are just starting. This the reason we call the latter starter allocations.

Mrs. HANSEN. Do you have criteria established for allocating to the refiners?

Mr. SNYDER. Within these 31 sections of the regulations we do have, yes. As a matter of fact, allocations to existing refiners are made pursuant to the regulation under section 10.

OIL IMPORT REGULATIONS

Mrs. HANSEN. Please insert in the record a summary of your regulations.

Mr. SNYDER. We will be happy to.

(The information follows:)

UNITED STATES
DEPARTMENT OF THE INTERIOR
Oil Import Administration

OIL IMPORT REGULATION 1 (Revision 5)
as amended through March 31, 1971

Sec.

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Sec. 1 Purpose.

These regulations implement Presidential Proclamation 3279, "Adjusting Imports of Petroleum and Petroleum Products into the United States," dated March 10, 1959, as amended, by providing for the discharge of the responsibilities imposed upon the Secretary of the Interior.

Sec. 2 Oil Import Administration.

There is in the Department of the Interior an Oil Import Administration under the direction of an Administrator designated by the Secretary of the Interior. The Administrator is hereby empowered to exercise, pursuant to this regulation, all of the authority conferred upon the Secretary by Proclamation 3279, as amended, and the Administrator may redelegate such authority.

Sec. 3 Allocation periods.

(a) With respect to Districts I-IV and District V, allocations of imports of crude oil, unfinished oils, and finished products (other than residual fuel oil to be used as fuel) will be made for periods of twelve months beginning January 1. Allocations of imports into Districts II-IV of residual fuel oil to be used as fuel will be made for periods of twelve months beginning April 1, and allocations of such imports into District V will be made for periods of twelve months beginning January 1.

(b) Allocations of imports of finished products into Puerto Rico will be made for periods of twelve months beginning January 1.

(c) Allocations of imports of crude oil and unfinished oils into Puerto Rico (except allocations made pursuant to paragraph (c) of section 15) will be made for periods of twelve months beginning April 1.

Sec. 4 Eligibility for allocations.

(a) To be eligible for an allocation of imports into Districts I-IV or into District V of crude oil and unfinished oils, a person must (1) have either refinery capacity or a petrochemical plant in the respective districts and (2) have had refinery inputs or petrochemical plant inputs in the respective districts for the year ending three months prior to the beginning of the allocation period for which the allocation is requested.

(b) To be eligible for an allocation of imports into Puerto Rico of crude oil and unfinished oils, a person must have had refinery capacity in Puerto Rico during the calendar year 1964. Allocations may also be made pursuant to paragraph (c) of section 15.

(c) (Reserved)

(d) (Reserved)

(e) To be eligible for an allocation of imports into Puerto Rico of finished products, other than residual fuel oil to be used as fuel, a person must have imported such products into Puerto Rico during the last half of the calendar year 1958.

(f) To be eligible for an allocation of imports into Puerto Rico of residual fuel oil to be used as fuel, a person must have imported residual fuel oil used as fuel into Puerto Rico during the last half of the calendar year 1958.

(g) A person is not eligible individually for an allocation of imports of crude oil and unfinished oils or finished products if the person is a subsidiary or affiliate owned or controlled, by reason of stock ownership or otherwise, by any other individual, corporation, firm, or other business organization or legal entity. The controlling person and the subsidiary or affiliate owned or controlled will be regarded as one. Allocations will be made to the controlling person on behalf of itself and its subsidiary or affiliate but, upon request, licenses will be issued to the subsidiary or affiliate.

[Amdt. 2] Sec. 5 Applications for allocations and licenses.

Applications for allocations of imports of crude oil, unfinished oils, or finished products and for a license or licenses must be filed with the Administrator, in such form as he may prescribe, not later than 60 calendar days prior to the beginning of the allocation period for which the allocations are required. However, if the 60th day is a Saturday, Sunday, or holiday, the application may be filed on the next succeeding business day. Allocation periods are provided for in section 3 of this regulation. This section does not apply to an application for an allocation pursuant to paragraph (c) of section 15 or to an application for imports into District I of residual fuel oil to be used as fuel.

Sec. 6 Records and inspections.

All persons receiving allocations pursuant to these regulations shall maintain complete records of imports, refinery inputs, petrochemical plant inputs and the outputs of such plants. These records shall be maintained on a current basis so that they will be available for inspection by a representative of the Oil Import Administration. All records required to be maintained pursuant to this section shall be retained for a period of three (3) years. In connection with the performance of the Oil Import Administration's responsibility for assuring full compliance with these regulations and Proclamation 3279, as amended, the person shall permit representatives of the Oil Import Administration to enter upon his office, property, plants and facilities to examine such records and, if deemed necessary in order to verify such records, to inspect the refinery, petrochemical plant, or terminal and all operations being performed within the facilities which include, but are not necessarily limited to refining, receiving, shipping, testing and storage. If requested by the Oil Import Administration representatives, the person shall be required to assign an employee to accompany the representatives of the Oil Import Administration in all inspections, record evaluations, and verification operations. The Oil Import Administration representatives shall not be required to sign any releases prior to entering upon a person's property or installation.

Sec. 7 Licenses.

(a) When an allocation has been made to a person under this regulation, the Administrator shall issue a license or licenses based on the allocation, specifying the amount of crude oil and unfinished oils or finished products which may be imported, the period of time such license shall be in effect, and the districts (District I, Districts I-IV, Districts II-IV, District V or Puerto Rico) into which the importation may be made. The Administrator may amend such licenses.

(b) No license issued pursuant to this section may be sold, assigned, or otherwise transferred.

[Amdt. 32] (c) (1) If an allocation made pursuant to section 9 or 10 of this regulation for the allocation period January 1, 1971 through December 31, 1971, is in excess of 1,300,000 barrels of imports, the Administrator shall first issue a license in the amount of 1,300,000 barrels or 35% of the allocation, whichever amount is greater. The Administrator shall, not later than June 1, 1971, issue a license, effective July 1, 1971, for the balance of the allocation. If the allocation is 1,300,000 barrels of imports or less, the Administrator shall issue a license for the full amount of the allocation.

(2) If an allocation made pursuant to section 11 of this regulation for the allocation period January 1, 1971 through December 31, 1971 is in excess of 2,900,000 barrels of imports, the Administrator shall first issue a license in the amount of 2,900,000 barrels or 35% of the allocation, whichever amount is greater. The Administrator shall, not later than June 1, 1971, issue a license, effective July 1, 1971, for the balance of the allocation. If the allocation is 2,900,000 barrels of imports or less the Administrator shall issue a license for the full amount of the allocation.

[Amdt. 31] Sec. 8 Small quantities.

(a) District Directors of Customs are authorized to permit without a license an entry for consumption of not to exceed 550 U.S. gallons of crude oil, unfinished oils, or finished products which are certified as samples for testing or analysis or which are included in shipments of machinery or equipment and are certified as intended for use in connection therewith, and baggage entries. Unless notified by the Administrator to the contrary, District Directors of Customs are authorized to permit without a license the entry for consumption of bonded fuel aboard an aircraft diverted from an international flight. In each instance in which such an entry is made, the owner of the aircraft shall promptly file with the Administrator, Oil Import Administration, Department of the Interior, Washington, D. C. 20240, a written report of the circumstances in which the entry was made and the quantity entered. Failure promptly to file such report may result in the suspension or abrogation of the privilege of making such entries.

(b) A person desiring to import small quantities of crude oil, unfinished oils, or finished products in circumstances not covered by paragraph (a) of this section shall file with the Administrator a written request for authorization for entry without a license for each shipment, describing the oil and the quantity thereof proposed to be imported and the circumstances which would justify an entry without a license, the date when the shipment is scheduled to arrive or upon which it has arrived, and the port of entry. If the Administrator determines that the entry without a license is consonant with the purposes of Proclamation 3279, as amended, he may authorize such an entry.

[Amdt. 29] Sec. 9 Allocations; petrochemical plants; Districts I-IV, District V.

(a) For the allocation period January 1, 1971 through December 31, 1971, each eligible person with a petrochemical plant in Districts I-IV shall receive an allocation of imports of crude oil and unfinished oils equal to the average barrels per day of petrochemical plant inputs to his petrochemical plants in these districts during the year ending September 30, 1970, multiplied by 11.2 percent.

(b) For the allocation period January 1, 1971 through December 31, 1971, each eligible person with a petrochemical plant in District V shall receive an allocation of imports of crude oil and unfinished oils equal to the average barrels per day of petrochemical plant inputs to his petrochemical plants in this district during the year ending September 30, 1970, multiplied by 11.9 percent.

(c) No allocation for Districts I-IV made pursuant to this section or section 25 shall entitle a person to a license which will allow the importation of unfinished oils in excess of 15 percent of the allocation, and no allocation for District V made pursuant to this section or section 25 shall entitle a person to a license which will allow the importation of unfinished oils in excess of 25 percent of the allocation. However, a person obtaining an allocation for imports of crude oil and unfinished oils pursuant to this section or section 25 may petition the Administrator to adjust the percentage of imports of unfinished oils upward to 100 percent of such person's allocation if the petitioner certifies that the imported unfinished oils will not be exchanged, that the oils will be processed entirely in the petitioner's own petrochemical plant, and that more than 50 percent of the yields (by weight) from the unfinished oils will be petrochemicals or that more than 75 percent (by weight) of recovered product output will consist of petrochemicals.

(d) 'Each allocation made pursuant to this section shall be reduced by the amount of any licenses issued to the applicant under an interim allocation for the allocation period.

(e) No allocation made pursuant to this section may be sold, assigned, or otherwise transferred.

/Amdt. 26/ Sec. 10 Allocations; refiners; Districts I-IV.

(a) For the allocation period January 1, 1971 through December 31, 1971, the Administrator shall allocate, as provided in paragraph (b) of this section, approximately 600,000 b/d of imports of crude oil into Districts I-IV among eligible persons having refinery capacity in these districts.

(b) Each eligible applicant shall receive an allocation of imports of crude oil based on refinery inputs for the year ending September 30, 1970, and computed according to the following schedule:

Average b/d Input		Percent of Input		No. of Days
0 - 10,000		20.0		
10 - 30,000	(x)	12.0	(x)	365
30 - 100,000		7.0		
100,000 plus		3.5		

However, each such allocation shall be reduced by the amount of any licenses issued to the applicant under an interim allocation for the allocation period.

(c) Under an allocation made pursuant to paragraph (b) of this section, unfinished oils may be imported, but imports of such oils shall not exceed 15 percent of the allocation.

(d) No allocation made pursuant to this section may be sold, assigned, or otherwise transferred, and except as this regulation may provide otherwise, no license issued under such an allocation shall permit the importation of Canadian imports as defined in section 1A of Proclamation 3279 as amended.

[Amdt. 31] Sec. 11 Allocations; refiners; District V.

(a) For the allocation period January 1, 1971 through December 31, 1971, the Administrator shall allocate, as provided in paragraph (b) of this section, approximately 229,000 b/d of imports of crude oil into District V among eligible persons having refinery capacity in that district. Such allocations shall supersede the tentative allocations which have been made of imports of crude oil into District V for that allocation period. Licenses issued under tentative allocations shall be charged against the new allocations and shall remain in force.

(b) Each eligible applicant shall receive an allocation of imports of crude oil based on refinery inputs for the year ending September 30, 1970, and computed according to the following schedule:

Average b/d Input		Percent of Inputs		No. of Days
0-10,000)		(60.0)		
10-30,000)	X	(15.0)	X	365
30,000 plus)		(5.0)		

However, each allocation made pursuant to this paragraph (b) shall be reduced by the amount of any license issued to the applicant under an interim allocation for the allocation period.

(c) Under an allocation made pursuant to paragraph (b) of this section, unfinished oils may be imported, but imports of such oils shall not exceed 25 percent of the allocation.

(d) No allocation made pursuant to this section may be sold, assigned, or otherwise transferred.

/Amdt. 31/ Sec. 11A Allocations of crude oil - District V - based upon production of low sulphur residual fuel oil to be used as fuel in District V.

(a) This section provides for the making of allocations of imports into District V of crude oil based upon the production of low sulphur residual fuel oil. To the extent that the provisions of this section are inconsistent with the provisions of other sections of this regulation, the provisions of this section shall be controlling.

(b) In addition to the allocations of imports of crude oil made under section 11 of this regulation, each eligible applicant with refinery capacity in District V who produces in District V low sulphur residual fuel oil to be used as fuel which contains not more than five-tenths of one percent (0.5%) sulphur by weight and which is delivered to consumers for use as fuel, in order to comply with governmental requirements respecting air pollution shall receive an allocation of imports of crude oil equal to the amount in barrels of such low sulphur residual fuel oil to which the applicant certifies both as to production and delivery.

(c) For the purpose of computing import allocations under section 11 of this regulation, crude oil imported pursuant to an allocation under this section 11A or domestic oil received in exchange pursuant to the provisions of section 17 and processed will not qualify as refinery inputs. However, the person receiving the foreign crude oil under an exchange agreement pursuant to section 17 may count such oil as a refinery input.

(d) An application for an allocation of imports of crude oil under this section must be filed with the Administrator no later than 20 days after the last day of the calendar month during which the low sulphur residual fuel oil upon which the application is based was delivered to consumers. An application must be in such form as the Administrator may prescribe.

(e) No license issued under an allocation made pursuant to this section shall be valid for a period longer than six months following the day on which the license is issued.

(f) No allocation made pursuant to this section may be sold, assigned, or otherwise transferred.

(g) The provisions of section 11A as amended by Amendment 18 (35 F.R. 13) will be applicable with respect to allocations made on the basis of low sulphur residual fuel oil to be used as fuel which is produced and delivered before April 1, 1971, and with respect to licenses issued under such allocations.

Sec. 12 Eligibility for and allocations of residual fuel oil to be used as fuel - District I.

/Amdt. 3/ (a) To be eligible for an allocation of imports into District I of residual fuel oil to be used as fuel a person must:

/Amdt. 26/ (1)

(2) Be in the business in District I of selling residual fuel oil to be used as fuel and have under his management and operational control a deep-water terminal located in District I into which there has been delivered residual fuel oil to be used as fuel which he owned at the time of delivery, such delivery being the first delivery of that oil into a deep-water terminal in District I; or

(3) Be in the business in District I of selling residual fuel oil to be used as fuel and have a throughput agreement (warehouse agreement) with a deep-water terminal operator under which agreement the person has delivered to the terminal residual fuel oil to be used as fuel which he owned when it was so delivered, such delivery being the first delivery of that oil into a deep-water terminal in District I. For the purposes of this section, "throughput agreement" means an agreement which provides for the delivery to a deep-water terminal by a person of residual fuel oil which he owns and for a right in such person to withdraw on call an identical quantity of of such oil from the terminal. A bona fide throughput agreement will be deemed to exist (1) only if the person operating under the agreement owns the oil at the time it is delivered to the terminal and only if that delivery is the first delivery of that oil into a deep-water terminal in District I; and (2) only if the person has delivered at least 25,000 barrels of residual fuel oil to be used as fuel into the terminal under the agreement during the allocation period ending March 31, 1967, or any subsequent allocation period.

/Amdt. 3/ (b) The maximum level of imports of residual fuel oil to be used as fuel into District I for a particular allocation period April 1 through March 31 shall be the level of imports of that product into that district during the calendar year 1957 as adjusted by the Secretary of the Interior as he may determine to be consonant with the objectives of Proclamation 3279 as amended. From this level the Administrator shall allocate in accordance with the decisions of the Oil Import Appeals Board, 5,480 b/d to the Department of Defense, 5,480 b/d to the General Services Administration, and the balance pursuant to paragraph (c) of this section.

/Amdt. 3/ (c) (1) The Administrator shall make allocations for an allocation period April 1 through March 31 to each eligible applicant in District I of such quantities of imports of residual fuel oil to be used as fuel as the applicant certifies are required by the applicant to meet his obligations under firm existing contracts between the applicant and customers in District I. The Administrator shall, under such an allocation, (1) issue during the allocation period licenses in such amounts as the holder of the allocation from time to time certifies have been delivered to customers under such contracts during the first eleven months (April--February) of the allocation period and (2) issue during the next allocation period licenses in such amounts as the holder of the allocation certifies have been delivered in the last month (March) of the preceding allocation period; and

(2) The Administrator shall make allocations for an allocation period April 1 through March 31 and simultaneously issue licenses to each eligible applicant in District I of imports of residual fuel oil to be used as fuel in quantities equal to the quantities of such product which the applicant certifies that he has sold and delivered to customers in District I during the allocation period or the last month (March) of the preceding allocation period, exclusive of quantities which the applicant has delivered under contracts and which constitute the basis for the issuance of licenses pursuant to subparagraph (1) of this paragraph.

/Amdt. 3/ (d) (1) To apply for an allocation of imports of residual fuel oil to be used as fuel in District I pursuant to subparagraph (1), paragraph (c), of this section (imports required to meet obligations under firm existing contracts), an eligible applicant should complete and submit OIA Form Resid-1 (white) to the Oil Import Administration. Instructions for completing this form are set forth on the reverse side of the form. An eligible applicant whose application is found to be in order will receive an allocation of imports of residual fuel oil to be used as fuel in District I for the allocation period ending March 31. OIA Form Resid-1 may be submitted at any time during the allocation period.

(2) Import licenses will not be issued under such an allocation until deliveries of residual fuel oil to be used as fuel have actually been made under the contracts on which the allocation is based and until the deliveries have been certified to the Oil Import Administration. To obtain an import license, the holder of an allocation should complete and submit OIA Form Resid-2 (green), to the Oil Import Administration, certifying the quantities of oil that have been delivered under such contracts. OIA Form Resid-2 may be submitted at any time during the allocation period, and, with respect to deliveries made in the last month (March) of an allocation period, may be submitted in the next allocation period.

(3) Each month, the Oil Import Administration will process all OIA Forms Resid-2 which have been received by the 10th day of that month. Licenses will promptly be issued to the holder of an allocation whose pending OIA Forms Resid-2 are in order in the amount of deliveries under contracts certified on such forms. OIA Forms Resid-2 received by the Oil Import Administration after the 10th day of a month may be held and processed in the following month.

(4) In the event that firm contracts which form the basis of an allocation are terminated or renegotiated during the allocation period, the holder of the allocation shall so advise the Oil Import Administration in writing and the allocation will be correspondingly adjusted.

/Amdt. 3/ (e) (1) To apply for an allocation and license pursuant to subparagraph (2), paragraph (c) of this section (based on sales and deliveries other than under firm existing contracts--for example, sales--"under the rack"), an eligible applicant should complete and submit OIA Form Resid-2 (green) to the Oil Import Administration.

(2) An eligible applicant may complete and submit an OIA Form Resid-2 at any time during an allocation period. By way of example, he may request an allocation and license on the basis of sales and deliveries made to customers during any month of the allocation period or the last month (March) of the preceding allocation period, or he may base his request upon sales and deliveries made over a period of 3 or 4 months of the allocation period. A person may find that, under arrangements with his suppliers, he has no need for an import allocation or license. If the occasion arises that an allocation and license are required at a later date, he may then submit an OIA Form Resid-2 to the Oil Import Administration upon which an allocation and license will be issued.

(3) Each month, the Oil Import Administration will process all OIA Forms Resid-2 which have been received by the 10th day of that month. Licenses will promptly be issued to each eligible applicant whose pending OIA Forms Resid-2 are in order in the amount of sales and deliveries certified on such forms. OIA Forms Resid-2 received by the Oil Import Administration after the 10th day of a month may be held and processed on the following month.

/Amdt. 4/ (f) All licenses issued during that part of an allocation period April 1 through January 31 shall expire at the end of the allocation period in which they are issued. Licenses issued during the months of February and March in an allocation period shall expire at the end of the next succeeding allocation period.

Example. Licenses issued in July 1967, expire on March 31, 1968, the end of the allocation period April 1, 1967 - March 31, 1968. Licenses issued in February and March 1968 expire March 31, 1969.

/Amdt. 26/ Sec. 13 Finished products.

(a) For the allocation period January 1, 1971 through December 31, 1971, there is allocated to the Department of Defense 20,000 b/d of imports of finished products into Districts I-IV and 7,500 b/d of imports of finished products into District V. For the same allocation period, 15,000 b/d of finished products have been allocated pursuant to subparagraph (4) of paragraph (b) of section 3 of Proclamation 3279, as amended.

(b) No allocation made pursuant to this section may be sold, assigned, or otherwise transferred.

Sec. 14 Determination of maximum level of imports - Puerto Rico.

Pursuant to paragraph (c) of section 2 of Proclamation 3279, as amended, the Secretary will, for each allocation period, establish a maximum level of imports of crude oil and unfinished oils into Puerto Rico. For each allocation period, the average barrels per day of imports of residual fuel oil to be used as fuel and of imports of finished products other than residual fuel oil to be used as fuel into Puerto Rico shall not exceed the average barrels per day of imports of such products, respectively, into Puerto Rico during the last half of the calendar year 1958. The Secretary may adjust such level to meet a demand in Puerto Rico for finished products that would not otherwise be met.

Sec. 15 Allocations of crude oil and unfinished oils - Puerto Rico.

(a) For each allocation period, the Administrator shall recommend to the Secretary an allocation of imports of crude oil and unfinished oils for each applicant having refinery capacity in Puerto Rico during the calendar year 1964 based upon estimates of the requirements of such applicant for the allocation period. Allocations will be made by the Secretary upon consideration of the Administrator's recommendations.

/Amdt. 6/ (b) If, during the calendar year 1968, a person who will receive an allocation under paragraph (a) of this section for the allocation period April 1, 1968, through March 31, 1969, ships to Districts I-IV or to District V unfinished oils or finished products (other than residual fuel oil to be used as fuel), or sells unfinished oils or finished products (other than residual fuel oil to be used as fuel) which were shipped to Districts I-IV or to District V in excess of the volume of unfinished oils or finished products (other than residual fuel oil to be used as fuel) which he so shipped or which he sold and were so shipped to the respective districts during the calendar year 1965, the person's allocation for the allocation period April 1, 1969 through March 31, 1970, shall be reduced by the amount of the excess.

Thereafter, each succeeding allocation made to such a person shall be reduced by the amount by which shipments (as described above in this paragraph) made by or attributable to such person during the calendar year immediately preceding the beginning of the allocation period exceeds shipments made by or attributable to such person during the calendar year 1965.

(c) (1) In instances in which the Secretary determines that accomplishment of the objectives of Proclamation 3279, as amended, will not be impaired, allocations of imports of crude oil and unfinished oils may be granted to persons as feedstocks for facilities which in the Secretary's judgment will promote substantial expansion of employment in Puerto Rico through industrial development.

(2) A person seeking such an allocation should file an application with the Administrator. The application should disclose in detail the nature of the facility which the applicant proposes to construct, the proposed location of the facility, the capacity of such facility, the feedstocks to be charged to the facility, the products to be produced and the anticipated destinations of such products, the capital outlay involved, and the manner in which construction of the facility would promote substantial expansion of employment in Puerto Rico through industrial development.

(3) Each such allocation shall be subject to the following conditions and restrictions:

(i) that the profits from the operation of the facility during a minimum period of ten years be invested in Puerto Rico in ways which will tend to promote substantial expansion of employment;

(ii) that all operations of the facility be conducted in accordance with sound business principles in order to provide maximum funds for investment in Puerto Rico;

(iii) that the Secretary or his authorized representative be given access upon request to all records of transactions pertaining to the operations of the facility, including the purchase of feedstocks for, and the sale and shipment of finished products, unfinished oils, and petrochemical products by, the facility;

(iv) that all feedstocks imported under licenses issued pursuant to the allocation shall be derived from crude oil produced in the Western Hemisphere (North America, Central America, South America, and the West Indies), except in those instances in which this requirement is waived by the Secretary;

(v) that no licenses will be issued under the allocation until the facility is ready to go on stream and thereafter only upon a certification of amounts to be directly used by the facility;

(vi) that all imports made under such licenses be directly used by the facility; and

(vii) that imports in storage be taken into account by the Administrator in issuing licenses under the allocation for the succeeding allocation period.

An allocation shall, in addition, be subject to such other conditions and restrictions as the Secretary may deem necessary to prevent impairment of the objectives of Proclamation 3279, as amended, and to assure that any imports so allocated are used for the purposes for which the allocation is made and that the holder of such allocation fulfills commitments made in connection with the making of the allocation. The holder of such an allocation shall comply with all such conditions and restrictions, and noncompliance shall be grounds for the suspension or revocation of the allocation.

(d) No allocation made pursuant to this section may be sold, assigned, or otherwise transferred.

Sec. 16 Allocations of finished products - Puerto Rico.

(a) For the allocation period beginning January 1, the Administrator shall allocate to each eligible applicant for an allocation for Puerto Rico a quantity of imports of finished products equal to the applicant's average barrels daily of imports of such products for the last half of the calendar year 1958 multiplied by the number of days in the allocation period. Separate allocation shall be made for imports of residual fuel oil to be used as fuel and of imports of finished products other than residual fuel oil to be used as fuel.

(b) In the event that the maximum level of imports of residual fuel oil to be used as fuel or of other finished products is increased to meet a demand in Puerto Rico that would not otherwise be met, the Administrator shall increase the individual allocation of the person who has the demand.

(c) No allocation made pursuant to this section may be sold, assigned, or otherwise transferred.

/Amdt. 10/Sec. 17 Use of imported crude oil and unfinished oils.

(a) Except as provided in paragraph (b) of this section, each person who imports crude oil or unfinished oils under a license issued pursuant to an allocation made under section 9, 10, 11, 15, or 25 of this regulation must process the oils so imported in his own refinery or petrochemical plant.

(b) (1) Subject to the provisions of this paragraph (b), a person who imports crude oil or unfinished oils under an allocation made under sections 9, 10, 11, paragraph (a) of section 15 or section 25 of this regulation may exchange his imported crude oil either for domestic crude oil or for domestic unfinished oils or exchange his imported unfinished oils either for domestic unfinished oils or for domestic crude oil. However, a person receiving an allocation under section 9 may be restricted in the exchange of imported unfinished oils, as provided in paragraph (c) of that section.

(2) A proposed agreement for each such exchange must be reported to the Administrator before any action involved in the the exchange is taken.

(3) Each such exchange must be effected on a ratio of not less than one barrel of domestic oil for each barrel of imported oil unless a different exchange ratio is approved by the Administrator.

(4) In any such exchange, the person who is exchanging oil imported pursuant to an allocation under section 9, 10, 11, 15, or 25 for domestic oil must take delivery of the domestic oil and process it in his own refinery or petrochemical plant, located in the same district for which the allocation is granted, not later than 120 days after the day on which the imported oil is delivered to the other party to the exchange.

(5) Each such exchange must be on an oil-for-oil basis, and no exchange involving adjustments, settlements, or accounting on a monetary basis is permissible.

(6) Any such exchange must not be otherwise unlawful.

Sec. 18 Reports.

(a) Each person who imports crude oil, unfinished oils, or finished products under a license issued under this regulation shall report to the Administrator the quantities in barrels corrected to 60° Fahrenheit of crude oil, unfinished oils, and finished products so imported. Each report shall state through which port of entry the importation was made and shall specify the kinds of unfinished oils and finished products imported. Each report shall be filed with the Administrator within fifteen (15) days of the end of a particular month.

(b) Each person who exchanges oil pursuant to section 17 of this regulation shall report the exchange to the Administrator on such forms as he shall prescribe. In addition, any changes occurring during an allocation period in the types of oils or the exchange ratio shall be reported.

Sec. 19 False statements.

Persons concealing material facts or making false statements in or in connection with any applications or reports filed with the Administrator or in connection with any license presented to or statements made to a Collector of Customs with respect to imports of crude oil, unfinished oils, or finished products, are guilty of a crime and upon conviction may be punished by fine or imprisonment or both.

Sec. 20 Revocation or suspension of allocations or licenses.

The Administrator may, after a hearing, revoke or suspend any allocation or license issued under this regulation, on grounds relating to the national security, or the violation of the terms of Proclamation 3279, this regulation, or licenses issued pursuant thereto.

Sec. 21 Appeals.

/Amdt. 23/ (a) There is in the Department of the Interior, an Oil Import Appeals Board comprised of a representative each from the Departments of the Interior, Justice and Commerce, designated, respectively, by the Secretaries of such Departments. The Board shall elect a Chairman from its own membership.

/Amdt. 24/ (b) The Appeals Board shall consider petitions by persons affected by this regulation that fall within the limits of the jurisdiction specified in this paragraph and may, within the limits of the maximum levels of imports established in section 2 of Proclamation 3279, as amended:

(1) Reverse of modify on grounds of error actions taken by the Administrator on applications for allocations under this regulation;

(2) Modify any allocation made to any person under this regulation on the grounds of exceptional hardship;

(3) Grant allocations of crude oil and unfinished oils in special circumstances to persons with importing histories who do not qualify for allocations under this regulation;

(4) Grant allocations of finished products on the grounds of exceptional hardship to persons who do not qualify for allocations under this regulation; and

(5) Review the revocation or suspension of any allocation or license.

/Amdt. 19/ (c) (1) Except as provided in subparagraphs (2) and (3) of this paragraph, the modification or grant of an allocation by the Appeals Board shall become effective in the allocation period, as provided in section 3 of this regulation, which succeeds the allocation period during which the Board's decision is made and no decision of the Appeals Board shall become effective unless it is made and the Administrator is notified more then 30 calendar days before the beginning of an allocation period

(2) An allocation granted pursuant to clause (2) or (3) of paragraph (b) of this section to a person who has become ineligible because of total loss of refinery capacity, petrochemical plant, or deep-water terminal facilities may be made effective within the allocation period during which the Appeals Board's decision is made.

(3) The Board may make effective in a current allocation period a grant or a modification of an allocation of imports when a quantity of such imports has been made available for such purpose by the Secretary.

/Amdt. 24/ (d) The Appeals Board may adopt, promulgate, and publish such rules and procedures as it deems appropriate for the conduct of its business. The action of the Appeals Board on a petition, if within the jurisdiction conferred upon it by paragraph (b), shall constitute final action within the Department for that case, but interpretations by the Board of this regulation or of Proclamation 3279, as amended, are not thereafter binding upon the Secretary.

/Amdt. 26/ (e) For the allocation period January 1, 1971 through December 31, 1971, 45,000 b/d of imports into Districts I-IV of crude oil and unfinished oils (including Canadian imports as defined in section 1A of Proclamation 3279, as amended) and finished products and 4,000 b/d of imports into District V of crude oil, unfinished oils, and finished products are made available to the Oil Import Appeals Board.

Sec. 22 Definitions.

As used in this regulation:

(a) "person" includes an individual, a corporation, firm or other business organization or legal entity, and an agency of a State, territorial, or local government, but does not include a department, establishment, or agency of the United States;

(b) "District I" comprises the States of Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Rhode Island, New York, New Jersey, Pennsylvania, Maryland, Delaware, West Virginia, Virginia, North Carolina, South Carolina, Georgia, and Florida, and the District of Columbia;

(c) "Districts II-IV" means all of the States of the United States except those States within District I and District V;

(d) "Districts I-IV" means the District of Columbia and all of the States of the United States except those States within District V;

(e) "District V" means the States of Arizona, Nevada, California, Oregon, Washington, Alaska, and Hawaii;

/Amdt. 6/ (f) "crude oil" means crude petroleum as it is produced at the wellhead and liquids (under atmospheric conditions) that have been recovered from mixtures of hydrocarbons which existed in a vaporous phase in a reservoir and that are not natural gas products and the initial liquid hydrocarbons produced from the tar sands;

(g) "finished products" means any one or more of the following petroleum oils, or a mixture or combination of such oils, which are to be used without further processing except blending by mechanical means:

/Amdt. 24/ (1) liquefied gases - ethane, propane, butanes, ethylene, propylene, and butylenes (but not methane) which are derived from natural gas or crude oil and which, to be maintained in a liquid state at ambient temperatures, must be kept under greater than atmospheric pressures;

(2) gasoline - a refined petroleum distillate which, by its composition, is suitable for use as a carburant in internal combustion engines;

(3) jet fuel - a refined petroleum distillate used to fuel jet propulsion engines;

(4) naphtha - a refined petroleum distillate falling within a distillation range overlapping the higher gasoline and the lower kerosenes;

(5) fuel oil - a liquid or liquefiable petroleum product burned for lighting or for the generation of heat or power and derived directly or indirectly from crude oil, such as kerosene, range oil, distillate fuel oils, gas oil, diesel fuel, topped crude oil, residues;

(6) lubricating oil - a refined petroleum distillate or specially treated petroleum residue used to lessen friction between surfaces;

/Amdt. 26/ (7) residual fuel oil - (i) topped crude oil or viscous residuum which has a viscosity of not less than 45 seconds Sayboit universal at 100° F. and (ii) crude oil which is to be used as fuel without further processing other than by blending by mechanical means.

(8) asphalt - a solid or semi-solid cementitious material which gradually liquefies when heated, in which the predominating constituents are bitumins, and which is obtained in refining crude oil;

(9) natural gas products - means liquids (under atmospheric conditions), including natural gasoline, which are recovered by a process of absorption, adsorption, compression, refrigeration, cycling, or a combination of such processes, from mixtures of hydrocarbons that existed in a vaporous phase in a reservoir and which, when recovered and without processing in a refinery, otherwise fall within any of the definitions of products contained in clauses (2) through (5), inclusive, of this paragraph (g);

(h) "unfinished oils" means one or more of the petroleum oils listed in paragraph (g) of this section, or a mixture or combination of such oils which are to be further processed other than by blending by mechanical means;

(i) "Administrator" means Administrator, Oil Import Administration, Department of the Interior, or his duly authorized representative;

(j) the words "importation," "importing," "import," "imports," and "imported" include both entry for consumption and withdrawal from warehouse for consumption;

/Amdt. 26/ (k) "refinery inputs" means feedstocks charged to 'refinery capacity'

(1) and include only--

(i) crude oil;

(ii) unfinished oils imported pursuant to an allocation, and

(iii) unfinished natural gas products

(2) but do not include inputs of crude oil or unfinished oils imported pursuant to paragraph (e), (f), or (h) of section 1A of Proclamation 3279, as amended, or, with respect to refinery inputs in District V, inputs of crude oil or unfinished oils imported pursuant to clause (4) of paragraph (a) of section 1 of Proclamation 3279, as amended.

/Amdt. 7/ (l) "Refinery capacity" means a plant which:

(1) Includes equipment for separating or converting hydrocarbons to finished products or unfinished oils;

(2) Uses crude oil as the predominant feedstock, and

(3) Converts for plant use as fuel in heating or generating power or for sale not less than 70 percent by weight of total refinery inputs into at least two separate and distinct finished products other than liquefied gases, each of which falls in a different one of the categories specified in subparagraphs (2) through (8) of paragraph (g) of this section--that is, gasoline, jet fuel, naphtha, fuel oil, lubricating oil, residual fuel oil, or asphalt--and each of which must be equal to not less than 4 percent by weight of total refinery inputs. Different grades or specifications of a finished product will not constitute separate and distinct finished products for the purpose of this definition.

(m) "deep-water terminal" means a permanent land installation which:

(1) consists of bulk storage tanks having not less than 100,000 barrels of operational capacity, pumps, and pipelines used for the storage, transfer and handling of residual fuel oil;

(2) is adjacent to waterways that permit the safe passage to the installation of tanker rated 15,000 cargo deadweight tons; and

(3) has a berth that will permit the delivery of residual fuel oil to be used as fuel into the installation by direct connection from a tanker rated at 15,000 cargo deadweight tons, drawing not less than 25 feet of water, and moored in the berth. Cargo deadweight tons represent the carrying capacity of a tanker, in tons of 2,240 pounds, less the weight of fuel, water, stores, and other items necessary for use on a voyage;

/Amdt. 7/ (n) "Petrochemical plant" means a facility or plant complex;

(1) Which includes equipment for converting hydrocarbons to petrochemicals by chemical reaction;

(2) Which manufactures for plant use or sale one or more separate and distinct petrochemicals by chemical conversion of each separate petrochemical plant input feedstock stream which is claimed by an applicant as a basis for obtaining an allocation, and

(3) In which more than 50 percent by weight of each separate feedstock stream is converted by chemical reaction into petrochemicals or in which over 75 percent by weight of recovered product output of each separate feedstock stream consists of petrochemicals which were converted by chemical reaction from such inputs.

/Amdt. 16/ (o) "petrochemical plant inputs" means feedstocks charged to a petrochemical plant

(1) and include only:

(i) crude oil,

(ii) unfinished oils (except those unfinished oils specifically excluded in subparagraph (2) of this paragraph) produced in Districts I-IV and District V, and unfinished oils imported pursuant to an allocation,

(2) but do not include:

(i) unfinished oils which are produced in a petrochemical plant in the manufacture of petrochemicals and subsequently charged to a unit which is a part of the same petrochemical plant in which they were produced or to any other petrochemical plant which is owned or controlled by the same person who claims the initial petrochemical plant inputs from which the unfinished oils are derived,

(ii) crude oil and unfinished oils which are imported into the United States by pipeline, rail, or other means of overland transportation from the country where they were produced, which country in the case of unfinished oils produced from crude oil, liquefied gases or natural gas products is also the country of production of the crude oil, liquefied gases or natural gas products from which the unfinished oils were processed or manufactured,

(iii) unfinished oils which are obtained by transactions such as sales, purchases, or exchanges which are designed to avoid the exclusion specified in subdivision (i) of this paragraph (2), and

(iv) benzene or toluene or any xylene derived from crude oil, liquefied gases or natural gas products which met the distillation specification of the ASTM standard specifications for that chemical but which subsequently has been recycled and mixed with other hydrocarbons, commingled, or purposely debased.

/Amdt. 7/ (p) "petrochemicals" means carbon or organic compounds (other than finished products or unfinished oils) which are produced from petrochemical plant inputs by chemical reaction in a petrochemical plant.

/Amdt. 6/ (q) As used in paragraph (g) and paragraph (h) of this section the term "petroleum oils" includes liquid hydrocarbons derived from crude oil.

/Amdt. 30/Sec. 23 Canadian Imports -- Districts I-IV.

(a) As used in this section, the term "Canadian imports" means imports from Canada of crude oil which has been produced in Canada and unfinished oils which have been derived from crude oil or natural gas produced in Canada and which have been transported into the United States by overland means or over waterways other than ocean waterways.

(b) To be eligible for an allocation of imports under paragraph (d) or (e) of this section, a person must have in Districts I-IV a facility capable of processing Canadian imports.

(c) The Administrator shall, in accordance with the terms of paragraphs (d) and (e) of this section, make allocations for the allocation period January 1, 1971 through December 31, 1971, of not to exceed 450,000 average barrels daily of Canadian imports into Districts I-IV. Licenses issued under such allocations shall permit the entry or withdrawal from warehouse for consumption of Canadian imports only.

(d) (1) The Administrator shall first make allocations of Canadian imports to eligible applicants who received allocations of such imports for the period July 1, 1970 through December 31, 1970, either from the Administrator under section 29 or from the Oil Import Appeals Board under section 21, or from both. Each such applicant shall be entitled to an allocation of Canadian imports equal to twice the total of allocations expressed in barrels, which he received under section 29 or section 21, or both sections, for the period July 1, 1970 through December 31, 1970, less twice the quantity, expressed in barrels, of natural gas liquids which he imported from Canada during the period April 1, 1970 through September 30, 1970. As used in this subparagraph, "natural gas liquids" means natural gas products and other hydrocarbons, such as ethane, propane, and butanes, or mixtures thereof, recovered from Canadian natural gas by means other than refining.

(2) If an applicant entitled to an allocation under subparagraph (1) of this paragraph would receive a larger allocation under paragraph (e) of this section, he shall be given the larger allocation in lieu of an allocation under subparagraph (1) of this paragraph.

(e) (1) Each eligible applicant shall be entitled to an allocation of Canadian imports equal to the total of the facility sub-allocations made to such person for each facility listed by the applicant in his application. The Administrator shall make a facility sub-allocation for a particular facility according to the following formula:

$$\frac{\text{Eligible applicant's qualified inputs to a particular facility}}{\text{Total qualified inputs to all facilities listed in applications of all eligible applicants}} \times \text{Quantity of Canadian imports not allocated under paragraph (d)}$$

As used in the formula, "qualified inputs" means refinery inputs to refinery capacity, and petrochemical plant inputs to facilities other than refinery capacity, made during the year ending September 30, 1970.

(2) With respect to new or reactivated refinery capacity, or petrochemical plants in Districts I-IV, the Administrator may make facility sub-allocations in accordance with, and subject to, the provisions of section 25 of this regulation, except that the facility sub-allocations shall be computed according to the formula set forth in subparagraph (1) of this paragraph (e). Subparagraphs (3) and (4) of paragraph (b) of section 25 shall have no application with respect to inputs estimated for the purposes of a facility sub-allocation. Paragraph (d) of section 25 shall be applicable only with respect to future allocations of Canadian imports.

(3) A person who receives an allocation under this paragraph (e) shall not receive an allocation under paragraph (d) of this section.

(f) Each allocation made to a person under paragraph (d) or (e) of this section shall be reduced by the amount of licenses issued under any interim allocation or partial allocation of Canadian imports made to that person for the allocation period.

(g) A person receiving an allocation under paragraph (d) of this section must process in his facilities a quantity of Canadian imports equal to at least 50 percent of that allocation. A person receiving an allocation under paragraph (e) of this section must process in each facility for which a facility sub-allocation is made a quantity of Canadian imports equal to at least 50 percent of that facility sub-allocation. For the purposes of this paragraph, blending by mechanical means does not constitute processing.

(h) If a person who receives an allocation of Canadian imports under this section fails to import the total quantity of imports specified in the allocation, or if he fails to process all such imports (and domestic oil received in exchange for such imports) in his facilities before March 1, 1972, or if he fails to meet the requirement of paragraph (g) of this section, then any allocation of Canadian imports, or any allocation for Districts I-IV to which such person may otherwise be entitled under section 9, 10, or 25 of this regulation, for the first allocation period beginning after January 1, 1972, shall be reduced by the Administrator by the amount of Canadian imports which such person has failed to import, or by the amount of Canadian imports and exchanged oil which such person has failed to process in his facilities before March 1, 1972, or by the amount of Canadian imports by which he failed to meet the requirements of paragraph (g), except that the Administrator need not make such a reduction to the extent that (1) such person demonstrates to the satisfaction of the Administrator that such failures were without such person's fault and were beyond his control, or (2) such person on or before May 1, 1971, in writing, relinquishes all or part of an allocation made under this section and returns to the Administrator licenses issued thereunder.

(i) A person to whom an allocation is made by the Administrator under this section shall report and certify in writing to the Administrator, Oil Import Administration, Department of the Interior, Washington, D.C. 20240, not later than March 15, 1971, (1) the total quantity of Canadian imports which that person imported during the period July 1, 1970 through December 31, 1970, pursuant to an allocation made under section 29 of this regulation, and (2) the quantity of such imports that were processed in his facilities before March 1, 1971. The amount so reported and certified shall be subject to verification by the Administrator. If a person to whom an allocation is made under this section fails to file by March 15, 1971, the written report and certification required by this paragraph, the Administrator shall suspend all licenses issued under an allocation made under this section until the written report and certification are received.

(j) If a person who received an allocation of Canadian imports under section 29 of this regulation failed to import the total quantity of imports specified in the allocation or (unless an exchange was approved) if he fails to process such imports in his facilities before March 1, 1971, then any allocation for Districts I-IV to which such person may otherwise be entitled under section 9, 10, or 25 of this regulation for the first allocation period beginning after March 1, 1971, shall be reduced by the Administrator by the amount of Canadian imports which such person failed to import or which such person has failed to process in his facilities before March 1, 1971, except that the Administrator need not make such a reduction to the extent that (1) such person demonstrates

to the satisfaction of the Administrator that such failures were without such person's fault and were beyond his control, or (2) such person on or before August 1, 1970, in writing, relinquished all or part of the allocation made under section 29 and returned to the Administrator licenses issued thereunder.

(k) An allocation made pursuant to this section shall not be sold, assigned, or otherwise transferred. Each person who imports Canadian imports under an allocation made pursuant to this section shall process such imports (or oil received in an exchange) only in the facilities set forth in his application.

(l) A person who imports Canadian imports under an allocation made pursuant to this section may exchange not to exceed 50 percent of such imports for domestic crude oil or domestic unfinished oils. A proposed agreement for each such exchange must be reported to the Administrator before any action involved in the exchange is taken. Each such exchange must be effected on a ratio of not less than one barrel of domestic oil for each barrel of Canadian imports.

(m) If a person holds an allocation of Canadian imports under this section and if he also holds an allocation of imports under section 9, 10, or 25 for the period January 1, 1971 through December 31, 1971, he may obtain from the Administrator a license which will permit him to import Canadian imports in a quantity not exceeding two-thirds of the amount of the allocation made under section 9, 10, or 25. Such licenses shall be charged against the allocation made under section 9, 10, or 25.

(n) Under the provisions of section 1A of Proclamation 3279, as amended, (35 F.R. 19392) "entries for consumption of crude oil or unfinished oils transported by pipeline may be made until midnight January 15, 1972, under any license authorizing such imports from Canada" into Districts I-IV for the period January 1, 1971 through December 31, 1971.

(o) An application for an allocation under this section shall be made by letter or telegram to the Administrator, Oil Import Administration, Department of the Interior, Washington, D. C. 20240. Applications must be received by the Administrator on or before March 5, 1971. An application must contain the following information, which shall be certified by an officer of the applicant:

(1) The nature of each of the applicant's facilities in which Canadian imports will be processed.

(2) The location of each such facility.

(3) The total barrels of natural gas liquids (see subparagraph (1) of paragraph (d)) imported from Canada during the period April 1, 1970 through September 30, 1970.

(4) The total barrels of qualified inputs (as defined in subparagraph (1) of paragraph (e)) for each such facility during the year ending September 30, 1970.

An officer of an applicant shall also certify in his application that, if an allocation of Canadian imports is made to the applicant under this section, the applicant will process all such imports (and all oil exchanged for such imports) in such facilities before March 1, 1972.

/Amdt. 16/Sec. 24 Aromatics and aliphatic hydrocarbons.

(a) Benzene or toluene or any xylene derived from crude oil, liquefied gases, or natural gas products which meets the distillation specification of the ASTM standard specifications for that chemical is neither a finished product nor an unfinished oil. However, a mixture of hydrocarbons derived from crude oil, liquefied gases or natural gas products which contains benzene, toluene, or xylenes but does not meet the distillation specification of the ASTM standard specifications for any of these chemicals is either a finished product or an unfinished oil.

(b) Materials which are derived from crude oil, liquefied gases or natural gas products and which are aliphatic mono-olefins or paraffins in the range of C_5-C_{15} are unfinished oils or finished products.

/Amdt. 9/ Sec. 25 Allocations of crude and unfinished oils--Districts I-IV, District V--new or reactivated refinery capacity and petrochemical plants--based upon estimated inputs.

(a) (1) The Administrator may make allocations of imports of crude oil and unfinished oils with respect to new or reactivated refinery capacity and petrochemical plants as provided in this section.

(2) Except as provided in paragraph (j), a person seeking such an allocation must file an application with the Administrator no later than 60 days prior to the beginning of an allocation period. The application shall disclose in detail such information as the Administrator may require, including:

(i) The nature of the facility,

(ii) The location of the facility,

(iii) The products and the quantity of each product to be produced,

(iv) The capital outlay involved,

(v) The expected average barrels per day of qualified feedstocks inputs to such facility,

(vi) The identification of the feedstocks, and the source thereof,

(vii) The date that the facility went on stream or is scheduled to go on stream, and

(viii) Whether this facility will replace an existing facility which is to be or has been shut down.

(b) (1) Subject to the limitations set forth in subparagraph (3) of this paragraph, if the new or reactivated refinery capacity is scheduled to come on stream during the allocation period for which the allocation is requested and if the applicant has no other refinery capacity, the allocation shall be computed according to the schedule in paragraph (b) of section 10 or 11 (as the case may be) on the basis of the quantity of inputs (divided by 365) which it is estimated will be made to such capacity during that allocation period. An applicant who receives an allocation for a particular allocation period pursuant to this subparagraph (1) may be eligible for an allocation pursuant to subparagraph (2) of this paragraph for the next succeeding allocation period.

(2) (i) Subject to the limitations set forth in subparagraph (3) of this paragraph, if the new or reactivated refinery capacity has come on stream during the allocation period immediately preceding the allocation period for which the allocation is requested and if the applicant has no other refinery capacity, the allocation shall be computed according to the schedule in paragraph (b) of section 10 or 11 (as the case may be) on the basis of the sum (divided by 365) of (i) the refinery inputs actually made to the new or reactivated refinery capacity during months of the allocation period immediately preceding the allocation period for which the allocation is requested and (ii) the inputs which it is estimated will be made to such capacity during the number of months which, when combined with the months in clause (i), will constitute a period of 12 months.

(ii) An applicant to whom an allocation is made under this subparagraph (2) shall not receive an allocation under section 9, or paragraph (b) of section 10 or 11.

(3) The maximum quantity of estimated inputs which an applicant may claim for the purposes of an allocation based entirely on estimated inputs pursuant to subparagraph (1) of this section shall be (i) 11 million barrels with respect to all new or reactivated refinery capacity in Districts i-IV, (ii) 11 million barrels with respect to such capacity in District V, (iii) 4 million barrels with respect to all new or reactivated petrochemical plants in Districts I-IV, and (iv) 4 million barrels with respect to such plants in District V. The maximum quantity

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of estimated inputs which an applicant may claim for the purposes of an allocation based on a combination of actual and estimated inputs pursuant to subparagraph (2) of this paragraph shall be the particular maximum quantity specified in the first sentence of this subparagraph (3) multiplied by the number of months of estimated inputs divided by 12.

(4) If the applicant has other refinery capacity, inputs estimated as provided in subparagraph (1) or (2) of this paragraph shall be added to the inputs of the applicant's other capacity for the purpose of computing an allocation under section 10 or 11.

(c) Allocations with respect to new or reactivated petrochemical plants shall be computed under section 9 of the regulations on the basis of estimated petrochemical plant inputs or a combination of actual and estimated inputs as provided for with respect to refinery capacity in paragraph (b) of this section 25.

(d) (1) If an allocation based in whole or in part on estimated inputs is made to an applicant pursuant to this section, the actual inputs submitted by the applicant as a basis for allocation in succeeding allocation periods will be adjusted upward or downward to compensate for the difference between the estimated inputs and the actual inputs made during the period for which inputs were estimated.

(2) If the estimated inputs upon which an allocation is based exceed the actual inputs made by more than 5 percent of the estimated inputs, in addition to the adjustment downward provided by subparagraph (1) of this paragraph the applicant shall be penalized for the overestimate as provided in this subparagraph (2). As a penalty, the actual inputs submitted by the applicant as a basis for allocations for succeeding allocation periods shall be further reduced by the number of barrels by which the estimated inputs exceeded the actual inputs by more than 5 percent of the estimated inputs. However, to the extent that an applicant demonstrates to the satisfaction of the Administrator that all or a part of the excess of estimated inputs over actual inputs was attributable to acts of God, fires or explosions, the Administrator may reduce the number of barrels of excess for which the penalty will be imposed. This subparagraph (2) shall not apply if an applicant made no use of the allocation based on estimated inputs.

(e) The Administrator shall make an allocation pursuant to this section only if he is satisfied that the applicant's new or reactivated refinery capacity or petrochemical plant constitutes a bona fide business venture. The Administrator shall not issue a license under an allocation made pursuant to this section until the new or reactivated refinery capacity or petrochemical plant has been on stream for not less than 60 days and until an on-the-spot evaluation of the new or reactivated refinery capacity or petrochemical plant has been conducted by authorized representatives of the Oil Import Administration and a determination has been made that

the facility has the actual operational capacity which the applicant has certified in his application. Licenses issued under allocations made pursuant to this section shall expire on the last day of the allocation period.

(f) If an allocation made under this section 25 has been made on the basis of the reactivation of particular refinery capacity or of a particular petrochemical plant, no further allocations shall be made under this section on the basis of a change in the status--that is, closure and reactivation--of the particular refinery capacity or petrochemical plant.

(g) New facilities which are constructed in Districts I-IV or District V for the purpose of replacing existing operating facilities in the respective districts which have been shut down or which are scheduled to be shut down will be evaluated on an individual basis, but in no event will the combined actual inputs to the facility which is to be replaced and estimated inputs to the new facility form the basis for computing an allocation under this section or sections 9, 10, or 11.

(h) No allocations made under this section may be sold, assigned, or otherwise transferred.

(i) (1) As used in this section 25, "new refinery capacity" or "new petrochemical plants" includes expansion of existing facilities by the addition of equipment, such as stills, towers, pumps, tanks, pipelines, and chemical conversion units if and only if the addition when installed independently of existing equipment would constitute refinery capacity or a petrochemical plant as defined in section 22. Additions which merely increase the throughput of existing equipment do not constitute new refinery capacity or petrochemical plants for the purpose of obtaining an allocation under this section. Transfers of equipment by an applicant from one of its plants or refineries to another of its plants or refineries do not constitue new refinery capacity or petrochemical plants for the purpose of obtaining an allocation under this section.

(2) As used in this section 25, "reactivated refinery capacity" and "reactivated petrochemical plants" means the restoration to operation of refinery capacity or a petrochemical plant which had been shut down for a period of not less than 12 months.

(j) (1) Subject to the limitations set forth in subparagraph (3) of paragraph (b), the Administrator may make allocations of imports of crude oil and unfinished oils with respect to new or reactivated refinery capacity and petrochemical plants for the last 184 days of this allocation period, as provided in this paragraph (j). Applications for allocations of imports of crude oil and unfinished oil under this paragraph (j) must be filed not later than July 17, 1968.

(2) (i) If new or reactivated refinery capacity has come on stream since January 1, 1967, or is scheduled to come on stream at any time during the current allocation period and if the applicant has no other refinery capacity, the allocation shall be computed according to the schedule in paragraph (b) of section 10 or of section 11 as amended by this Amendment 9 on the basis of the quantity of inputs (divided by 184) which it is estimated will be made to such capacity during the last 184 days of the allocation period.

(ii) An applicant eligible for an allocation under this subparagraph (2) may be eligible for an allocation under section 9, 10, or 11; in such instance, the Administrator shall compute allocations under section 25 and under section 9, 10, or 11 and make available to the applicant the larger of the two allocations.

(3) If the applicant has other refinery capacity, the allocation shall be computed under section 10 or 11 (as the case may be) on the basis of inputs to the other capacity plus actual inputs made to the new or reactivated refinery capacity during the period specified in those sections and an allocation shall be computed on the basis of inputs to the other capacity during the period specified in those sections plus estimated inputs to the new or reactivated refinery capacity for the last 184 days, as provided in subparagraph (2) of this paragraph, and the larger allocation shall be made to the applicant.

(4) Allocations with respect to a petrochemical plant shall be computed under section 9 of the regulations in the same manner as provided with respect to refinery capacity under this paragraph (j).

*Sec. 26 Allocations of unfinished oils--Districts I-IV based on production of low sulphur residual fuel oil in Districts I-IV.

/Amdt. 11/ (a) As used in this section:

(1) "low sulphur residual fuel oil" means residual fuel oil:

(i) which is manufactured in Districts I-IV, and

(ii) which contains not more than 1 percent of sulphur by weight, and

(iii) which is delivered (either directly by the manufacturer or by others following its sale by him) to customers in Districts I-IV who must burn such fuel in order to comply with Federal, State or local requirements.

*By order of April 30, 1969 (34 F.R. 7535), the Secretary of the Interior indefinitely suspended this section 26.

(2) "Western Hemisphere" means North America, Central America, South America, and the West Indies.

(3) "Desulphurization facility" means a facility which includes equipment for removing sulphur or sulphur compounds from residual fuel oil and which produces low sulphur residual fuel oil.

/Amdt. 11/ (b) This section provides for the making of allocations of imports into Districts I-IV of residual fuel oil or fuel oil based upon the production or estimated production of low sulphur residual fuel oil. Allocations made by the Administrator under this section 26 shall be in addition to allocations made under other sections of this regulation, and the Administrator shall make allocations under this section without respect to the quantity of imports available for allocations in Districts I-IV for a particular allocation period under other sections of this regulation. To the extent that the provisions of this section are inconsistent with the provisions of other sections of this regulation, the provisions of this section shall be controlling.

/Amdt. 11/ (c) (1) A person who manufactures low sulphur residual fuel oil in a desulphurization facility by desulphurization of residual fuel oil containing at least 2.0 percent sulphur by weight which was derived from crude oil produced in the Western Hemisphere shall receive an allocation of imports of residual fuel oil equal to the amount in barrels of low sulphur residual fuel oil so manufactured. Residual fuel oil imported under such an allocation must be derived from crude oil produced in the Western Hemisphere and must be processed other than by blending by mechanical means either by the person to whom the allocation is made or by the person receiving the residual fuel oil under an exchange agreement.

/Amdt. 13/ (2) Upon a showing satisfactory to the Administrator that the construction of a desulphurization facility has been or is about to be completed, the person owning the facility shall be entitled to an initial specific allocation of imports of residual fuel oil on the basis of the quantity of low sulphur fuel oil which he estimates will be produced by the facility during a period of 90 days following the day the facility goes on stream. No license shall be issued under such an allocation earlier than 45 days prior to the date that the newly constructed desulphurization facility is scheduled to go on stream, except in such amounts as may be required for starting and testing the new desulphurization facility, and in no event shall a license be issued under such an allocation until an on-the-spot inspection of the new facility has been conducted by authorized representatives of the Oil Import Administration and a determination has been made that the newly constructed facility will have the operational potential which the applicant has certified to in his application, and that it appears that construction will be completed. The Administrator may make further specific allocations based on the production estimated for succeeding

periods of 90 days each. Residual fuel oil imported under such an allocation must be derived from crude oil produced in the Western Hemisphere and must be processed other than by blending by mechanical means either by the person to whom the allocation is made or by the person receiving the residual fuel oil under an exchange agreement.

/Amdt. 13/ (3) In order to encourage the construction of new desulphurization facilities in Districts I-IV the Secretary may make a general allocation to an applicant if the Secretary is satisfied that an applicant's proposal to construct a desulphurization facility in Districts I-IV constitutes a bona fide business venture and that the construction of such facility will be carried to completion within a reasonable time. Such a general allocation may provide that the applicant shall be entitled, for such a period of time as the Secretary may determine, to specific allocations of imports of residual fuel oil as provided in subparagraph (1) of this paragraph and to initial allocations as provided in subparagraph (2) of this paragraph and to specific allocations as provided in paragraph (d) of this section.

/Amdt. 13/ (d) A person who produces low sulphur residual fuel oil by mechanically blending residual fuel oil to be used as fuel which has a viscosity not greater than 275 Saybolt Furol seconds at 122° F., which contains over 1.5 percent sulphur by weight, and which is derived from crude oil produced in the Western Hemisphere with distillate fuel oil which has a viscosity in the range of 22-40 Saybolt Universal seconds at 100° F. and which is manufactured in his refinery capacity or desulphurization facility in Districts I-IV shall receive an allocation of imports of fuel oil equal to the amount in barrels of the fuel oil which had a viscosity in the range of 22-40 Saybolt Universal seconds at 100° F. which was manufactured in his refinery capacity or desulphurization unit, and which was mechanically blended to produce low sulphur residual fuel oil. Fuel oil imported under such an allocation must have a viscosity within 2.0 Saybolt Universal seconds at 100° F., plus or minus, of the viscosity of the distillate fuel oil used for blending, must be derived from crude oil produced in the Western Hemisphere, and must be processed other than by blending by mechanical means either by the person to whom the allocation is made or by the person receiving the residual fuel oil or fuel oil under an exchange agreement.

/Amdt. 11/ (e) For the purpose of computing import allocations under sections 9, 10, and 25 of this regulation, neither residual fuel oil or fuel oil imported pursuant to an allocation made under this section 26 nor domestic oil received in exchange pursuant to the provisions of section 17 will qualify as either refinery inputs or petrochemical plant inputs. However, the person receiving the imported residual fuel oil or fuel oil under an exchange agreement pursuant to section 17 may count such oils as such inputs.

/Amdt. 11/ (f) The Administrator shall make an allocation under subparagraph (1) of paragraph (c) or paragraph (d) of this section only upon receipt from an applicant of a certification satisfactory to the Administrator with respect to the following matters pertaining to the production and delivery of the low sulphur residual fuel oil forming the basis of the application:

(1) location of plant in which produced,

(2) amount and sulphur content,

(3) source of crude oil from which unfinished oils were produced,

(4) source and disposition of unfinished oils,

(5) delivery, either directly by applicant or by others following sale by applicant, to customers in Districts I-IV who are required to burn such fuel oil in order to comply with Federal State or local requirements.

A similar certification as to prospective operations shall be made by an applicant for an allocation under subparagraphs (2) and (3) of paragraph (c). The Administrator may prescribe the form of certifications. An application for an allocation may be filed at any time. To apply for an allocation of imports under this section, an application must be filed with the Administrator in such form as he may prescribe. The Administrator may fix a period of time (not less than 180 days) for the expiration of licenses issued pursuant to specific allocations made under this section.

/Amdt. 11/ (b) No allocation made under this section shall be sold, assigned, or otherwise transferred.

/Amdt. 15/Sec. 27 Zone allocations -- District V.

(a) In instances in which the Secretary determines that to do so will be consonant with the objectives of Proclamation 3279, as amended, a zone allocation may be made to a person for feedstocks for refinery capacity or a petrochemical plant which will be established in a foreign trade zone in District V or for such a facility which is established in a foreign trade zone. Such a zone allocation will authorize the person to whom it is made to move quantities of foreign crude oil, or unfinished oils, having a non-privileged status,* into a specific foreign trade zone for processing. A zone allocation will not authorize the transfer of crude oil, unfinished oils, or finished products from a foreign trade zone into customs territory.

*Privileged foreign merchandise is merchandise which is appraised and taxes determined and duties liquidated thereon upon application for admission of the merchandise into the zone, or at any time thereafter and before the merchandise has been manipulated or manufactured in the zone in a manner which has effected a change in its tariff classification. (See 19 CFR 30.6)

(b) A zone allocation may be made for such period of time as the Secretary may determine and shall be subject to such conditions as the Secretary may prescribe.

(c) An application for a zone allocation should be filed with the Administrator. An applicant shall furnish in detail, such information as the Administrator may require, including--

(i) the nature of the facility,

(ii) the location of the facility,

(iii) the products and the quantity of each product to be produced,

(iv) the capital outlay involved,

(v) the average b/d of feedstock inputs to such facilities,

(vi) the identification of the feedstocks and the source thereof,

(vii) the date that the facility went on stream or is scheduled to go on stream,

(viii) the kinds and quantities of unfinished oils, finished products, or petrochemicals to be exported from the foreign trade zone; the kinds and quantities of unfinished oils or finished products which will be transferred from the foreign trade zone to customs territory under allocations made pursuant to sections 9, 11, 13, 25 and 28; the kinds and quantities of products to be shipped in bond from the zone for offshore use; and the kinds and quantities of petrochemicals to be transferred to customs territory from the foreign trade zone.

(d) Crude oil and unfinished oils moved into a foreign trade zone pursuant to a zone allocation made under this section shall remain in a non-privileged status and shall be processed in a particular zone and facility for which the allocation was made.

(e) When a zone allocation has been made under this section, the Administrator shall issue a license or licenses based on the allocation specifying the quantities of crude oil or unfinished oils which may be moved into the foreign trade zone, and the period of time such license or licenses shall be in effect. The Administrator may amend such licenses.

/Amdt. 15/Sec. 28 Allocations of low sulphur residual fuel oil--District V.

(a) This section provides for the making of allocations of imports into District V of low sulphur residual fuel oil to be used as fuel in District V. As used in this section 28, "low sulphur residual fuel oil" means (1) residual fuel oil to be used as fuel which is manufactured in a foreign area and which contains not more than five tenths of one percent (0.5%) sulphur by weight, or (2) residual fuel oil to be used as fuel which is manufactured by facilities in a foreign trade zone located in District V and which has a sulphur content not exceeding the percent by weight required by local government requirements.

(b) To be eligible for an allocation of low sulphur residual fuel oil under this section, a person must:

(1) Be in the business in District V of selling residual fuel oil to be used as fuel and have under his management and operational control a deep-water terminal located in District V into which there has been delivered residual fuel oil to be used as fuel which he owned at the time of delivery, such delivery being the first delivery of that oil into a deep-water terminal in District V; or

(2) Be in the business in District V of selling residual fuel oil to be used as fuel and have a throughput agreement (warehouse agreement) with a deep-water terminal operator under which agreement the person has delivered to the terminal residual fuel oil to be used as fuel which he owned when it was so delivered, such delivery being the first delivery of that oil into a deep-water terminal in District V. For the purposes of this section, "throughput agreement" means an agreement which provides for the delivery to a deep-water terminal by a person of residual fuel oil which he owns and for a right in such person to withdraw on call an identical quantity of such oil from the terminal. A bona fide throughput agreement will be deemed to exist only if the person operating under the agreement owns the oil at the time it is delivered to the terminal and only if that delivery is the first delivery of that oil into a deep-water terminal in District V.

(c) The maximum level of imports of residual fuel oil to be used as fuel into District V for a particular period, January 1 through December 31, shall be the level of imports of that product into District V during the calendar year 1957 as adjusted by the Secretary of the Interior as he may determine to be consonant with the objectives of Proclamation 3279, as amended.

(d) (1) The Administrator shall make allocations and issue licenses to each eligible applicant in District V of such quantities of low sulphur residual fuel oil to be used as fuel as the applicant certifies are required by the applicant to meet his obligations under firm existing contracts between the applicant and customers in District V.

(2) In the event that firm contracts which form the basis of an allocation are terminated or renegotiated, the holder of the allocation shall so advise the Oil Import Administration in writing and the allocation will be correspondingly adjusted.

(e) No allocations made pursuant to this section may be sold, assigned, or otherwise transferred.

Sec. 29 (Reserved)

Sec. 30 Allocations of No. 2 Fuel Oil--District I.

/Amdt. 26/ (a) For the purposes of this section:

(1) The term "No. 2 fuel oil" means a finished product which has the following physical and chemical characteristics:

Closed Cup Flash Point °F.	Min. 100
Pour Point °F.	Max. 20
Water and Sediment, percent	Max. 0.10
Carbon Residue on 10 percent Residuum percent	Max. 0.35
Distillation Temperature °F.	Max. 675
90 percent point	Min. 540
Viscosity, Saybolt Universal	Max. 40.0
Seconds at 100° F.	Min. 33.0
Gravity A.P.I.	Min. 30.0

(2) The term "Western Hemisphere" means North America, Central America, South America, and the West Indies.

(3) The term "deep water terminal" means a permanent land installation which:

(i) consists of bulk storage tanks having not less than 100,000 barrels of operational capacity, pumps and pipelines used for storage, transfer and handling of No. 2 fuel oil;

(ii) is on waterways that permit the safe passage to the installation of a tanker rated 15,000 cargo deadweight tons, drawing not less than 25 feet of water; and

(iii) has a berth that will permit the delivery of No. 2 fuel oil into the installation by direct connection from a tanker rated at 15,000 cargo deadweight tons, drawing not less than 25 feet of water, and moored in the berth. Cargo deadweight tons represent the carrying capacity of a tanker, in tons of 2,240 pounds, less the weight of fuel, water, stores and other items necessary for use on a voyage.

(4) The term "throughput agreement" means a written agreement which provides for the delivery to a deep water terminal by a person of No. 2 fuel oil which he owns at the time of delivery to the terminal and for a right in such person to withdraw on call an identical quantity of such oil from the terminal. Any transaction between persons involving sales, purchases, or exchanges of No. 2 fuel oil which were designed to gain allocation benefits for a person who would not otherwise be eligible shall not be deemed to constitute a throughput agreement.

/Amdt. 26/ (b) For the period January 1, 1971 through December 31, 1971, 40,000 b/d of imports of No. 2 fuel oil which is manufactured in the Western Hemisphere from crude oil produced in the Western Hemisphere are available for allocation in District I to eligible persons having qualified terminal inputs of No. 2 fuel oil in this district.

/Amdt. 26/ (c) (1) Except as provided in subparagraph (2) of this paragraph, a person shall be eligible for an allocation of imports into District I of No. 2 fuel oil under paragraph (e) of this section:

(i) If he is in the business in District I of selling No. 2 fuel oil and has under his management and operational control a deep water terminal which is located in District I and in which No. 2 fuel oil is handled, or

(ii) If he is in the business in District I of selling No. 2 fuel oil and has a throughput agreement with a deep water terminal operator in District I who does not have a crude oil import allocation in Districts I-IV.

(2) No person who has an allocation of imports into Districts I-IV of crude oil under sections 9, 10, or 25 of this regulation shall be eligible for an allocation under paragraph (e) of this section.

/Amdt. 26/ (d) A person seeking an allocation under paragraph (e) of this section must file an application with the Administrator on such form as he may prescribe no later than fifteen (15) days after the publication of this section in the Federal Register. The application shall disclose such information as the Administrator may deem necessary in such detail as he may require.

/Amdt. 26/ (e) (1) For the period January 1, 1971 through December 31, 1971, each eligible applicant under this section shall receive an allocation of imports into District I of No. 2 fuel oil which has been manufactured in the Western Hemisphere from crude oil produced in the Western Hemisphere computed according to the following formula:

$$\frac{\text{Applicant's qualified terminal inputs - avg. b/d for the period Oct. 1, 1969 through September 30, 1970}}{\text{Avg. b/d of all qualified terminal inputs for the period October 1, 1969 through September 30, 1970}} \times \text{40,000 avg. b/d of No. 2 fuel oil}$$

However, each such allocation shall be reduced by the amount of any licenses issued to the applicant under an interim allocation for the allocation period.

/Amdt. 33/ (2) The Administrator shall provide that each license issued under an allocation made pursuant to this paragraph (e) shall expire on December 31, 1971.

/Amdt. 26/ (f) (1) An eligible applicant may count as qualified terminal inputs quantities of No. 2 fuel oil:

(i) delivered during the 12-month period ending September 30, 1970, into a deep water terminal in District I which was under his management and operational control or into a deep water terminal with which the eligible applicant had a throughput agreement before the oil was delivered, if he owned the oil when it was placed in the terminal and if the delivery constituted the first delivery of that oil to a deep water terminal in District I; or

(ii) which the applicant owned, sold to a Federal agency or to any agency of a State or a political subdivision of a State, and delivered during the 12-month period ending September 30, 1970, to a deep water terminal in District I for the account of such agency, providing such delivery constituted the first delivery of that oil to a deep water terminal in District I; or

(iii) which was delivered to applicant's deep water terminal in District I as a first delivery into a deep water terminal in District I under a written agreement to purchase such oil and to which, pursuant to such agreement, the applicant took title during the 12-month period ending September 30, 1970 upon withdrawal by him from the terminal.

(2) For the purpose of this paragraph (f), storage of No. 2 fuel oil at a refinery in which the oil was produced or delivery of No. 2 fuel oil into a deep water terminal under the management and operational control of a person who has an allocation of imports of crude oil into Districts I-IV shall not be deemed to be a first delivery to a deep water terminal in District I.

/Amdt. 26/ (g) No allocation made pursuant to this section may be sold, assigned, or otherwise transferred. Licenses issued under allocations made pursuant to this section shall permit the importation only of No. 2 fuel oil which is manufactured in the Western Hemisphere from crude oil produced in the Western Hemisphere. No. 2 fuel oil imported under an allocation made pursuant to this section shall be sold for use as fuel in District I.

/Amdt. 27/Sec. 31 Asphalt

(a) As used in this section, the term "asphalt" means (1) if asphalt cement, a solid or semi-solid cementitious material which is

refined from crude oil and in which the predominant constituents are bitumens, and (2) if liquid asphalt, a product (i) the principal constituent of which is a cementitious material that, when refined from crude oil, was a solid or semi-solid consisting predominantly of bitumens, (ii) the kinematic viscosity of which is not less than 250 centistokes at 140° F., and (iii) in which hydrocarbon solvents do not exceed 40 percent of the product by volume.

(b) For the allocation period January 1, 1971 through December 31, 1971, the Administrator shall make an allocation of imports of asphalt into Districts I-IV to any person who certifies that such imports are required to meet obligations under contracts with, or purchase orders from, customers in Districts I-IV or to meet his own construction or manufacturing requirements. The allocation shall be in the quantity which such person certifies in writing is required to meet such obligations or requirements.

(c) Asphalt imports under an allocation made pursuant to paragraph (b) shall not be further processed except by blending by mechanical means or by air blowing and shall not be burned for lighting or for the generation of heat or power.

(d) Applications for allocations under this section may be filed with the Administrator at any time during the period. An application must be filed in such form as the Administrator may prescribe. All licenses issued under allocations made pursuant to this section shall be valid only during the period January 1, 1971 through December 31, 1971.

(e) No allocation made pursuant to this section may be sold, assigned, or otherwise transferred.

Mr. SNYDER. We also make allocations to petrochemical operators, regular and starters, and to the Canadian oil importers, crude and unfinished oil, in districts I–IV only, and then we have the deepwater terminal operators on the east coast who receive allocations of No. 2 oil.

EXCHANGES

Under past conditions, these allocations of 626,000 barrels a day to refiners and 106,000 barrels a day to petrochemical plants have exchanged for approximately an average of $1.25 a barrel.

The 450,000 barrels a day, because of the differential between the price of Canadian oil and that of domestic oil, have been exchanged for something like 50 or 60 cents a barrel. The 40,000 barrels a day of the No. 2 fuel oil that is imported in the Northeast we would expect to exchange for around a dollar a barrel, but because of the high tanker rates and because of the disruption in supply some of these exchanges are not going for near that.

SUPPLY DISRUPTIONS

Mrs. HANSEN. Why was there a disruption of the supply?

Mr. SNYDER. Tapline from the Middle East through Syria to Lebanon was ruptured and was not repaired. That disrupted the normal supply; and at the same time Libya cut back their production, which also disrupted a normal supply.

Mrs. HANSEN. How much did they cut back production?

Mr. SNYDER. As I recall, it was something like 700,000 to 750,000 barrels a day. I will have to check this.

But the result of this is that to move into Europe the same amount of oil required more tanker bottoms to come around by north Africa.

Mrs. HANSEN. You mean South Africa, don't you?

Mr. SNYDER. You are right, South Africa. I am sorry. The longer route required more T–2-type equivalents to carry the same volume of oil. Therefore, it placed a terrific demand on tankers and ran the rates up.

DESCRIPTION OF OIL IMPORT PROGRAM DISTRICT V

District V is a so-called deficit area. This particular district consists of Hawaii, Alaska, Washington, Oregon, California, and Arizona. You are in district V in respect to supply and demand of petroleum products. For the year 1971 we have estimated the demand for district V to be 2,115 000 barrels a day. We estimate that the domestic supply is 1,500,000 barrels a day. Therefore, we have a 615,000-barrel-a-day supply-demand gap that must be filled with imports. We have oil that is coming in by overland means from Canada into the State of Washington. We have estimated the quantity coming through the transmountain pipeline to be——

Mrs. HANSEN. Where is the terminal point?

Mr. SNYDER. In Anacortes, in Ferndale, in that area. I have never been there, Madam Chairman. Then we have made allocations to the Department of Defense. This is only in district V. If you recall, we made allocations to Defense in districts I to IV for 20,000 barrels a day. In district V we set aside for the Oil Import Appeals Board 4,000 barrels a day to make allocations to persons that show exceptional hardship caused by the program.

Also we have what we call a low sulfur residual fuel oil bonus program in district V whereby persons making five-tenths of 1 percent residual fuel oil in refineries in district V and delivered to customers that must burn this oil——

Mrs. HANSEN. Where is this oil from?

Mr. SNYDER. Where does the oil come from? The oil can be made from domestic and/or foreign oil. In these areas where the local government requires fuel oil with five-tenths percent or less sulfur content for antipollution control, we reimburse refiners for making low sulfur residual fuel with a barrel of crude oil from offshore. There are other technical requirements, but it is an incentive plan to use the import program for——

Mrs. HANSEN. What does that add to the cost?

Mr. SNYDER. Actually, on the west coast, incidentally, I might say that a barrel of oil under normal conditions has exchanged in district V for about 90 cents a barrel, but that is because you don't have the added tanker rates that you have to add in districts I through IV to have American-flag tankers move domestic crude oil up to the east coast.

Mrs. HANSEN. How many domestic-flag tankers are there on the west coast?

Mr. SNYDER. How many domestic-flag tankers that are operating on the west coast? I will have to look that up.

Mrs. HANSEN. Please insert in the record the domestic-flag carriers operating on the east and west coasts.

Mr. SNYDER. Yes. They change, but we will give you the best we can.

(The information follows:)

Domestic-flag tankers

West coast	41
East coast	133

Source: Maritime Administration.

Mr. SNYDER. At any rate, this 100,000 barrels a day we have to set aside because we allocate during the course of a year on a monthly basis to them for each month that they make x number of barrels of residual fuel oil. We will reimburse them with an equal number of barrels of crude oil.

In district V this chart is a further breakdown of how the oil is allocated. The U.S. Oil & Refining Co. in Tacoma, Wash., had been granted at an earlier date a continuing allocation for 8,000 barrels a day of crude oil on the basis that the Board found it was suffering an exceptional hardship because of a lack of domestic crude oil available to them, and the Board has continued that allocation. That is a board grant, but it is a deductible item from the total, and we have to account for it.

There are very few plants in district V; therefore, we have only set aside 4,000 barrels a day.

Mrs. HANSEN. Where are the petrochemical plants located?

Mr. SNYDER. The petrochemical plants are spread out mostly in California and are mostly an integral part of the refineries there. Of that 4,000 barrels we actually allocated around 3,600.

We allocate to the petrochemical plants at a percentage factor of 11.9 percent multiplied by their qualified feedstocks which they convert into petrochemicals.

DESCRIPTION OF ALLOCATION COMPUTATION, DISTRICTS I TO IV

We will go back to districts I through IV and I will try to simplify the somewhat complex formula under which we allocate. Each refiner submits its application to us through the controlling entity. An entity makes application for all of their refineries.

Mrs. HANSEN. Such as?

Mr. SNYDER. Such as Standard of New Jersey being the controlling person would make application for all its domestic refineries that are operated and controlled by the parent and subsidiaries. They submit to us a total number of refinery inputs as the basis for an allocation. We compute the quota in the following fashion: Assuming they have 800,000 barrels a day of total inputs the first 10,000 barrels, we would give them 20 percent of that in the form of quota. On the next 20,000, between 10,000 and 30,000, we give them 12 percent, and so on. Now, this more or less gives the ratio preference to the smaller refiners in order that they can compete on a little bit more favorable basis. This procedure has been debated over the years but it is still in effect.

Mr. YATES. On the quota, sir, when you say that they get 20 percent what does that mean? That they get 20 percent——

Mr. SNYDER. Well, now, a company is eligible by definitions under the regulations. Let's just speak of a refinery in Districts I through IV. There is a certain quantity of oil which we are going to allocate. We allocate it on the basis of qualified and defined feedstocks that a refinery processes. We use these feedstocks as a measurement of the business done by the refinery. We do this on a sliding scale. If a plant has a total of 100,000 barrels a day of qualified feedstocks, we multiply the first 10,000 by 20 percent. On the next 20,000 we multiply by 12 percent, and then we carry out whatever 12 percent is of 20,000. We have this illustrated on the next chart. The computation is cumulative 100,000 barrels a day of inputs would earn a quota of 9,300 barrels a day. The larger refiners exceed 100,000 barrels a day. They get 3.5 percent of all inputs over 100,000 barrels a day. This formula is not a happenstance. It is something we have to work out and formulate each time and with a given amount of quota we try to make it reasonable and fair.

Mrs. HANSEN. Does that answer your question?

Mr. YATES. Yes.

DESCRIPTION OF ALLOCATION COMPUTATIONS, DISTRICT V

Mr. SNYDER. Madam Chairman, in District V, because we have fewer refiners and smaller amount of oil, we concentrate on the smaller refiners. For the first 10,000 barrels a day of inputs we allocate 60 percent. In that area there is a reason for the larger percentage, but I won't get into it unless you want me to.

Mrs. HANSEN. Please do.

Mr. SNYDER. In District V the major portion of the domestic crude oil is not owned by independent refiners. Therefore, given the relatively

larger quota which they can exchange for domestic crude oil, they are given somewhat more assurance that they can get the domestic oil. It has this effect: For instance, a 10,000-barrel-a-day refinery in District V would get 6,000 barrels a day of offshore quota which it would not necessarily have to run itself but could exchange it for domestic oil and the value of the quota reduces the total average cost of their feedstocks, what they have to pay out of pocket for the feedstocks. I am sorry; it is a little difficult to explain.

Mrs. HANSEN. I understand.

Mr. SNYDER. Now, this chart is designed to show you, as to refiners, assumed different sizes of entities, the controlling company, and the various ratios of 1971 quota compared to their total inputs.

Mrs. HANSEN. Please insert the charts in the record?

Mr. SNYDER. Yes, ma'am.

(The charts follow:)

MANDATORY OIL IMPORT CONTROL PROGRAM

1971

DISTRICTS 1 - 1V

	B/D	B/D	B/D
PROCLAMATION 4025 Level			
Offshore (Includes 40,000 B/D #2 Oil)			1,000,000
Canadian Crude and Unfinished Oil			450,000
TOTAL CONTROLLED DISTRICTS 1 - 1V IMPORTS			1,450,000
LESS:			
Puerto Rico Shipments			
Phillips	24,800		
Commonwealth	20,000		
Sun	17,200		
		62,000	
Mexico		30,000	
Oil Import Appeals Board		45,000	
Reserve for Contingencies		56,000	
Defense (Excludes Residual)		20,000	
			213,000
TOTAL ALLOCABLE			1,237,000

DISTRICTS 1 - IV

	B/D	B/D	B/D
ALLOCATED QUANTITIES			
Hess Oil Co. (Virgin Islands)		15,000	
Refiners (Regular and Starters)		626,000	
Petrochemicals (Regular and Starters)		106,000	
Canadian Oil Importers		450,000	
Terminal Operators (#2 Oil)		40,000	
TOTAL ALLOCATED			1,237,000

DISTRICT V

	B/D	B/D	B/D
TOTAL CONTROLLED DISTRICT V IMPORTS (DEMAND LESS SUPPLY)			615,000
LESS:			
Estimated Canadian Imports		245,000	
Defense (Finished and Residual)		7,500	
Oil Import Appeals Board		4,000	
Estimated Low Sulphur Residual		100,000	
			356,500
TOTAL ALLOCABLE			258,500

DISTRICT V

	B/D	B/D	B/D
ALLOCATED QUANTITIES			
U. S. Oil (OIAB Grant)		8,000	
Petrochemical (Regular and Starters)		4,000	
Refiners (Regular and Starters)		246,500	
TOTAL ALLOCATED			258,500

DISTRICTS I-IV

INPUTTERS

MB/D				B/D		B/D	B/D
0 - 10	=	20.0%	X	710,228	=	142,046	
10 - 30	=	12.0%	X	883,439	=	106,013	
30 - 100	=	7.0%	X	1,839,027	=	128,732	
100 +	=	3.5%	X	6,112,154	=	213,925	
							590,716
OIAB Grants						750	
Gabriel							750
TOTAL							591,466

DISTRICT V

INPUTTERS

MB/D				B/D		B/D	B/D
0 - 10	=	60.0%	X	240,930	=	144,558	
10 - 30	=	15.0%	X	237,930	=	35,637	
30+	=	5.0%	X	967,343	=	48,367	
							228,562

OIAB GRANTS

U. S. Oil	8,000	8,000
		236,562

DISTRICTS 1-IV

B/D Inputs	B/D Allocation	Percent of Inputs
10,000	2,000	20.0
30,000	4,400	14.7
70,000	7,200	10.3
100,000	9,300	9.3
200,000	15,250	7.6
300,000	16,300	5.4
400,000	19,800	5.0
500,000	23,300	4.7
600,000	26,800	4.5
700,000	30,300	4.3
800,000	33,800	4.2
900,000	37,300	4.1

DISTRICT V

B/D Inputs	B/D Allocation	Percent of Inputs
10,000	6,000	60.0
30,000	9,000	30.0
70,000	11,000	15.7
100,000	12,500	12.5
150,000	15,000	10.0
200,000	17,500	8.8
300,000	22,500	7.5
400,000	27,500	6.9

OIL IMPORT ADMINISTRATION

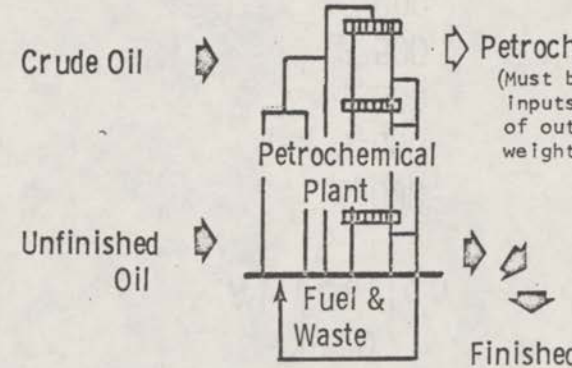
INPUTS

ELIGIBLE

Domestic Crude Oil
Domestic Unfinished Oils
Domestic Natural Gas Products
Foreign Oils Imported pursuant to an allocation (except overland imports)

INELIGIBLE

Canadian Natural Gas Liquids
Ethane, Propane, and Butane
From Western Hemisphere



OUTPUTS

Polyethlene
Ethylene Oxide
Styrene
Vinyl Chloride
Ethanol
Polypropylene
Acrylonitrile
Propylene Oxide
Isopropanol
Oxo Alcohols (approx.10)
Cumene
Benzene
Toluene
Xylenes (3)
Carbon Black
Butadiene
Phenol Derivatives (approx.20)
Tetraethyl Lead
Synthetic Rubber (approx. 5)

OIL IMPORT ADMINISTRATION

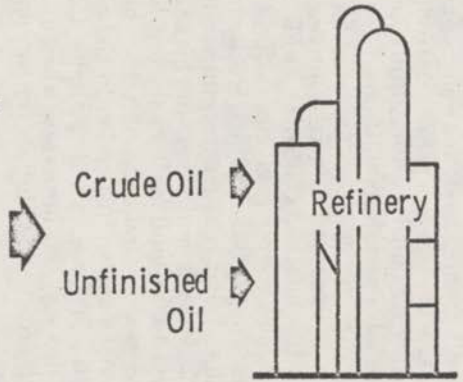
INPUTS

ELIGIBLE

Domestic Crude Oil
Domestic Natural Gas Products
Foreign Crude and Unfinished Oils imported pursuant to an allocation

INELEGIBLE

Domestic Unfinished Oils
Mexican Crude and Unfinished Oils
Canadian Natural Gas Liquids
Ethane, Propane, and Butane From Western Hemisphere



OUTPUTS

Finished Products
(must be 70% of Inputs)

Gasoline
Jet Fuel
Heating Oil
Lube Oil
Asphalt

Unfinished Oils
(to be further processed)

Mr. SNYDER. Let's just move on now. The next chart shows district V and a 100,000 barrel refiner in district V under this formula receives 12,500 barrels a day of quota. 10,000 barrels a day as an example gets 6,000, so you can see the difference. We relate it somewhat to the income tax scale, only in reverse.

FUNDING JUSTIFICATION

It is incumbent upon us to verify from time to time, not from the standpoint necessarily that people are trying to defraud, but from the standpoint of interpretation and clarification of various and different construction of the regulations so that everyone will submit data in a consistent manner and receive a fair share of quota.

Now, the reason that we need inspectors to verify is because we have a very complex way of measuring the inputs we have mentioned. As an example, in the refineries only some of the feedstocks are qualified inputs. Some feedstocks are ineligible.

As an example of ineligible feedstocks, in district V there is oil from Canada, imported by overland means that is going into your State of Washington. Because the oil is quota free and we don't limit the quantity, it doesn't form a basis for generating an offshore quota. In districts I through IV where we are controlling Canadian oil imports, and where we have it under an allocation system, we allow it to be counted as inputs under certain conditions.

Mrs. HANSEN. Such as?

Mr. SNYDER. Well, if it is crude oil and it is processed it can be counted as a basis for getting another Canadian crude oil allocation and in addition it can also be counted as inputs for computing an offshore quota. If it is a natural gas liquid, which is a hydrocarbon and quota free because it is a liquid that is usually produced in conjunction with the production of natural gas and the policymakers felt that it wasn't necessary to control those liquids, it could not be counted as an input even though processed in a refinery. What we have along the Canadian border requires not only an inspection in the plants, but we must identify in that particular area, which includes Chicago, those hydrocarbons which can properly be imported without a license, as well as hydrocarbons which are qualified inputs for computing offshore and Canadian oil allocations.

Mrs. HANSEN. You referred to policymakers. Who are the policymakers?

Mr. SNYDER. As I pointed out in the early part of my presentation, the proclamation is governing. It sets forth policy. The Oil Policy Committee recommends to the President various changes. He either accepts their recommendations or he rejects them.

Mr. YATES. Madam Chairman, did you say he placed the names of the people on the Oil Policy Committee in the record?

Mrs. HANSEN. Yes; they were inserted in the record earlier.

PETROCHEMICAL PLANT ALLOCATIONS

Mr. SNYDER. Now, as to the petrochemical allocations, and although we allocate 106,000 barrels a day, which is somewhat short of the 626,000 barrels a day that we allocate to refiners——

Mrs. HANSEN. Why the distinction?

Mr. SNYDER. Well, it is an evolutionary process of bringing the petrochemical people into the program during the latter part of 1966, and then upward adjusting that portion of the level allocable to them. At the present time petrochemical allocations are not computed on a sliding scale. Petrochemical plants receive 11.2 percent of inputs, but it is a very complex program and there may be three petrochemical plants in one geographical area. We are looking to the chemical conversion of a particular feedstocks by a particular plant that may be a part of a larger complex.

Mrs. HANSEN. Have you made any changes with regard to oil imports for petrochemicals this year?

Mr. SNYDER. No, ma'am. Under amendment 29, section 9, we made allocations for the 1971 period of this 106,000 barrels that we have set aside for them. We have given them 11.2 percent of their inputs during the year ending September 30 and we have some quota left to be allocated to the starters.

Mrs. HANSEN. Please continue.

FUNDING JUSTIFICATION

Mr. SNYDER. Now, I just want to bring your attention to one more point, and I am going to bring this to a close unless you have more questions, Madam Chairman. We have established the Houston office, and there are 275 plants, refiners, and petrochemical plants in that area. The $117,000 increase for which we are asking is to open the proposed Chicago and Los Angeles offices. The Chicago office will be responsible for 176 plants in that area and the Los Angeles office 118 in its area.

Now, I want to go on the record at this point and say that I can't foresee in my judgment that we will ever in operating an oil import quota program as we know it today need any further personnel for these field offices. If we are successful in maintaining and establishing a verification program in these new offices, the two new ones that we hope to get——

LOCATION OF OIA FIELD OFFICES

Mrs. HANSEN. Where are your field offices located?

Mr. SNYDER. Right at the present time we have one in Houston, Tex. and what we are asking for here are the funds to open our Chicago and our Los Angeles offices so we can spread this verification task around.

Mrs. HANSEN. Do you have any offices in the Northeast or the East?

Mr. SNYDER. No. In the Northeast, first of all, there are not many refineries and petrochemical plants. In the direct Northeast, if you are talking about the New England States, we do have the terminal operators.

Mrs. HANSEN. I am talking about the whole east coast.

Mr. SNYDER. Yes. Now, we plan to do some inspection out of the Washington office if we feel that it is more justified to send people from the Washington office, but basically the Chicago office will cover the New York and New England, areas.

INCREASED FUNDING AND STAFFING

Mrs. HANSEN. Justify your requested increase of $117,000 and six positions.

Mr. SNYDER. Yes, ma'am. May I ask Mrs. Ronkovich if she would break that down for you?

Mrs. HANSEN. Yes.

Mrs. RONKOVICH. We would like to have three people in each office, a chemical engineer-industrial specialist and one assistant industrial specialist (petroleum accounting), and then one steno in each office.

Mrs. HANSEN. To what extent have you been able to improve your audit of oil imports during the past year?

Mr. SNYDER. To the extent that we have opened our Houston office and have gone through a training program, that is, we have improved in that respect, but we have also——

SURVEILLANCE PROCEDURES

Mrs. HANSEN. What does your surveillance consist of?

Mr. SNYDER. In going out into the field, and so forth?

Mrs. HANSEN. Yes, in your inspections.

Mr. SNYDER. This is the thing about it. Operating our inspection business like we have, we have just been merely touching the surface, the problems that we have found result partly from misinterpretations of the regulations, partly from the importers putting the burden on us to prove them wrong. We found that we have to start establishing a system whereby the importers themselves will maintain their own inspection system to assure compliance and we propose to write into the regulations the general procedures for this system and the supplemental provisions that will take care of the different plants, you see, but we have not performed the type of inspection that we feel we should perform because we have been merely touching the surface.

We thought at one time that we would get industry policing, that people would call to our attention to incorrect data but we found that this was not true.

Mrs. HANSEN. That is never going to work.

Mr. SNYDER. No. Well, we were hopeful at the beginning of this program that people knew their competitors' business a little bit more but they just don't know it well encough for the technical aspects of computing quotas. They may know what a competitor sells and they may know where he gets his crude oil, but they have a hard time knowing on a day-to-day basis——

INCREASED FUNDING JUSTIFICATION

Mrs. HANSEN. I think it is your responsibility to have this information.

Mr. SNYDER. Oh, yes.

Mrs. HANSEN. I am somewhat startled that you haven't asked earlier for increases in compliance and audit because this has been

something we have asked about each year. Each year we have been assured that it was progressing satisfactorily.

Mr. SNYDER. Madam Chairman, I will have to ask Mr. Perry. Actually, we were just given our funds for the Houston office in fiscal 1971 for the first time.

Mrs. HANSEN. I do not recall an additional request of funds for this activity in the past.

Mr. SNYDER. On October 1 of 1963 I drafted and we implemented in the regulation under section 6 an inspection and compliance authorization. I can only speak of my efforts over the years because I just happen to be Acting Administrator at this moment.

Mrs. HANSEN. Some place in the budgetary system the funds were deleted.

Mr. SNYDER. Apparently.

Mrs. HANSEN. Each year we have asked you what you have been doing to step up your auditing procedures so that you would have adequate information because it seemed to us that you are overseeing a sizable amount of oil and you needed to have the necessary personnel.

Mr. GALIFIANAKIS. Madam Chairman, may I ask what is the prevailing violation?

Mr. SNYDER. May I give you an example, sir?

Mr. GALIFIANAKIS. Yes, sir.

Mr. SNYDER. In the petrochemical areas, as a matter of fact, in the whole course of the import program, we operate in a fishbowl. We have a complicated application form in respect to the conversion requirement and the capabilities of these various plants. The petrochemical industry is an industry that has been progressing all along. They are very secretive in their particular operations.

Mrs. HANSEN. Why?

Mr. SNYDER. What do you call it?

Mrs. HANSEN. Proprietary interest?

Mr. SNYDER. Yes; proprietary interest. Therefore, when many of these people who are competitors come in and look at the application forms, they see how certain companies are completing it, and interpreting the regulations, then they will go back the next year and they will interpret the regulations this same way, and the first thing you know there are maybe four or five companies interpreting the regulations a strained or a different way entirely than what we thought we had written in the English language. In the meantime what has happened is that the companies have gotten into the situation of putting the burden on us.

Mr. GALIFIANAKIS. Wherein lies the violation of the proprietary right?

Mr. SNYDER. That is the reason I was giving you this example. Where it lies is a matter of interpreting the regulations in such a manner as to fit their particular operation the best to gain them the quota. It is a competitive situation. If given a certain amount of oil to allocate and a percentage——

Mr. GALIFIANAKIS. The allocation is based on their allegations in their applications, is that right?

Mr. SNYDER. That is right.

Mr. GALIFIANAKIS. And you evaluate those?

Mr. SNYDER. We hope to evaluate them better. We evaluate them on the basis of submissions to us, based on certification.

Mr. GALIFIANAKIS. I was trying to get at when you evaluate one, for example, you find what? That they are padding facts so as to increase their allocations?

Mr. SNYDER. No; I am going to give way to Mr. Perry here because he has done quite a lot of our outside inspection for us and he has been in company with the auditors. Dell, if you would.

Mr. PERRY. With most of the petrochemical plants to which Mr. Snyder has addressed himself the problem arises in that they have to have a 50-percent conversion. Now, the method by which they construe conversion and 50 percent and what they construe to be their inputs is where we have the problem. The constructions are not all alike.

Mr. GALIFIANAKIS. You are checking the formula application, aren't you?

Mr. PERRY. Yes; I have not found in our cursory inspections, particularly, that anybody is knowingly making false statements.

Mr. GALIFIANAKIS. You are talking about mathematical formulas, aren't you?

Mr. PERRY. Let me see. It is not a matter of a simple arithmetical computation if that is what you are asking.

Mr. GALIFIANAKIS. That is part of it, though, isn't it?

Mr. PERRY. It is, but this is not where the problem arises. A petrochemical plant has to convert 50 percent of its eligible inputs into petrochemicals. This conversion should be verified. We find sometimes that they claim as inputs some of these ineligible materials shown on the chart. I don't contend that they deliberately attempt to defraud. The regulations are pretty complex. One of the common things that has happened is that we construe our regulations to say very plainly these products have to be separate streams. Occasionally somebody will have several of these products mixed together in one stream and claim the component parts.

Mr. GALIFIANAKIS. Are the regulations written in such a way that they are that inarticulate so that you have such a wide divergence of viewpoint as to what is expected?

Mr. SNYDER. Yes. That is why we think we ought to have more staff.

Mr. GALIFIANAKIS. That is what I was groping for. When they ask for the additional staff what in fact are they inspecting? The procedures?

Mr. PERRY. We find that we need to have an engineer to tell us what this plant does and whether it can do what they are contending that it does. It is very hard for a layman to walk out and see these massive arrays of pipes——

Mr. GALIFIANAKIS. What is the qualification of your inspectors?

Mr. PERRY. We are looking for a chemical engineer at grade 13 and the second man is really not an accountant, in the parlance of

the industry he is a yield clerk or someone who has been responsible for accounting for materials going through a plant. We expect to hire for this position at the grade 12 level.

Mr. GALIFIANAKIS. Basically, you accept the word of the company on that score?

Mr. PERRY. At the present time we accept it almost entirely.

Mr. SNYDER. I might add if we are successful in this I think that our workload in these areas will actually decrease in 3 years. This is the reason why I feel that we will never have to add anybody into those offices.

Mrs. HANSEN. How many violations have you had?

Mr. SNYDER. Of the percentage that we have looked at, I would say that there are hardly any we have ever gone to that we don't find something wrong.

Mrs. HANSEN. So it is mandatory that you have the additional people?

Mr. SNYDER. I feel very strongly that it is if we are to administer a program fairly and equitably among all quota holders.

Mrs. HANSEN. Mr. Yates?

OIL IMPORT POLICY DETERMINATION

Mr. YATES. Who determines the amount of oil that comes into this country?

Mr. SNYDER. The President ratifies a proclamation.

Mr. YATES. Who makes the proclamation?

Mr. SNYDER. You mean in the draft form?

Mr. YATES. You said the President ratifies the proclamation.

Mr. SNYDER. The Oil Policy Committee recommends the——

Mr. YATES. The amount of oil that is to come into this country?

Mr. SNYDER. Yes.

Mr. YATES. How do I get more oil and oil products for the city of Chicago which has a shortage?

Mr. SNYDER. Sir, at the present time the amount of crude and unfinished oil that can come down to what we call the northern tier area from Canada is 450,000 barrels a day.

Mr. YATES. Why isn't it more?

Mr. SNYDER. This in the judgment of the policy committee was the proper amount. That figure was placed in the proclamation which the President signed. Now, there were figures looked at and it was a balance between total imports and total domestic supply that was available to the area.

Mr. YATES. You mean to maintain a shortage there?

Mr. SNYDER. To maintain a shortage in that area?

Mr. YATES. To maintain a shortage in Chicago. There has been a shortage in Chicago and in that area for the last 10 years, to my knowledge. Is it the policy of the committee to maintain that kind of a shortage?

Mr. SNYDER. No, sir. We speak of allocations in barrels-per-day, this means when we license a company it has a total license that is good for the year. He can nominate his oil. He can program it and he

can transport it there. As an example, 450,000 barrels a day multiplied by 365 days, all of this oil could come in during the first 3 months. It is the prerogative of the importer as to how he schedules his own oil. We don't limit him to the 450,000 barrels a day of Canadian oil. That is the way we express it, but the license is in total barrels.

Mr. YATES. Can he import as much as he wants to?

Mr. SNYDER. He can import as much as he can possibly get through the pipeline that is coming down there right now at the present time under the allocation system.

Mr. YATES. I know that.

Mr. SNYDER. If he can nominate the oil.

Mr. YATES. I know it is under the allocation system. Suppose there were no allocation system. Would he be able to import more from Canada?

Mr. SNYDER. I think that it would be a melding between the domestic supply of the refiners in the Chicago area and their particular lead plans of taking domestic production from themselves or other people in the Louisiana area and also in the Texas area. You want to remember all the time that they have to meld these things because they can't be completely dependent on a single source of supply for 3 months and shut something else down and then turn around and shut that down. You see, it is a lead time type of thing. It is a melding, a percentage, blending their tanks, figuring their yields of the particular type of products that they want to manufacture and the quality of the crude oil.

Mr. YATES. What you are saying is that there is a certain amount of oil available from the various fields to parts of the country and that there is a limit that is placed on the amount that is made available from those fields during the course of the year; is that correct?

Mr. SNYDER. You are speaking in terms of prorationing laws, and so forth? I am not an expert on this.

Mr. YATES. The answer to that is yes, isn't it?

Mr. SNYDER. The answer to what is yes?

Mr. YATES. To my question.

Mr. SNYDER. I was trying to point out that there is a system of regulatory agencies in six States.

Mr. YATES. That is right, and they limit the amount of oil that can be withdrawn from the ground?

Mr. SNYDER. Under their own formula.

Mr. YATES. That is right. Wouldn't it be better if the purpose of that is to conserve our domestic supply to open up the import quotas and permit more oil to come in from outside of the country?

Mr. SNYDER. And conserve your own oil?

Mr. YATES. That is right.

Mr. SNYDER. I will make one comment here. There is one thing that I think you must remember, that there are thousands of wells, which are known as marginal wells, throughout the country. These wells are not the type that you can shut in and bring back on the stream with any kind of economic benefit. I am no geologist but all the geologists and the petroleum engineers tell me you must keep these types of wells flowing. They are on pumps mostly, two, three barrels a day.

Mr. YATES. With respect to the offshore oil which is federally owned and which is under lease, can any independent refiner in the city of

Chicago, for example, make a deal with the driller to get as much oil as he wants, or is there a quota on those, too?

Mr. SNYDER. There is a production allowable and this has been under discussion recently. At one time, not too long back, the Federal Government allowed its particular offshore production to fall in line with adjoining States, but I believe that the President passed this on to Secretary Dole. This is out of my area. I shouldn't comment on it.

Mr. YATES. What did Secretary Dole do? As I remember what happened, Secretary Dole opened them up and permitted more oil to be pumped, didn't he?

Mr. SNYDER. I am not real familiar with what they are doing in that area. I will have to apologize on that. I am under the impression that they were hopeful that more oil could be produced.

Mr. YATES. Yours is purely an administrative agency?

Mr. SNYDER. I am Acting Administrator of the Oil Import Administration.

Mr. YATES. All you do is carry out the orders of this committee which establishes the quotas; is that correct?

Mr. SNYDER. Basically, that is. I look upon ourselves as being the technicians, the mechanics, the ones who are making things work. We design the things. When the policy is given to us it is usually in broad terms and we accept this policy whether we like it or not.

Mr. YATES. There is nothing you can do about increasing the supply of oil? That is fixed?

Mr. SNYDER. And make the program work.

Mr. YATES. That is the answer to my question. I can't go to you to get more oil for Chicago, can I?

Mr. SNYDER. No, sir.

Mr. GALIFIANAKIS. May I ask a question? As I interpret the policy, it is to keep a balance between production and conservation of the sources of oil?

Mr. SNYDER. Yes, sir.

Mr. GALIFIANAKIS. One other question and I will finish. Have you had recent importations from Russia?

Mr. SNYDER. There was a little bit that Dr. Laird spoke of this morning in the form of residual fuel oil to the east coast. It is not very profitable to these people if they can get a supply elsewhere and one reason, if I am not mistaken, is the tariff is higher on the non-GATT countries. Is that the way you speak of it? There is a GATT arrangement, a general agreement for tariffs, and as an example on residual fuel that is 25 degrees API, or less, which is a measurement of specific gravity in oil terms, the import tax is 5¼ cents on that from GATT countries, countries that have gotten into this General Agreement on Tariffs. The Soviet bloc countries I am sure are not in that. Therefore, they pay twice as much.

The competition being what it is today, this may have the effect of preventing a whole lot of this oil from coming in. Most of the residual fuel oil, as an example, comes from the Western Hemisphere.

Mr. GALIFIANAKIS. That is policy. Suppose Russia were to become a GATT country.

Mr. SNYDER. That is not my department. That is the State Department.

Mr. GALIFIANAKIS. Thank you.

TUESDAY, MARCH 23, 1971.

OIL IMPORT ADMINISTRATION

WITNESS

LEONARD A. VICKERS, ADMINISTRATIVE OFFICER

Mrs. HANSEN. We now have the Oil Import Appeals Board and the principal witness is Mr. Lewis S. Flagg, the chairman.

Mr. VICKERS. Madam Chairman, I am Len Vickers, administrative officer, of the three small offices you have heard from today. I have been asked by Mr. Flagg, who is unable to attend, to make his presentation.

Mrs. HANSEN. Where is he?

Mr. VICKERS. He is in California participating in a National Petroleum Refiners Association program in which he is trying to tell how to utilize the OIAB procedures.

Mrs. HANSEN. Please proceed Mr. Vickers.

GENERAL STATEMENT

Mr. VICKERS. Mr. Flagg has prepared a statement which I would like to submit for the record and comment on some of the key statements included.

Mrs. HANSEN. Please do.

(Mr. Flagg's statement follows:)

STATEMENT OF LEWIS S. FLAGG, III, CHAIRMAN, OIL IMPORT APPEALS BOARD FOR FISCAL YEAR BUDGET 1972

The Oil Import Appeals Board receives petitions to provide appropriate relief where error, exceptional hardship, or special circumstances have been caused by limits imposed upon the importation of petroleum products. Within the scope of Presidential Proclamation 3279 and Oil Import Regulations Nos. 1 and 2, the Board takes such actions on petitions as it deems appropriate. It provides final administrative review. The Board is commencing its 12th year of operation.

During calendar year 1970, the Board awarded allocations to import 77,212 barrels per day of crude petroleum and crude products for an aggregate allocation of over 28 million barrels for the year as contrasted with the 1969 aggregate allocation of less than 4 million barrels.

The Board is composed of representatives from three departments designated by the Department heads. The Department of Commerce's member is a deputy assistant secretary, with other duties. The Department of Justice has a member, so designated. I am the member from the Department of the Interior, serving as chairman. The Board is administered and housed at the Department of the Interior. In addition to participating in the adjudicative functions, I furnished to the interested public information and advice on appeals matters and procedures at all times.

As a result of studies made by a Cabinet level task force, changes were effected in the oil import program during 1970. For example, imports of petroleum from Canada, which had previously been exempt from control, were controlled. The new controls affected importers and potential importers and as a result, 26 petitions were presented to the Board for adjudication. Then too, efforts to obtain cleaner air resulted in an extraordinary demand for the importation of low sulfur residual fuel oil in the midcontinent. This demand resulted in 24 petitions being presented to the Board for adjudication. There developed a critical shortage of asphalt for paving and for roofing, which resulted in 41 petitions to the Board for relief. As a result thereof, the Board's petition workload in 1970 was 192 as contrasted to 81 in 1969. The petitions doubled and became more complex.

Some of the above areas of concern are still with us. With events in the Middle East altering the international oil picture, I have every reason to believe that the workload this year will be greater than that of last year. This latter conclusion is buttressed by the fact that the number of petitions filed for this calendar year has already exceeded the number filed this time last year, our heaviest year. Over 100 petitions have been filed so far this year, while this time last year approximately 59 had been filed.

During the latter part of calendar year 1970, with many petitions remaining to be finally acted upon before December 31st, I was compelled to appeal to the assistant secretary for mineral resources and the assistant secretary for administration for immediate assistance. Dr. Carl Kelley, a petroleum specialist, was detailed to the Board from the Bureau of Mines. With his professional expertise and assistance, the Board was able to timely process the annual workload.

Although we could and did summarily dispose of approximately 20 of the 1971 petitions by dismissal when the requirement for having an allocation to import asphalt was eliminated, the 80 petitions remaining still exceed the 59 filed this time last year.

Since it appears evident that the 1971 workload will be greater than that of 1970, I am accordingly requesting additional funds to enable the petroleum specialist to be retained upon the Board's staff and to enable us to provide for increased support services, notably hearing transcripts. Dr. Kelley is in the upper steps of GS–14. Support services and the temporary assistance of a typist are also necessary.

The requested increase for fiscal year 1972 should permit the Board to properly serve the public.

I ask your favorable consideration of the Board's need for $66,000.

Mr. VICKERS. First of all, the Oil Import Appeals Board receives petitions——

OIL IMPORT APPEALS BOARD MEMBERSHIP

Mrs. HANSEN. Who are the members of the Oil Import Appeals Board?

Mr. VICKERS. The Board is composed of representatives from three different departments, Madam Chairman.

Mrs. HANSEN. Will you list them for us please.

Mr. VICKERS. First is Stanley Nehmer, Department of Commerce member, who is also Deputy Assistant Secretary for Resources. He has some other duties, of course. The Department of Justice member, Mr. George H. Schueller, puts in full time and attention to his participation. And the third member of the Board is from the Department of the Interior, Mr. Lewis Flagg, who serves as chairman. Mr. Flagg is one of the staff of the Solicitor and this budget presentation this afternoon does not include any salary for him, since he is reimbursed as part of the Solicitor's group.

The Board, of course, is administered and housed in the Department of the Interior and the budget for a proposed $66,000 level for 1972 includes salaries and benefits, transcript costs, and general support for only four people.

1970 PROGRAM PERFORMANCE

Last year, 1970, the Board awarded to appellants allocations to import over 77,000 barrels of oil per day. You might refer to Mr. Snyder's earlier presentation to get an order of magnitude there.

Over the calendar year the board allocated relief to applicants of 28 million barrels. These 28 million barrels with varying prices, as

again Mr. Snyder reported, estimates out to more than $30 million valuation for calendar year 1970.

This small Board with only two people, both clerical types, is actually swamped by the responsibilities that they now have to handle. To give you an idea of one change, the 28 million barrels awarded from last year was an increase by 4 million, allocated in 1969. In other words, an allocation of about 24 million.

This past year has been a very changeable one for the Oil Import Appeals Board. For example, imports of petroleum from Canada, which had previously been exempted, now became controlled. This represented a very large chunk of the previous references to the Chicago and Midwest support.

INCREASED WORKLOAD

Mrs. HANSEN. Isn't this where your appeals can be made?

Mr. VICKERS. This is where a great deal of additional business was generated for the Oil Import Appeals Board; for example, this new program developed 26 different petitions and each of these had to be handled on an individual-appeal basis. The chart which was submitted on O. & G., page 17 of the justification, Madam Chairman, indicates an increase in appeals filed the last calendar year up to a new high total of 192, compared with the previous year's level of 81. This is more than twice as many, and obviously the clerical workload doubled as did Mr. Flagg's time for investigations necessary to prepare each case. Many of them were handled by briefs only but an appeal in person is the right of any applicant.

Mr. YATES. How much relief did he give?

Mr. VICKERS. As a matter of fact, sir, Mr. Flagg and his Board last year were well impressed with the appeals submitted and gave relief to more than 50 percent of the applicants. This represents, as I recall, an increase of 15 or 20 percent over the previous several years' average. So, with the additional complications and new problems the Board was in a position to give relief of some nature to a higher proportion of the applicants than ever before. In each one of these cases, I might point out, they had to work that much harder because they were not able to refer to precedents.

The Board's petition workload for 1970, 192, contrasted to 81 in 1969 and, unfortunately, Mr. Flagg has to report that we already have 100 petitions on file this calendar year. This paper which was prepared early in March indicated that in 2 months we have 100 petitions already lined up; 59 had actually been filed last year at this time, to give you an idea that again the workload is increasing

INCREASED PROFESSIONAL STAFF SUPPORT NEEDED

For these reasons Mr. Flagg has requested in this budget justification presentation a staff addition of one professional industrial specialist assistant. This would be a petroleum economist who is able to provide him with backup service in investigating some of the applications and making analyses for the other Board members as well as himself.

In addition, the additional typing and transcript costs, verbatim

transcripts of all these proceedings must be procured, and obviously with the increased workload the transcript cost next year will indicate some $3,000 or $4,000 more going for that function.

As I do manage Mr. Flagg's small budget and some personnel work, I can attest to the fact that this is a continuing job with increased complications, increased applications, which shows no sign of improvement. The only way that Mr. Flagg can handle the double workload is to double his force by increasing his backup of one additional economist position and an additional stenographer.

I think that summarizes his presentation, Madam Chairman, unless there are some questions.

Mrs. HANSEN. Mr. Yates?

RELIEF GRANTED TO APPELLANTS FROM OIA SETASIDE QUOTAS

Mr. YATES. When relief is granted by the Appeals Board is it within the quotas that are established? You have said I think earlier that a ceiling had been imposed out of Canada. Can the relief that your Appeals Board grant go beyond that ceiling?

Mr. VICKERS. As Mr. Snyder pointed out on his several charts, there is a certain setaside for OIAB reallocation and when these reach that limit, it has to be stopped.

Mr. YATES. That is it, so that even though the number of appeals increases and the relief is warranted the relief may not be granted if that ceiling is reached; is that correct?

Mr. VICKERS. I would say it would have to be, unless there were other arrangements made possibly with the Oil Import Appeals Board.

Mr. Snyder, would you be able to say what OIA could do under such circumstances?

Mr. SNYDER. For the year 1971 the Board set-aside for making allocations during the year 1971 is 45,000 barrels a day in districts 1 through 4. The Board can make allocations for crude oil, unfinished oil, or finished products within that level.

Mr. YATES. Mr. Snyder, with respect to the question that I asked this gentleman on appeals, no matter how many appellants you have, in the event that all of them were to be entitled to the relief which they seek in their appeals if there is a ceiling on the amount of oil that can come into the country that ceiling cannot be exceeded; is that correct?

Mr. SNYDER. That is correct.

Mrs. HANSEN. Mr. Galifianakis?

TOTAL FISCAL YEAR 1972 BUDGET REQUEST OF $66,000

Mr. GALIFIANAKIS. I was just looking at the last figure, the $66,000. Is that for one additional person plus one stenographer?

Mr. VICKERS. The $66,000 will be the total OIAB budget. Are you talking about the increase?

Mr. GALIFIANAKIS. Yes.

Mr. VICKERS. We are requesting a proposed increase of $40,000, broken down into salaries for $33,000 and support for $7,000 this is a $40,000 increase over the present $26,000. As I pointed out earlier, sir, the salary of the member of the Appeals Board from the Department is not included in this small budget.

Mr. GALIFIANAKIS. Thank you.

CURRENT BACKLOG OF CASES

Mrs. HANSEN. What is your current backlog of cases?

Mr. VICKERS. 110 petitions received by March 23, 1971, six decisions made, 20 petitions dismissed, seven petitions withdrawn, 77 cases is the current backlog.

Mrs. HANSEN. What was the previous backlog?

Mr. VICKERS. Well, it started from zero at the beginning of the calendar year, Madam Chairman, when we has a new allocation year. We had disposed of all of the others, which wound up with 192 actually handled, some of them for asphalt and residual fuel oil.

Mrs. HANSEN. I notice in your statement that cleaner air requirements resulted in an extraordinary demand for the importation of low sulfur residual fuel oil in the midcontinent. Was this part of your additional workload?

Mr. VICKERS. Yes, indeed. It will probably continue to be.

Mrs. HANSEN. Where is your asphalt for paving and roofing coming from?

Mr. VICKERS. Most of it is coming in directly from Trinidad and Venezuela, which are the main sources.

Mrs. HANSEN. Such as?

Mr. VICKERS. Our biggest asphalt import problem, I understand, as an onlooker, is getting enough tankers with heating capability to make sure this asphalt doesn't solidify while it is coming across the cold ocean. This shortage of tankers is another factor in the low asphalt availability.

Mrs. HANSEN. Of the total petitions you heard in calendar year 1970, how many decisions were in favor of the petitioner?

Mr. VICKERS. I have a figure of 50 percent of those. I would like to put that in the record, ma'am.

(The information follows:)

In 1970, 192 petitions were submitted to the Oil Import Appeals Board; 105 were granted a 54-percent average. This is an increase of 10 percent over the 84 petitions received, 37 (44 percent) granted in 1969.

Mrs. HANSEN. Does the petition have the right of appeal to a higher reviewing board in the event your decision is unfavorable?

Mr. VICKERS. No, ma'am. The Oil Import Appeals Board is the final administrative review.

Mrs. HANSEN. Are all your hearings held in Washington, D.C.?

Mr. VICKERS. Yes.

Mrs. HANSEN. Thank you very much.

Mr. VICKERS. Thank you, Madam Chairman.

OFFICE OF COAL RESEARCH

WITNESSES

GEORGE FUMICH, JR., DIRECTOR
G. EDWARD LARSON, CHIEF, DIVISION OF CONTRACTS AND ADMINISTRATION
NEAL COCHRAN, CHIEF, DIVISION OF UTILIZATION
FRANCIS M. WILES, DIRECTOR OF BUDGET, INTERIOR DEPARTMENT

Mrs. HANSEN. We now have the Office of Coal Research. The principal witness is Mr. Fumich, Director. Mr. Funich, please insert your general statement in the record and summarize it for us.

OPENING STATEMENT

Mr. FUMICH. I will submit it for the record, and then rather than giving you a long-detailed presentation I will use charts like, I understand, some of the others have been doing today.

(Mr. Fumich's statement follows:)

Madam Chairman, the Office of Coal Research request for fiscal year 1972 is $21,000,000. This is an increase of $3,840,000 over the amount appropriated for fiscal year 1971.

The contract research program will require $20,455,000 of this request. The contract research program in fiscal year 1971 was $16,645,000 for an increase of $3,810,000. The amount requested for administration and supervision of the entire Office of Coal Research program for fiscal year 1972 is $545,000 compared with $515,000 in fiscal year 1971, an increase of $30,000. Included in this sum is a request for one additional position, an increase from 25 positions in fiscal year 1971 to 26 positions in fiscal year 1972.

The contract research program provides continued funding of four pilot plant projects in fiscal year 1972. The requirement for these will total $11,955,000. This represents a slight decrease of $350,000 below the level requested on these same projects in fiscal year 1971. The fiscal year 1972 request also includes a request for $4,300,000 of funding on two separate new starts of pilot plant projects in fiscal year 1972.

In addition, funds are requested for continuing research on 10 nonpilot plant projects in fiscal year 1972 totalling $4,200,000, compared with funds on 13 separate nonpilot plant projects in fiscal year 1971 totalling $4,440,000.

The program and goals of the Office of Coal Research are to develop methods and processes for converting our abundant domestic coal supplies to clean forms of gaseous, liquid, and solid fuels; to develop cleaner and more efficient methods of generating electricity from coal; to find better methods of burning coal in its conventional form without damage to the environment; to develop improved methods of mining and processing coal to remove those contaminants which may pollute the atmosphere or create corrosion and slagging problems when coal is burned; to find constructive uses for the waste products of coal processing and utilization; and to develop this technology without the creation of new ecological problems and at minimal cost to the ultimate energy consumer—the American citizen.

Significant progress has been made by the Office of Coal Research in the technology of converting coal to pipeline gas. OCR has in operation several coal conversion gasification pilot plants and supporting projects. Research to date has been evaluated by OCR and by outside consultants and has been deemed promising. There is sincere and eager interest on the part of gas companies, and participating financial support by the American Gas Association.

Synthetic petroleum products from coal, particularly low-sulfur fuel oils, could help to solve some of today's recognized energy and environmental problems. High-quality synthetic crude oil from coal could augment our Nation's reserves and insure potential independence from foreign sources. Construction and operation of plants needed to convert coal to such oil, gas, or power, could create numerous job opportunities in remote rural areas of the country. Creation of jobs in these areas would bring about an overall social benefit that would be beneficial to the entire country. OCR's projects relating to liquid fuels are described in the budget document.

The third broad category of effort relates to the efficient generation of electricity from coal to reduce environmental damage per unit of electricity produced, and conservation of coal reserves. Mining and beneficiation of coal, flyash utilization, and improvement in the efficiency and cleanliness of coal-burning electric power generation through development of fluidized-bed boilers are being researched. Coal-burning boiler generators now being installed or planned will have a service life extending well into the next century, and improvements in these areas are most desirable.

Also promising is research on improved higher efficiency coal-burning electric power generating systems that possess inherent benefits including coal resource conservation and reduction in thermal and atmospheric pollution. Some of these systems—now known to be technically but not yet commercially or practically feasible—have the potential of reducing thermal pollution by 33 percent per unit of electricity produced. These benefits result purely from increased efficiency. In addition the systems also show good potential for almost entirely eliminating air pollution from coal-fired generating systems.

In the area of power generation through the use of magnetohydrodynamics (MHD), a means of power generation described elsewhere in this budget, the Office of Coal Research has undertaken some work and is now formulating a major development plan in cooperation with the U.S. Bureau of Mines and the Electric Research Council. The general nature of this activity was recommended by an MHD Panel and submitted in June 1969, to the President's Office of Science and Technology. It has been estimated that years of high-level effort will be required to bring such a program to successful completion.

Energy is the lifeblood of our Nation, but like our environment it has been taken too much for granted. Estimates of energy demand expected at the end of this century have been developed by numerous forecasters and the general consensus is that if energy is abundant, it will be consumed at a much higher rate than it is today. The consumption of electricity, a preferred form of energy, has been doubling every decade and it is expected to continue its rapid growth.

With increasing population and increased per capita consumption of energy, all domestic energy forms, and especially coal, will have to make a maximum contribution to supply the demand and forestall dependence on overseas sources.

COAL—AN ENERGY RESOURCE BASE

The energy resources base will have to be coal. Coal reserves represent approximately three-fourths of our Nation's known total fossil fuel reserves, but coal supplies only about 21 percent of the fossil fuel energy which is consumed.

Each of the fossil fuels has handicaps relating to availability, sources of supply, costs or utilization. Coal in its mined state is not a clean-burning fuel, and the consumer has developed a preference for energy in the form of electricity, natural gas, and liquid fuels.

As awareness of the necessity for environmental protection developed in the Nation, restrictions were placed on the use of certain fossil fuels, especially coal. Recourse to cleaner burning fuels, especially natural gas, has affected the availability and price of such fuels. For a variety of reasons natural gas is already in short supply in many areas.

Energy supply requires the same kind of national concern that is now being shown for the problems of the environment. In fact the solution of environmental problems depends to a major degree upon solving the problems related to the supply of clean energy. The Nation's security, its growth, wealth, productivity, and health, as well as its capacity to perform responsibly in what is becoming an increasingly industrialized and urbanized society, are all closely related to the amount of clean, reasonably priced energy available from indigenous sources.

SHORTAGE OF NATURAL GAS

The forecast shortage of natural gas is of real concern, and the supply soon may need to be greatly supplemented. Natural gas has replaced synthetic "town" gas made from coal. The technology of converting coal to clean, synthetic high B.t.u. gas has long been known, but it is the economical and competitive production of such synthetic gas that has delayed its introduction.

The Office of Coal Research budget request for fiscal year 1972 contains major items for coal gasification. The request for coal liquefaction research work, however, is for a reduced amount. This reflects the shift in priority based upon a recognization of problems of supply for a high-quality synthetic pipeline gas. This is due partly to the increasing impact of pollution control levels and increased demand for pipeline gas as a clean high B.t.u. fuel. Approximately two-thirds of OCR's contract research program is represented by projects covering conversion of coal to pipeline gas and to liquid fuels. These combined totaled $15,155,000 in fiscal year 1972 compared with $13,585,000 in the appropriations for these projects in fiscal year 1971.

The remaining one-third of the OCR project request for contract research represents projects for conventional electric power (1) chiefly for developing the low-sulfur low-ash fuel for powerplants and for utilization of flyash; (2) developing of a new method of power generation magnetohydrodynamics (MHD), because of its high efficiency and low air and water pollution; and (3) projects for mining and preparation of coal to improve the economics of coal to conversion processes.

The pilot plant for OCR's Char-Oil-Energy-Development (Project COED) under a contract with the FMC Corp. at Princeton, N.J., was completed and

dedicated in October 1970. This project is for a process to produce clean synthetic liquids, gases, and char (a coke-like solid material) from coal. The budget requests operation and maintenance funds for the pilot plant project in fiscal year 1972.

The Office of Coal Research pilot plant for hydrogasification was dedicated in Chicago, Ill., in October 1970. With both Government and private funding this process may be proved for commercial application by the end of 1975. The pilot plant for lignite gasification is far along in its construction at Rapid City, S. Dak. It should be ready for dedication in the fall of 1971.

A third gasification pilot plant project is ready for the pilot-plant stage and the Office of Coal Research proposes to begin construction of the Bituminous Coal Research, Inc. (BI–GAS), process.

The proposed pilot plant to utilize the BCR (BI–GAS) process is proposed for construction at Homer City in western Pennsylvania. The funds requested in fiscal year 1972 represent only two-thirds of the amount required to begin the process in the fiscal year and the remaining one-third is being sought from non-Federal sources.

None of the gasification work being pursued either by the Office of Coal Research or by the Bureau of Mines is duplicative. Rather, each project is seeking the best technical and economic process possible utilizing different technology to develop a clean, low-cost premium fuel from coal without pollution. We believe that one or more of these processes will prove successful.

The proposed new pilot plant start for the Pittsburg & Midway low-ash low-sulfur coal process is proposed for a site in Tacoma, Wash. This particular project has been ready to proceed to the pilot-plant stage for a period of years. The funds being requested in fiscal year 1972—$2,100,000—represent two-thirds of the required funding to begin the pilot-plant project. The additional one-third funding is being sought from non-Federal sources. This project has been underway for a number of years and process development unit (PDU) scale work is just getting underway at Grand Forks, N. Dak. We look forward with confidence to the success of this work which can be conducted concurrently with the start of the pilot-plant activity. The process will produce a unique product containing less than one-half of 1 percent sulfur and a tenth of 1 percent ash. It is exceptionally high in B.t.u. value and, of course, represents the kind of clean, convenient, quality fuel that coal must become for large segments of its markets.

The non-pilot-plant projects that are underway are primarily supporting type research efforts designed to supplement other ongoing research at the pilot-plant level. The single exception is in the field of magnetohydrodynamic power. The Office of Coal Research budget request for MHD research in fiscal year 1972 is $1 million, compared with a request of $600,000 in fiscal year 1971. The increase will permit continued funding of ongoing MHD research and possible initiation of other research contracts in the field of MHD power.

INTRODUCTION OF STAFF

Mr. FUMICH. My name is George Fumich, Director of the Office of Coal Research. Before getting started, I would like to introduce my Division Chiefs.

Mrs. HANSEN. Please do.

Mr. FUMICH. Mr. Ed Larson, Chief of the Division of Contracts and Administration; Mr. Neal Cochran, Chief of the Division of Utilization; and Mr. Wayne McCurdy, Chief of the Division of Mining and Preparation. I think that the charts are the best way to give you a real picture of how OCR fits into the energy frame of things today, and I think it will show that our program is one of the most important in Government——

Mrs. HANSEN. Mr. Fumich, the Office of Management and Budget doesn't help you very much on that consideration.

Mr. FUMICH. Madam Chairman, I think the next time I go up before the OMB, I would like to take you up with me.

PRESENTATION OF CHARTS

Mrs. HANSEN. I would love to go.

Mr. FUMICH. I agree for some reason we don't seem to be on the same wavelength. However, just to give you a better idea these charts present a graphic picture and I know that the others have been doing the same thing but don't really look at the figures here as what we are trying to do is give you a portrayal. You will note the gross national product has been climbing and energy consumption is almost going along in a parallel line in this particular projection. The incline gets much steeper after 1970. What this means, of course, is that by around 1985 we are going to have to almost double the production of energy. With this start let's go to the next chart so that I can show you what the energy mix has been and also give you an idea of what has been happening since 1910.

In 1910 you will notice that coal represents about 75 percent of the energy consumption pattern. Actually, wood at this time furnishes more energy than oil and gas combined. Now, you also note that going into 1930, you can see this declining line representing the coal consumption pattern is concerned. Now, in 1930 coal was still king but as you can see oil and gas were increasing their energy partnership; 1950 was the first year that coal was not the major energy source. That was the approximate time that coal lost its title as "King Coal."

Mrs. HANSEN. To what do you attribute this?

REASONS FOR COAL'S DECLINE

Mr. FUMICH. Well, Madam Chairman, there are various causes, but I believe that the chief reasons, and this is still, frankly, the problem area that we are talking about, is oil and gas are very clean and relatively cheap to transport. They are also very convenient to use. Coal is a lump, solid type of material. Coal never was really a national energy product. It was always localized because you had to transport it somewhere and it was too cheap in value to transport long distances. Transportation costs are still very expensive and this is still the reason that coal is more of a regionalized industry. You don't really have a national coal industry.

As far as oil and gas is concerned, you have a different picture. Right after World War II coal was furnishing about 130 million tons to the railroad market. The diesel engine came along and displaced the steam engine. The only place you can find a steam engine today is at the Smithsonian. The gas industry with technology developed the welded steel pipeline. There went another 120 million tons of coal.

This is the story of coal. In other words it is a raw material, lumped, and expensive to transport, making it a regionalized industry. You don't have the advantages of cleanliness and ease of use. This is what is happening today.

CHANGING USE PATTERNS

As you can see for 1970, coal represents 22 percent of the consumption pattern, oil represents 44 percent, gas represents about 33 percent. As you notice, wood has been pinched off in 1950, and hydro still represents about 4 percent of the energy consumption pattern.

Why is oil particularly critical? Oil is critical because in the four energy consuming sectors today, oil is almost the 100-percent energy source in the transportation market, and it is one sector today for which we have no substitute available. In other words, no other fuel source can fit in that particular area. That is the reason this is critical.

Mrs. HANSEN. Why is that?

Mr. FUMICH. Madam Chairman, we don't have enough time this afternoon or I could really go into that.

Mrs. HANSEN. Please discuss it briefly.

Mr. FUMICH. I think past policy had a lot to do with it. Since we are talking about policy you are getting out of my area.

Mrs. HANSEN. This morning we heard testimony that the largest consumer of oil is the automobile.

Mr. FUMICH. That is what makes it critical. We can't do without it.

Mrs. HANSEN. You can decrease its use if you provide mass transportation or limit the number of cars entering a city. There are many alternatives.

Mr. FUMICH. At this point we can't do without it. I agree that over a period of time, limitations can be made.

Mrs. HANSEN. This can be done in the future.

Mr. FUMICH. I was just getting ready to get into the future.

On this chart we are trying to point out the different members of the energy family and show how they have been doing through the years. Gas represents our high priority target area. You know we have one pilot plant built in Chicago, and the mission there is to make a high quality synthetic pipeline gas from coal. We have another being constructed in Rapid City. This is what is happening.

Why are we doing this? We are starting off here first with 1-percent import of our natural gas requirements. We are now importing 3 percent, and we are domestically producing about 97 percent. We are getting around 700 billion cubic feet from Canada at this time.

The critical point is when the gap starts. This will be about 1975 if our gas consumption pattern keeps going like it is now. In the last two decades we have been increasing our gas consumption by 6 percent a year. This is almost double our energy consumption pattern of about 3.4 percent a year.

Mrs. HANSEN. Each year our gas reserves are decreasing.

Mr. FUMICH. That is exactly right. Our gas requirements are increasing a trillion cubic feet a year. The last few years we had a shortfall of about 18 trillion cubic feet.

What we are saying is that at this point in time, even with some of these supplemental supply areas that we are talking about, we are still going to have a gap. I frankly don't know, and I don't think anyone else knows, what is going to happen around 1980.

If we could accelerate the OCR program, we believe that a realistic assumption is we could produce about 3 trillion cubic feet of gas from coal annually by 1980. Some people call that optimistic. I don't know. Other people say that by 1990 this can go up to 10 trillion cubic feet, and to 20 trillion by 2000.

At least by this point in time unless we do something, we may have to consider end-use possibilities. This is what we are talking about. You can see that we may be producing 70 percent of our gas requirements at this point in time—1980.

We have a good idea what is going to happen here. This is the big question mark.

I know that you saw some other charts from the Office of Oil and Gas. I don't want you to really nail down these figures because you can get all kinds of projections but they are all in the same range.

Today we are consuming around 15 million barrels of oil a day. Observe this little section here.

Mrs. HANSEN. I want to congratulate you. For the first time in the history of the Department of the Interior the various agencies all have the same figures as to what our energy reserves are.

Mr. FUMICH. I tried to protect myself in case they were different. This little section here shows that we are importing about 530,000 barrels a day from the Eastern Hemisphere. The 23 percent here, of course, is the whole total of imports, but mostly from the Western Hemisphere. This is a figure of about 2.2 million barrels a day. We are also importing around 700,000 barrels a day from Canada. That is just for a point of reference.

The Office of Oil and Gas showed you that in 1985 the consumption figure was going to be up here. We are using a conservative figure. They were talking about 26, not 20 million for 1985. They were also projecting that unless something was done at this time that instead of importing 23 percent of our daily requirement of petroleum as we are now, that around 1985 we would only produce about 44 percent and be importing 56 percent. I am talking about 1985.

Mrs. HANSEN. The Office of Oil and Gas testified this morning, that the more you import, the higher the cost is going to be.

Mr. FUMICH. I agree with that. Ten years ago the Free World other than the United States was consuming around 19 million barrels of petroleum a day. Now it consumes 41 million barrels and in 1980 projections go up to 70 million barrels a day. That gives you an idea.

Again, let me point out this particular section. You notice I mentioned we were importing 530,000 barrels a day of petroleum from the Eastern Hemisphere at this time. This amounts to about 2 to 4 percent of our import requirements. This is still a safe range.

Observe the 44 percent total we propose to import in 1980. We feel that by this time the limit of our production will be approximately 12 million barrels a day, which means that we will be importing 10 million barrels a day.

The real critical aspect is that about half of that 10 million barrels a day will be coming from the Eastern Hemisphere countries which means we will be in a security bind if we allow that to happen.

NORTH SLOPE OIL

There is only one possibility frankly that will alleviate that. There are more than one, but one that you have been hearing about is the possible imports from the Alaska North Slope. We are talking about 2 to 3 million barrels a day.

If we import 3 million barrels a day from the North Slope of Alaska, this 22-percent figure from the Eastern Hemisphere would go down to 13 percent which is still a dangerous amount.

ENVIRONMENT AND ECOLOGY

Mrs. HANSEN. The lands in the Northern Slope of Alaska and oil shale development are fraught with environmental hazards.

The committee asked the Office of Oil and Gas this morning, if the pipeline goes across Canada, what agreements have to be made as to that supply line being shut off in case of emergency.

As you are well aware they have yet to develop the answers. Is this not correct?

Mr. FUMICH. Yes, Madam Chairman. This is one of our critical problems today, the environmental problem. Of course, it cuts across the whole energy spectrum. Many people still haven't realized that in order to solve our environmental problems we are going to have to solve our energy problems. You can't solve one without solving the other.

INCREASED COST OF ENERGY

Mrs. HANSEN. I think you have to make people understand what the costs are going to be to develop our energy resources.

Mr. FUMICH. We agree with that philosophy, Madam Chairman. We feel that the energy costs are going to be much higher in the near future and for many reasons. You are going to have health and safety costs, environmental costs, and so forth.

Mrs. HANSEN. The costs will be ultimately borne by the consumer.

Mr. FUMICH. That is right. They will have to pay for it.

OIL AND GAS DISCOVERY USE RATIO

Getting back to the oil and gas picture again, I want to let you take a look at this diminishing incline plane. You notice in the early fifties the industry was discovering a little over 2 cubic feet of gas for each cubic foot of gas that was consumed.

At the same time the industry was discovering about a barrel-and-a-half of petroleum for each barrel that was consumed.

What you see here in 1970 is less than unity. In other words, we are discovering less gas than we are consuming and also discovering less petroleum than we are consuming. This is in the face of better technology and higher priority targets.

ENERGY RESERVES ON PUBLIC LANDS

I know that in the past you have always heard of our resources on our public lands. We have all heard about the tremendous natural resources we have in and on the public lands. You have never really heard the name of coal mentioned as a large resource in this particular connection.

Mrs. HANSEN. The Bureau of Mines testified yesterday about the large resource of coal.

Mr. FUMICH. I am sorry. I withdraw that statement.

What I am trying to show you here relates to reserves on public lands and again you can see the dimensions. Don't look at the figures. You can see we have many, many times greater coal reserves than we have anything else.

The fact is you could lump all of the others together and you would still have much more coal and this is just referring to the public lands.

Forget about the public lands for a minute and imagine that this chart represents our total fossil fuel reserves in the United States.

MINING SUITABLE ON PUBLIC LANDS

Mrs. Hansen. Of your coal reserves on the public lands, how much can be developed through deep mining and how much through strip mining?

Mr. Fumich. Madam Chairman, I could tell you the figure could be anywhere from 830 billion tons to 1.6 trillion tons total, and that would be based upon only 50 percent recovery. One-third of that is considered to be strip minable coal. Because the public lands are in the West—I would say a much greater percentage would be strippable.

I would say the figure would be higher in the public lands.

Mrs. Hansen. Apparently from the discussion yesterday, strip mining in the West is more prevalent than deep mining.

Mr. Fumich. I would say especially the lignite and much of the subbituminous. You have a lot of shale. In order to have a good safe, deep mine you have to go about 100 feet or more below the surface and it is better to have some strong strata-like sandstone or something like that so the roof material can hold together.

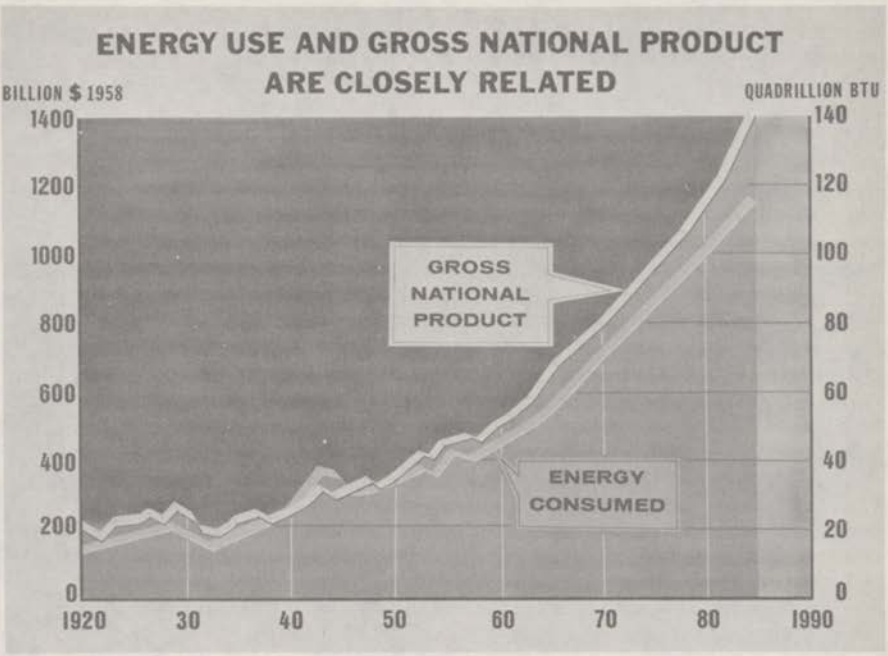
Now let's forget about the public lands and imagine that this chart refers to all of our fossil fuel reserves in the United States. The same picture emerges. Coal would be either up here or maybe way up in here as far as its representative column, and again oil shale would be second, natural gas and petroleum together would represent, I would say, approximately 7 percent.

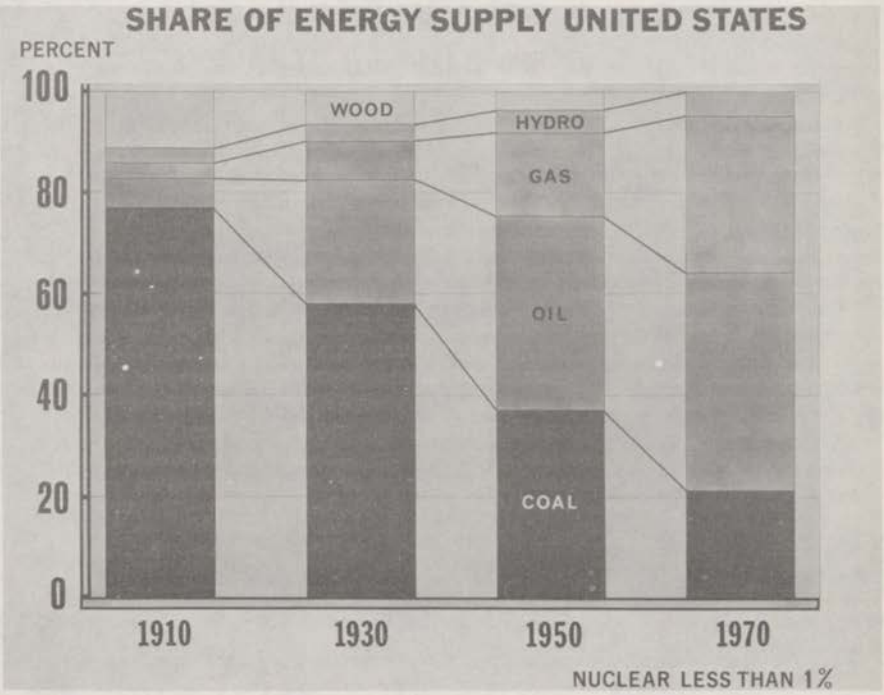
Oil shale represents approximately 16 percent. Coal would make up between 78 and 81 or 82 percent of our total fossil fuel reserves. Again we are trying to relate our program back to our energy consumption pattern the way it has been and——

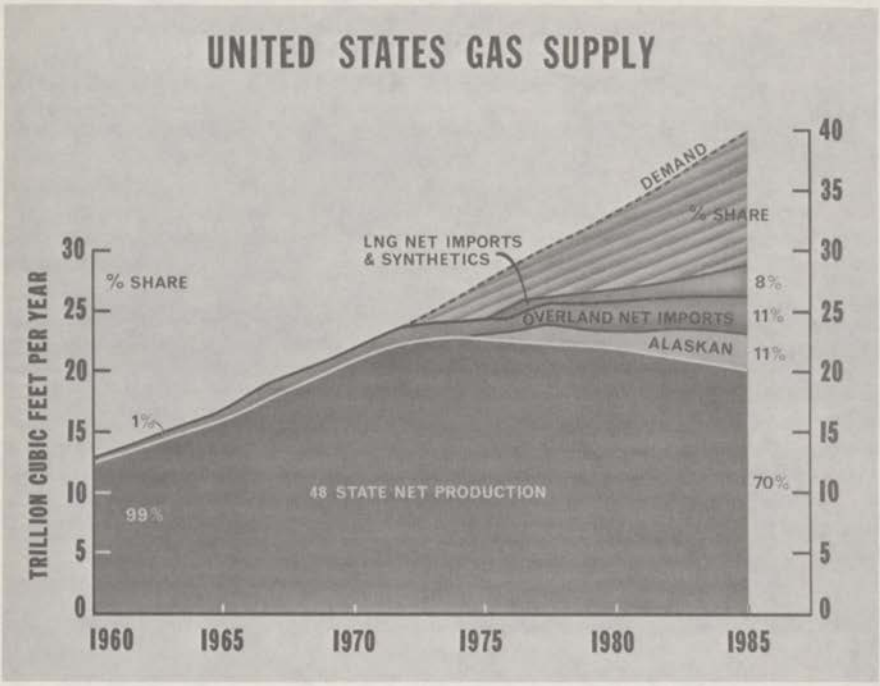
Mrs. Hansen. Do you have copies of the charts?

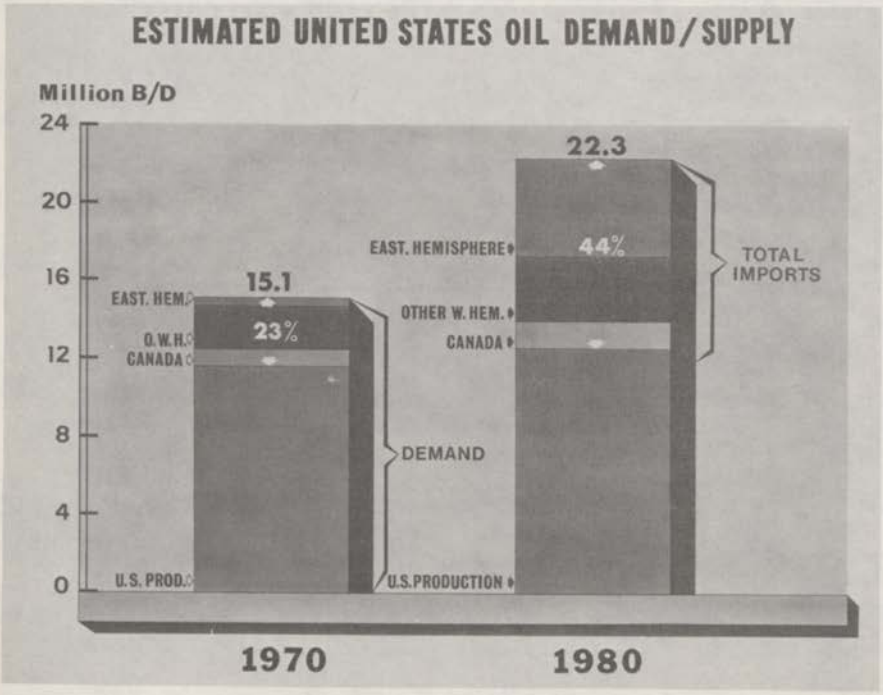
Mr. Fumich. We will have them presented for the record.

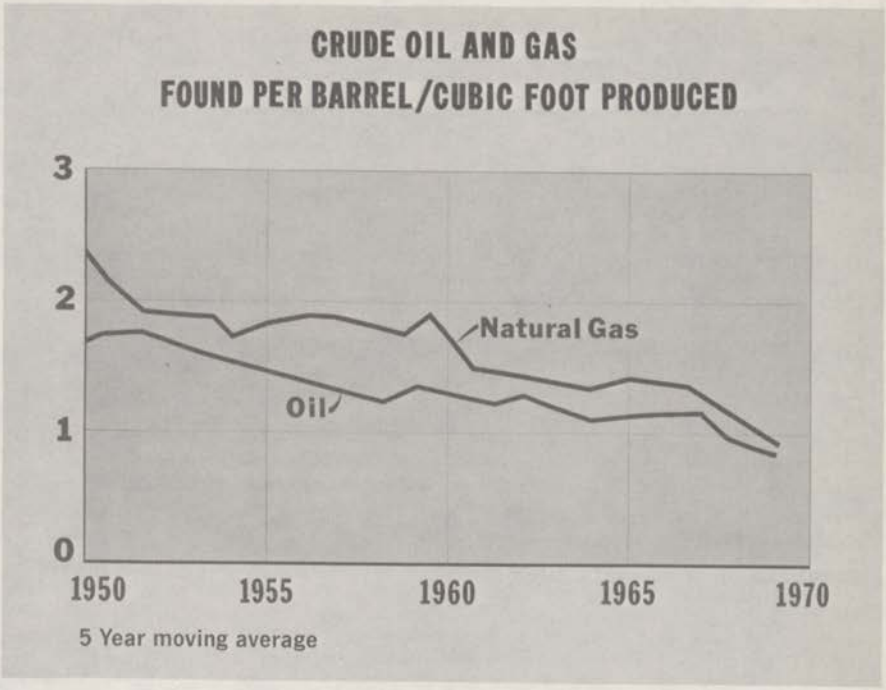
(The charts follow:)

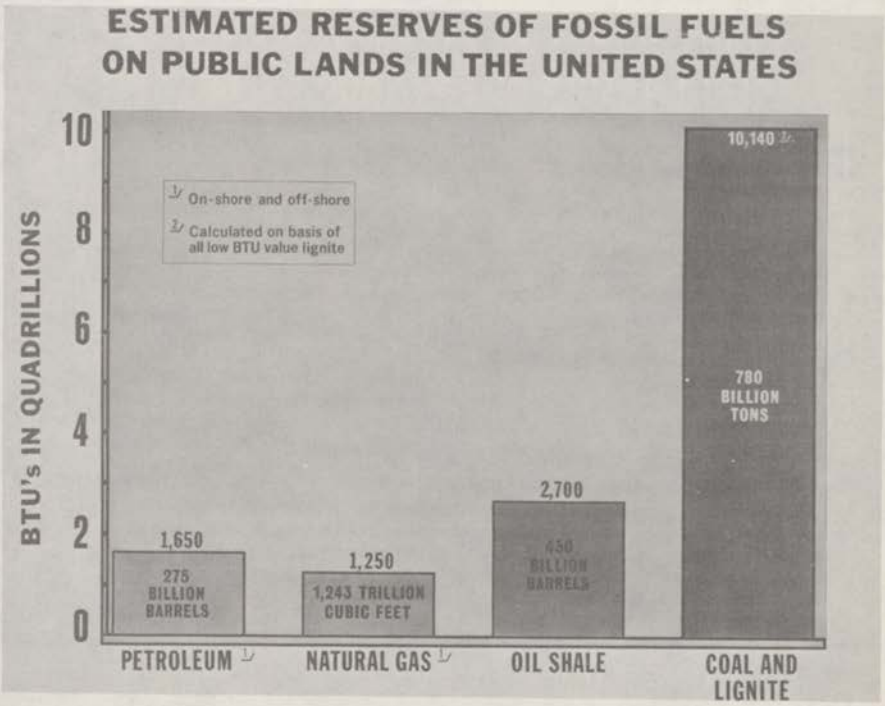

ENERGY USE AND GROSS NATIONAL PRODUCT
ARE CLOSELY RELATED
BILLION $ 1958
QUADRILLION BTU
1400
1200
1000
800
600
400
200
0
140
120
100
80
60
40
20
0
GROSS NATIONAL PRODUCT
ENERGY CONSUMED
1920
30
40
50
60
70
80
1990

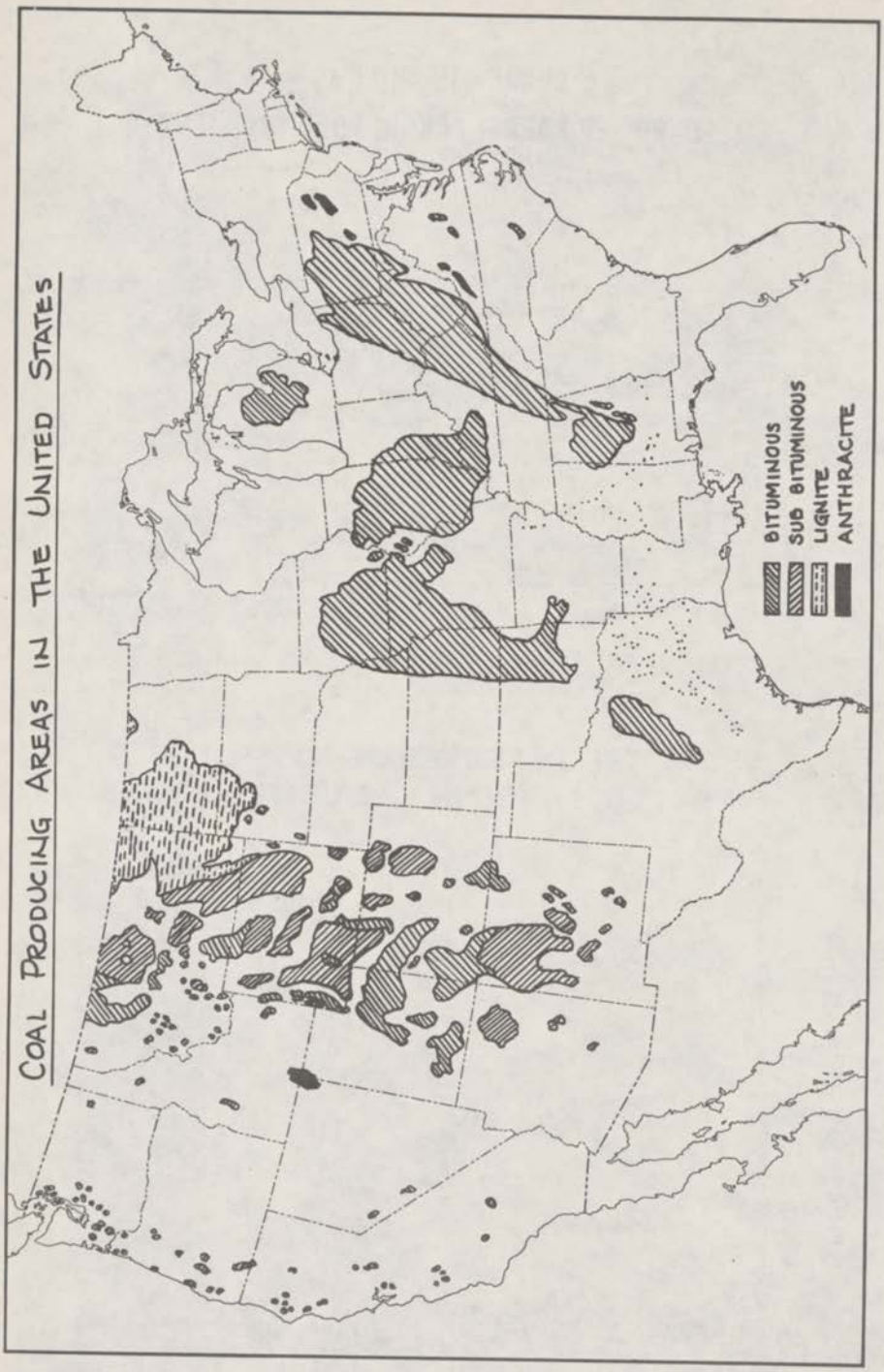

SHARE OF ENERGY SUPPLY UNITED STATES
PERCENT
100
80
60
40
20
0
WOOD
HYDRO
GAS
OIL
COAL
1910
1930
1950
1970
NUCLEAR LESS THAN 1%

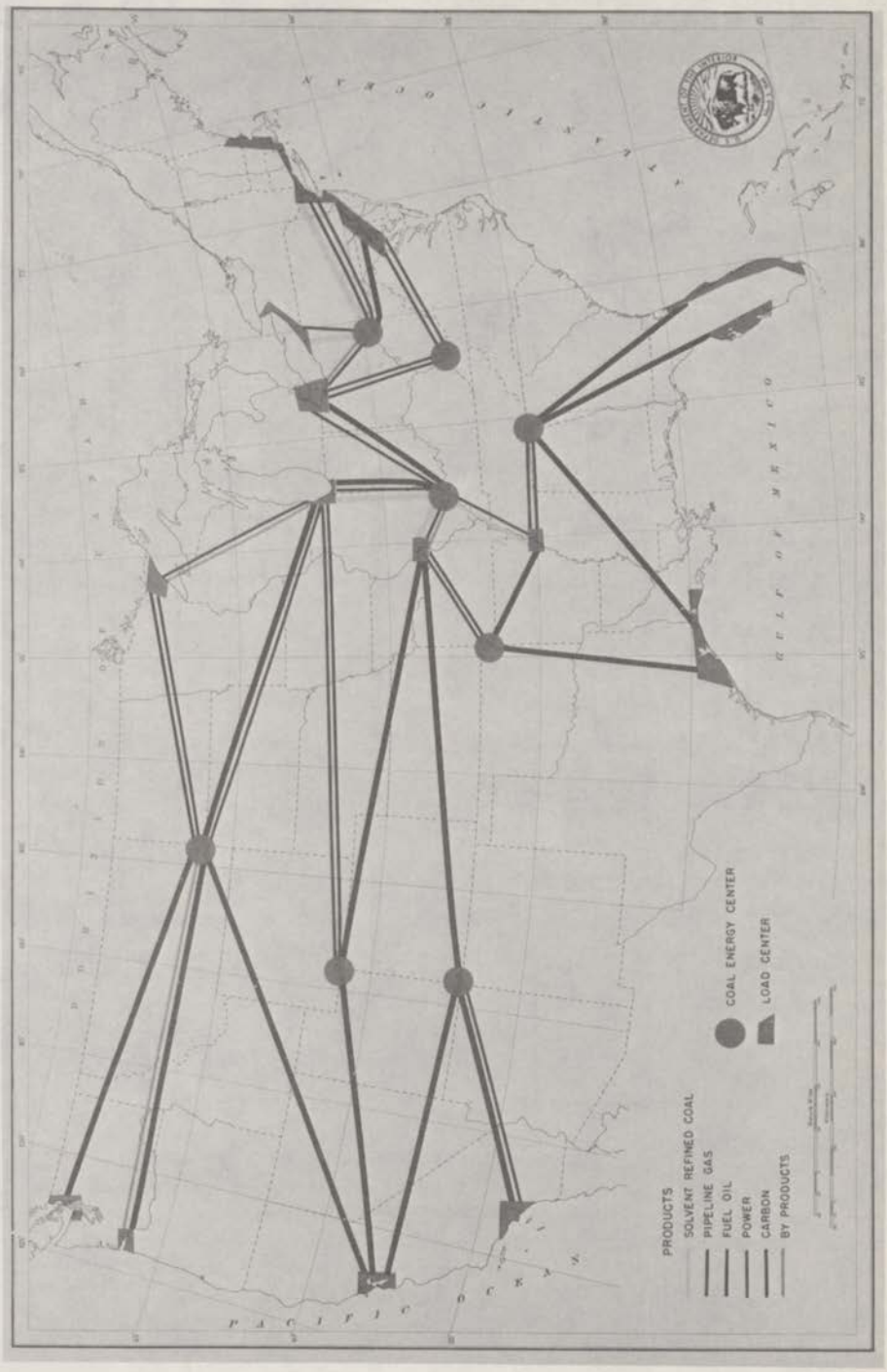

UNITED STATES GAS SUPPLY
TRILLION CUBIC FEET PER YEAR
% SHARE
DEMAND
% SHARE
LNG NET IMPORTS & SYNTHETICS
8%
OVERLAND NET IMPORTS
11%
ALASKAN
11%
1%
99%
48 STATE NET PRODUCTION
70%
0
5
10
15
20
25
30
35
40
1960
1965
1970
1975
1980
1985

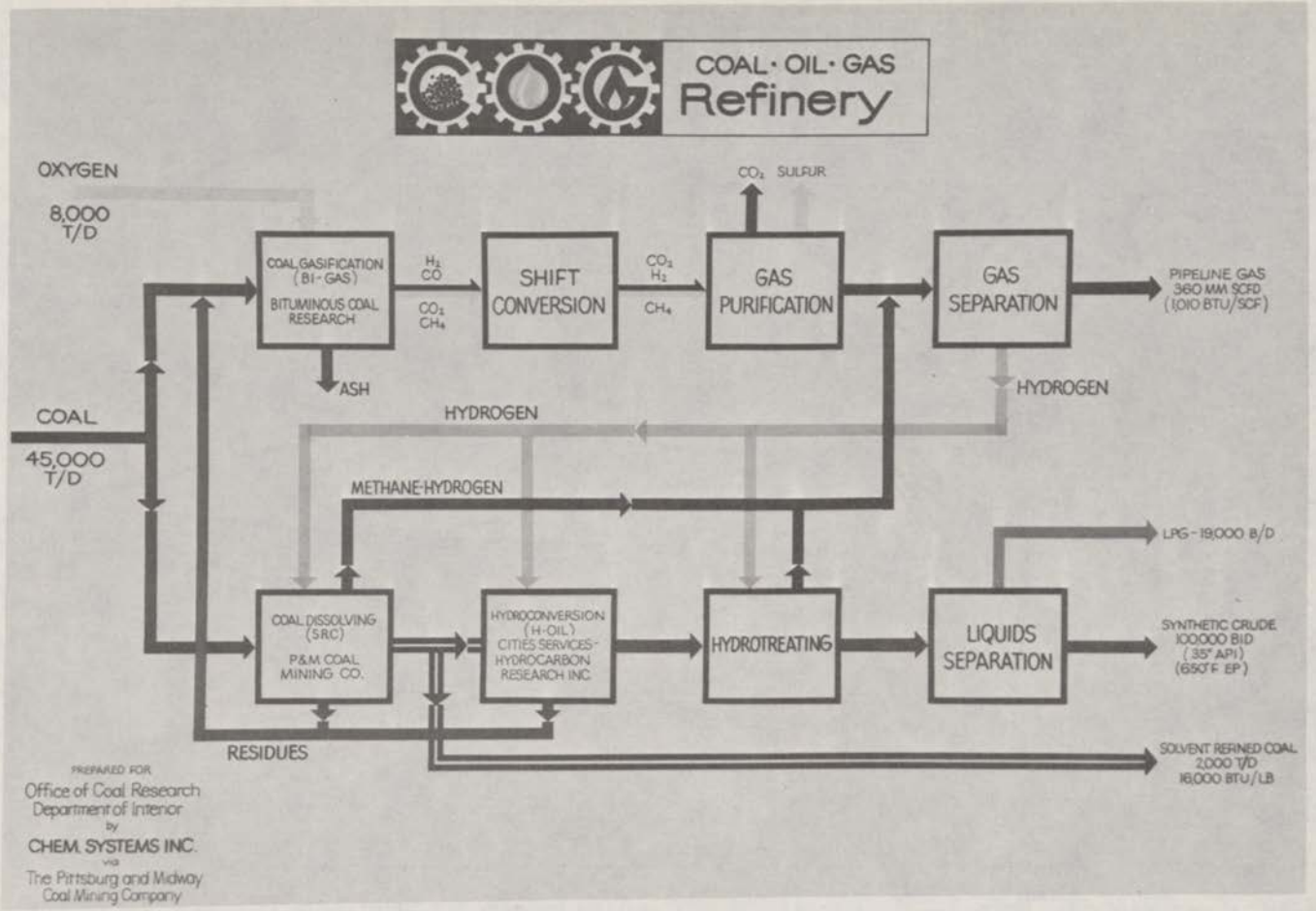

ESTIMATED UNITED STATES OIL DEMAND/SUPPLY
Million B/D
24
20
16
12
8
4
0
15.1
EAST. HEM.
23%
O.W.H.
CANADA
DEMAND
U.S. PROD.
22.3
EAST. HEMISPHERE
44%
OTHER W. HEM.
CANADA
TOTAL IMPORTS
U.S. PRODUCTION
1970
1980


CRUDE OIL AND GAS
FOUND PER BARREL/CUBIC FOOT PRODUCED
3
2
1
0
Natural Gas
Oil
1950
1955
1960
1965
1970
5 Year moving average


ESTIMATED RESERVES OF FOSSIL FUELS
ON PUBLIC LANDS IN THE UNITED STATES
BTU's IN QUADRILLIONS
10
8
6
4
2
0
1/ On-shore and off-shore
2/ Calculated on basis of all low BTU value lignite
1,650
275 BILLION BARRELS
1,250
1,243 TRILLION CUBIC FEET
2,700
450 BILLION BARRELS
10,140 2/
780 BILLION TONS
PETROLEUM 1/
NATURAL GAS 1/
OIL SHALE
COAL AND LIGNITE


COAL PRODUCING AREAS IN THE UNITED STATES
BITUMINOUS
SUB BITUMINOUS
LIGNITE
ANTHRACITE


ARCTIC OCEAN
GULF OF MEXICO
PACIFIC OCEAN
PRODUCTS
SOLVENT REFINED COAL
PIPELINE GAS
FUEL OIL
POWER
CARBON
BY PRODUCTS
COAL ENERGY CENTER
LOAD CENTER


COAL · OIL · GAS
Refinery
OXYGEN
8,000
T/D
COAL GASIFICATION
(BI-GAS)
BITUMINOUS COAL
RESEARCH
ASH
H_2
CO
CO_2
CH_4
SHIFT
CONVERSION
CO_2
H_2
CH_4
CO_2 SULFUR
GAS
PURIFICATION
GAS
SEPARATION
PIPELINE GAS
360 MM SCFD
(1,010 BTU/SCF)
HYDROGEN
COAL
45,000
T/D
HYDROGEN
METHANE-HYDROGEN
LPG - 19,000 B/D
COAL DISSOLVING
(SRC)
P&M COAL
MINING CO.
HYDROCONVERSION
(H-OIL)
CITIES SERVICES-
HYDROCARBON
RESEARCH INC.
HYDROTREATING
LIQUIDS
SEPARATION
SYNTHETIC CRUDE
100,000 B/D
(35° API)
(650°F EP)
RESIDUES
SOLVENT REFINED COAL
2,000 T/D
16,000 BTU/LB
PREPARED FOR
Office of Coal Research
Department of Interior
by
CHEM. SYSTEMS INC.
via
The Pittsburg and Midway
Coal Mining Company

OFFICE OF COAL RESEARCH

I. Office was established July 7, 1960, P.L. 86-599 (74 Stat. 336) and was formally set up in January 1961

II. Appropriations by Fiscal Years

1961	$1,000,000	
1962	1,000,000	
1963	3,450,000	
1964	5,075,000	
1965	6,836,000	
1966	7,220,000	
1967	8,220,000	
1968	10,980,000	
1969	13,700,000	
1970	15,300,000	
1971	17,160,000	
1972	21,000,000	(Current request)

III. Staff

FY-1971 Ceiling	25
FY-1972 Request	26
Present Staff	21

10	Professionals
11	Secretarial and Clerical
21	

Currently recruiting for two (2) positions

MAP SHOWING U.S. COAL RESERVES

Mr. FUMICH. Here, again, is another factor that we believe is extremely important. You will notice that the coal reserves aren't just in one locality. You will notice that we have a major coal reserve in the East that is surrounded by an ocean of people.

You will notice we have another tremendous coal reserve in the Midwest that is surrounded by an ocean of people. The only place where we don't have a dense population is in the western sector, but we have compensating factors there.

We have a tremendous reserve here, most of which, as I mentioned previously, has maybe about a 10- to 20- or 30-foot overburden and much of the coal is in very thick seams—in fact I saw a seam in Wyoming over 80 feet thick right near the surface. What I am saying is most of this can be mined very cheaply and can stand the handicap of transportation costs either east, west, or south.

Mrs. HANSEN. I am intrigued by one thing on your charts. You show a reserve of anthracite coal on the Idaho border. Why is there only that one deposit of anthracite in that area?

Mr. FUMICH. You know how coal, and oil, and gas were formed because of pressure on sedimentary deposits. Evidently back in the prehistoric days there was a swamp there and because of greater pressure than you have for bituminous, or subbituminous, you had a little bit of anthracite. I think the scale of this is misleading. I don't think we have that much anthracite there.

Mrs. HANSEN. Has it ever been mined?

Mr. FUMICH. I don't think so.

Mr. LARSON. It is a very remote spot and there is no transportation again.

Mrs. HANSEN. There are many transportation problems in the West.

POSSIBLE MAJOR ENERGY CENTERS

Mr. FUMICH. Here is how we are disposed to answer that transportation problem. You notice here we propose a group of energy centers all over the country. These centers would be based at mine-mouth coal complexes. Each of these would convert coal either to a gas, liquid, or power, and as we all know, it is much cheaper to transport either gas or petroleum in pipelines or power one way or the other than it is to transport the raw coal material.

We haven't tried to pinpoint it.

Mrs. HANSEN. Where are the energy centers?

Mr. FUMICH. We have four States here.

Mrs. HANSEN. You are avoiding the west coast.

Mr. FUMICH. At this time possibly, but I don't think that would be necessarily true. It depends on how some of our work blossoms. We are showing simply a general concept here.

CONCEPTUAL COAL-OIL-GAS COMPLEX

Now I want to show you a specific concept and have Mr. Cochran explain it. This is based on one of the recent studies we were funding with our Pittsburg & Midway pilot plant funds. This is called a coal-oil-gas refinery. If you look at this while Mr. Cochran is explaining, you will see one of the possible complexes that we feel will be emerging within this decade.

Mr. COCHRAN. Madam Chairman, in considering better ways to use the results of the work we have achieved to date, we frequently attempt to combine processes. This past fall we authorized the Pittsburg & Midway Coal Mining Co. to execute a subcontract with Chem Systems, Inc. to do exactly that.

What you see in front of you is a combination of the Pittsburg & Midway process combined with the process we have under development with Bituminous Coal Research to make pipeline gas in a way that makes it better for making gas and for making liquids. Better than either of the processes by themselves and reduces the net cost of the products which are produced. The figures which are shown on the chart show that 45,000 tons of coal per day produce roughly 360 million cubic feet per day of gas, about 19,000 barrels per day of liquefied petroleum gases, approximately 100,000 barrels per day of crude and 2,000 tons per day of the solvent refined coal. Approximately 13,000 additional tons of coal are fed to the unit, converted to refined coal, and provide the energy needs of the system.

VAST COAL CONSUMPTION IN CONCEPTUAL PLANT

The actual input to the plant is 58,000 tons of coal per day. All of the products which are produced are nonpolluting in the sense that sulfur has been removed from them and the plant itself is a nonpolluter.

We estimate that plants of this sort would provide something in the vicinity of 7,500 to 10,000 new jobs in the area in which located without any multiplier for the effect of a direct payroll for such a plant.

OCR FUNDING SINCE INCEPTION

Mr. FUMICH. I want to show you the only weakness we have in the program, Madam Chairman.

As you know our office was formed by legislation passed on July 7, 1960. We started with a very small funding base of $1 million and through the years we have advanced to the request that we are presenting today of $21 million for the fiscal year 1972.

Of course, you are going to want to know what this has to do with the frame of reference we have been trying to give you here as a background.

Mrs. HANSEN. Do you mean you think I am going to ask that question?

Mr. FUMICH. We are just trying to give you some more facts, material, and more evidence.

The $21 million, frankly a great majority of that is our pending pilot plant program.

REQUESTS FOR PILOT PLANT PROJECTS

We are asking for $3,500,000 for our Institute of Gas Technology pilot plant at Chicago. We are asking for $3,420,000 for another pilot plant being constructed in Rapid City, S. Dak., and $2 million for a pilot plant modification at Cresap, W. Va. We are also asking for $2.1 million for the BCR coal gasification process, pilot plant proposed for Homer City, Pa., and another $2,200,000 for a project that I know you

have been wanting to hear about, our Pittsburg & Midway proposed pilot plant in Tacoma, Wash.

Those figures add up to a total of $16,255,000.

SUPPORTING RESEARCH PROJECTS

We also have a concurrent program of 10 supporting projects for which we are requesting funding. These total $4,200,000. So our total operating research budget is $20,455,000. Added to that is our administrative request of $545,000 which altogether totals $21 million.

We are asking for a $30,000 increase in the administrative budget, and an increase of $3,810,000 for our contract research operating budget.

DETAILS OF ADMINISTRATIVE BUDGET

The $30,000 adds up to one professional position we are requesting, because if these pilot plants go, and some of them are going to go, we must have more professional expertise to make the evaluations and monitor the projects. We believe we can save much more than would be expended for the extra professional staff.

Madam Chairman, all I can say right now, is that I am at your mercy, based on previous experience.

Mrs. HANSEN. We have been very merciful to you.

Mr. FUMICH. I really have to agree with you.

BUDGET JUSTIFICATION MATERIAL

Mrs. HANSEN. We will insert pages 1 through 13 of the justifications in the record at this point.

(The pages follow:)

DEPARTMENT OF THE INTERIOR

OFFICE OF COAL RESEARCH

SALARIES AND EXPENSES

Appropriation, 1970	$15,300,000	
Unobligated balance from prior year	201,000	
Total available, 1970		$15,501,000
Appropriation, 1971	17,160,000	
Unobligated balance from prior year	2,017,000	
Total available, 1971		19,177,000

SUMMARY OF INCREASES AND DECREASES, 1972

	Base for 1972	Increase 1972	
Increase to insure proper administration and monitoring of program	515,000	$30,000	
Increase in contract research program	16,645,000	3,810,000	
Reduction in unobligated balance in contract research program	2,017,000	-2,017,000	
Net increase 1972			1,823,000
Budget estimate, 1972			21,000,000

DEPARTMENT OF THE INTERIOR

OFFICE OF COAL RESEARCH

SALARIES AND EXPENSES

Analysis by Activity

Activity	F.Y. 1970 Amount Available	Fiscal Year 1971 Total Appropriation	Pay Cost Supplemental	Unobligated Balance	Amount Available
Administration and Contract Supervision	$ 451,000	$ 495,000	$ +20,000	$ -	$ 515,000
Contract Research	15,663,000	16,665,000	-20,000	2,017,000	18,662,000
Unobligated balance	2,017,000 1/	-	-	-	-
Total	18,131,000	17,160,000	-	2,017,000	19,177,000

Activity	F.Y. 1970 Amount Available	F.Y. 1971 Amount Available	F.Y. 1972 Estimate	Increase (+) Decrease (-) 1972 comp. to 1971
Administration and Contract Supervision	$ 451,000	$ 515,000	$ 545,000	$ +30,000
Contract Research	15,663,000	18,662,000	20,455,000	+1,793,000
Unobligated balance	2,017,000 1/	-	-	-
Total	18,131,000	19,177,000	21,000,000	+1,823,000

1/ Including $2,000,000 held in budgetary reserve for carry-over to FY-1971.

PROGRAM JUSTIFICATION

DEPARTMENT OF THE INTERIOR

OFFICE OF COAL RESEARCH

Fiscal Year 1972

laries and Expenses: Fiscal Year 1971, $17,160,000; Fiscal Year 1972, 1,000,000; increase $3,840,000. The increase consists of:

Increase (+) or Decrease (-) Amount	Positions	Total Program	Total Positions	Explanation
)$ +30,000	+1	$ 545,000	26	To insure proper administration and monitoring of contract research program.
) +3,810,000	--	20,455,000	--	Increase in contract research program.
+3,840,000	+1	21,000,000	26	

Cost Factors Involved in Increases

e requested staffing level for the office is twenty-six (26) employees. This is increase of one to satisfy requirements for more frequent technical and ministrative monitoring of contractors' performance and activities. Two more lot plant phase projects are proposed on the basis of successful preliminary search. This represents increased cost, complexity, and activity.

e increase of $3,810,000 for the contract research program is due chiefly to e advancement of two projects to the pilot plant stage, one in the vital field coal gasification and the other for the solvent refining of coal and lignite to a low-sulfur, low-ash liquid or solid fuel.

ntinued funding of four (4) pilot plant projects in the amount of $11,955,000 is ovided in the FY-1972 program. This represents a decrease of $350,000 on these me projects in comparison with FY-1971. The sums being requested for FY-1972 r the six (6) above-mentioned pilot plant projects are:

Pilot Plant Projects	Approp. for FY-1971	Estimate for FY-1972
Consol - Cresap Pilot Plant - Contract 14-01-0001-310 (operation and maintenance following modifications to change to "H-Coal" process for production of low-sulfur liquid fuel) ...	$ 3,000,000	$ 2,000,000
Consol - Lignite Gasification Project - Contract 14-01-0001-415 (completion of construction and operation and maintenance funds) ...	3,000,000	3,420,000
FMC Corporation - Project COED (Char-Oil-Energy-Development) Contract 14-01-0001-498 (operation and maintenance funds for pilot plant	3,000,000	3,035,000

Pilot Plant Projects	Approp. for FY-1971	Estimate for FY-1972
4. Institute of Gas Technology - Gasification Project - Contract 14-01-0001-381 (operation and maintenance funds for pilot plant - basic construction completed)	$ 3,205,000	$ 3,500,000
5. Bituminous Coal Research, Inc. - Gasification Project - Contract 14-01-0001-324 (to begin construction of pilot plant)	-	2,200,000
6. Pittsburg & Midway Coal Mining Co. - Solvent-Refined Coal Project - Contract 14-01-0001-496 (to begin construction of pilot plant and additional process development)	-	2,100,000
Subtotal	12,205,000	16,255,000

Funds are requested by the Office of Coal Research for continuing research on ten (10) nonpilot plant projects as follows:

Nonpilot Plant Projects	Approp. for FY-1971	Estimate for FY-1972
1. Avco Corporation - Contract 14-01-0001-493	$ 300,000	$ 300,000
2. Bituminous Coal Research, Inc. - Contract 14-01-0001-324	900,000	600,000
3. Iowa State University - Contract 14-01-0001-479	50,000	100,000
4. Pennsylvania State University - Contract 14-01-0001-390	390,000	400,000
5. The Pittsburg & Midway Coal Mining Co. - Contract 14-01-0001-496	590,000	1,000,000
6. University of Utah - Contract 14-32-0001-1200	200,000	200,000
7. Virginia Polytechnic Institute - Contract 14-01-0001-410	200,000	200,000
8. West Virginia University - Contract 14-01-0001-488	200,000	200,000
9. University of Wyoming - Contract 14-01-0001-1196	200,000	200,000
10. Magnetohydrodynamic (MHD) Coal/Power Research	600,000	1,000,000
11. Westinghouse Electric Corporation - Contract 14-01-0001-303	620,000	-
12. Pope, Evans and Robbins - Contract 14-01-0001-478	90,000	-
13. Hydrocarbon Research, Inc. - Contract 14-01-0001-	100,000	-
Subtotal	4,440,000	4,200,000

All of the funds requested, both for pilot and nonpilot projects, are for continued funding of ongoing projects.

Cost increases for administration and supervisory activities will total $30,000. The $545,000 funding proposed for Fiscal Year 1972 for administration and supervision represents less than 3 percent of the total projected contract research program, and covers one more position as well as total salaries, personnel benefits, travel, and all miscellaneous items as broken out in the object classification. The total request for administration and supervision in FY-1972 is shown below:

	Approp. for FY-1971	Estimate for FY-1972
Administration and Supervision	$515,000	$545,000

RECAP: (Subtotals)

	Estimate for FY-1972
Pilot Plant Projects	$16,255,000
Nonpilot Plant Projects	4,200,000
Administration and Supervision	545,000
	21,000,000

A funding level of $16,255,000 is proposed for pilot plant projects in FY-1972, and funds requested for nonpilot plant projects total $4,200,000.

The Office of Coal Research continues to work closely with its General Technical Advisory Committee (GTAC), a distinguished, able, and technically qualified group of advisors drawn from industry, science, education, and labor, and appointed by the Secretary of the Interior. This group, as well as other nongovernmental technical consultants assists in the review of ongoing work and new work. The budget for FY-1972 reflects detailed discussions with the GTAC relative to individual projects as well as areas of research effort for the proposed areas of work to be covered.

Program

Coal represents only about 21 percent of total fossil fuels consumed annually; however, it represents 72 percent of our Nation's total fossil fuel reserves. When processes are fully developed for economical conversion of coal to clean, readily transportable and consumable liquid and gaseous fuels, the pattern of coal use will be much more closely related to the pattern of the availability of reserves, and will represent a very significant contribution of conservation.

Our Nation's energy requirements will continue to double within each decade for the foreseeable future due to increasing per capita energy consumption and population increases. All energy sources--coal, oil, gas, water power, and nuclear--will be strained to meet the demand. Crises in natural gas supply and electric power generation (blackouts and brownouts) are immediate, and petroleum shortages within the future can be foreseen.

Technologies for energy production and utilization are inextricably interlocked with pollution in all its forms and all forms of energy (except hydropower) are active contributors to air, water, and land pollution. When the problems of energy supply and pollution reduction are considered together rather than separately, it becomes apparent that the answers, if they are to be found, must come from technological research.

The Office of Coal Research has developed a broad spectrum of research projects intended to reduce air and water pollution through economic conversion of coal to synthetic pipeline gas, electric power, and synthetic crude oil. For example:

Progress made in the technology for converting coal to pipeline gas gives strong indication that dwindling natural gas supplies can be significantly supplemented with clean high Btu gas from coal by 1980. Of the fossil fuels, pipeline gas is the cleanest and the lowest source of pollutants. Because of the emerging gas scarcity which affects supplies available to industry, as well as cost to residential consumers, accelerated research in this area is vital to our economy.

Equally important is improvement in the efficiency and cleanliness of coal-burning electric generation--through development of coal-based fuel cells and magnetohydrodynamic (MHD) generators. Both would be major contributors to environmental (air and water) improvement, and would enable use of our energy reserves for highest potential use. For the shorter range, research work has been conducted on the development of a boiler for steam-electric generation using coal burned in a "fluidized bed" at lower temperatures. Air pollution would be drastically reduced in such a boiler.

A process under development involves the solvent extraction of coal to eliminate ash down to 0.1% and reduce the sulfur content to one-half of one percent (0.5%). The resultant product could be efficiently burned with minimum air pollution, after only minor modification to existing electric utility generating plants.

The production of synthetic liquid fuels from coal becomes increasingly important in the event of curtailment of oil imports from foreign sources, and the liquid products are designed to be very low in sulfur. The desulfurized chars would be available for use as low-pollutant electric utility fuel, conserving the short supply of low-sulfur coals for metallurgical use and for dollar-earning exports.

Pilot Plant Projects:

Consolidation Coal Company/Hydrocarbon Research, Inc. (Fuel Oil Project) $2,000,000 1/

The pilot plant on Project Gasoline was completed in 1967 at Cresap, West Virginia. Operation of the extraction and hydrogenation portions of the plant was pursued in varying degrees. Integrated operation of the pilot plant was difficult but after months of intensive experimentation was achieved briefly.

The plant is currently shut down awaiting engineering and process modifications which will continue into FY-1972. When operation resumes, the testing of various coals will be completed utilizing the H-Coal Process. It is estimated that the data will be complete in FY-1973; the commercial design is scheduled for FY-1974. The plant will produce a clean high-grade low-sulfur synthetic fuel oil.

Consolidation Coal Company (Project Lignite Gasification) $3,420,000

Construction of the pilot plant at Rapid City, South Dakota, began in August 1969. This process is designed to use lignite as a raw material for conversion to pipeline-quality gas. The principal feature of the process is that it does not require a large amount of oxygen. Dolomite (limestone) is used to absorb CO_2 and as a heat-transfer medium. Laboratory and bench-scale work has been completed with encouraging results.

1/ Represents 2/3 of the funding requirement for FY-1972 with the remaining 1/3 to be sought from non-Federal sources.

Commercial application could significantly reduce air pollution by providing both a clean competitive gaseous fuel, and a low-sulfur solid fuel for power generation. Applications of the process could accelerate the use of coal in arid areas, and utilize the vast lignite reserves of the West.

The pilot plant is scheduled for completion late summer or early fall of FY-1972. Operations will continue through FY-1972 and FY-1973. The commercial plant design is scheduled for FY-1974.

FMC Corporation (Char-Oil-Energy-Development) $3,035,000

The 25-ton-per-day pilot plant is completed and is still undergoing startup test. Calibration for data runs began in October 1970. Variable test runs will continue through FY-1972, and into FY-1973. The effort is directed to produce data and variable studies to establish design criteria for a commercial plant operation. The final report and commercial design is scheduled for FY-1974.

Optimum studies during the pilot plant operation will seek to determine the most desirable product balance for commercial operation (varying from oil, gas, and maximum solid boiler feed to all-oil, and pipeline or industrial gas).

The process is designed to produce clean liquids, gases and char.

Institute of Gas Technology (Hydrogasification) $3,500,000

The pilot plant construction started in 1969. It has just been completed. Test runs are underway and will continue during FY-1972 and into FY-1973, to verify bench-scale results and produce sufficient data for design of larger coal-to-pipeline gas plants.

The plant operating runs may be completed in FY-1973, and a commercial plant design is expected to be available by about FY-1975 or shortly thereafter.

Large bench-scale development of the electrofluid-bed process for production of hydrogen from char promotes prospects for higher gas yields per ton of coal at lower cost.

The process technology was more fully developed than that of other promising coal-gasification methods. The present OCR contract includes continuing support from the American Gas Association (AGA) toward pilot plant construction and operation costs.

Bituminous Coal Research (Two-stage Super-pressure Gasification) $2,200,000 1/

This project also seeks to develop an economic process to produce a pipeline-quality gas from coal. After considerable success in experimental development with a small unit simulating the second stage of the proposed gasifier, the contract was extended and funding increased. The extension involves a 100-pound-per-hour second-stage process equipment development (PEDU) unit, and testing of an experimental high-pressure coal feeder. Engineering data is continuing to be developed. Supporting petrographic and laboratory studies will continue. A pilot plant is currently being designed under subcontract. If the present work on the project continues to be successful it is proposed to begin pilot plant construction in FY-1972.

1/ Represents 2/3 of the funding requirement for FY-1972 with the remaining 1/3 to be sought from non-Federal sources.

The process techniques and work performed to date have been subjected to a careful and detailed examination by the General Technical Advisory Committee and an "outside" contractor. These are all affirmative and indicate the need to go forward with the pilot plant stage. A 27-acre site has been selected by the Secretary near Homer City, Pennsylvania.

This plant will provide space for multi-purpose testing of alternate procedures for downstream quality control for both pipeline and industrial gas processes. Conclusion of the pilot plant program can be expected to provide data and process variables to design complete commercial plants. It is also expected to support developments in other OCR processes with reference to meeting AGA specifications for pipeline quality gas.

Pittsburg & Midway (Low-Ash/Low-Sulfur Coal) $2,100,000 1/

The Pittsburg & Midway project represents development of a solvation process for treating coal to remove ash, sulfur, and other impurities. Technical feasibility has been demonstrated on a wide range of coals from the highest rank to the lowest (lignite). The end product, regardless of the coal type or source, contains approximately 16,000 Btu's per pound, an ash content of one-tenth of one percent, and a very low sulfur content of approximately 0.5%. The product, a solid material at room temperature may be transformed into a pumpable liquid by the use of relatively low heat.

Studies indicate that this versatile product has potential as a powerplant fuel with low atmospheric contamination, as a gas turbine and diesel fuel (perhaps mixed with a distillate oil), and for carbon and graphite electrodes because of its purity as a raw material, and other uses. A site for the pilot plant has been selected on Government property at Fort Lewis (Tacoma), Washington. The detailed construction design by Stearns Roger Corporation is completed.

The successful pursuit of the project for the development of low-ash low-sulfur "solvent refined coal" would contribute to national environmental objectives.

Significant contributions to national objectives by this program are:

a. Air pollution: Successful completion of the pilot plant development work would provide a fuel that meets the most stringent sulfur dioxide limits now being proposed in air quality standards.

b. Particulate matter pollution of air and water: Since the process removes essentially all coal ash, its use would satisfy the requirements concerning particulate matter.

c. Synthetic gas: The process would provide some excess pipeline gas as a byproduct over and above the fuel required for the process. The economics of this production should favorably compare with the cost of natural gas.

d. Synthetic liquid fuels: The process would provide a de-ashed coal product which could readily be converted to synthetic fuels such as gasoline or light fuel oil.

e. Supply of low-sulfur fuel: The process could result in commercially adaptable means of increasing the supply of low-sulfur coal.

f. Low-cost sulfur and other byproducts.

1/ Represents 2/3 of the funding requirement for FY-1972 with the remaining 1/3 to be sought from non-Federal sources.

contract will conclude with a preliminary design of a 50-ton-per-day coal feed pilot plant and a more detailed conceptual design and profitability analysis of a commercial-scale operation.

All work on the project will be directed toward lowering costs for commercial-scale coal hydrogenation. The project work seeks methods that will allow coal hydrogenation at pressures below 2,000 pounds per square inch and possibly as low as 1,000 pounds per square inch. If these results can be achieved, the economics of converting coal to synthetic liquid fuels will be considerably improved.

Multiple Catalyst Fluidized Reactions (University of Wyoming) $200,000

This research continues to explore the reactions of coal or char with steam in a fluidized bed in the presence of several different catalysts simultaneously at pressures up to 450 pounds per square inch. The objective is to produce useful hydrocarbons and gases from coal at an optimum level and so reduce costs of conversion. Small-scale investigation will shift to a larger bench-scale reactor, and additional data will be developed.

Electrofluidic Coal Processing (Iowa State University) $100,000

Current laboratory work has indicated the feasibility of producing useful gases by utilizing a fluidized bed and resistance electric heating. The Institute of Gas Technology (one of OCR's pilot plant contractors) will use the system (developed under this contract) to produce hydrogen in its hydrogasification processes. A larger reactor is presently being designed. A method for electrotreatment of coal which is both technically and economically successful will permit the establishment of mine-mouth complexes for production of chemicals.

Flyash Utilization, Construction Materials (West Virginia University) $200,000

Production of structure building materials from coal ash has been successfully demonstrated in a pilot plant operated by the Coal Research Bureau of West Virginia University. Work is currently centered in the following seven areas:

1. Pilot scale investigation using newly developed acid additive technology to substantially reduce production costs.

2. Expanded examination of destructive brick efflorescence and scumming.

3. Brick production from sulfur absorbing limestone modified flyash, a potential major waste product.

4. Pilot scale investigation of brick production from solid mine waste.

5. Production of brick without slag additions.

6. Wall and structure fabrication and durability tests.

7. Production of textures and colored brick on a pilot scale.

Other areas should also be investigated to demonstrate additional feasibility. The process has been licensed to various prospective developers.

Mining Optimization (Virginia Polytechnic Institute) $200,000

Computer simulation programs for mining developed under an earlier contract with VPI have been accepted and are being widely used by the mining industry, in this country and abroad. These simulations permit a mining operator to detect bottlenecks and cost problems within the system and determine which operations should be

Nonpilot Plant Projects:

Nonpilot plant projects deal primarily with support research for liquefaction, gasification and electric generation projects of OCR. Sometimes nonpilot plant projects are intended to develop other new uses.

These deal with problems which may impede commercial application of processes under development, or which may make those processes more economic. Support projects are crucial as they may ultimately determine the technical or economic feasibility or the extent of application of liquefaction, gasification or electric generation technology.

Arc Processing (Avco Corporation) $300,000

Evaluation of experimental work under this contract shows that it has potential commercial application for the manufacture of acetylene, used in the production of plastics. There are many indications that coal treated by intense concentration of energy will, in microseconds, form useful chemicals. The problem areas are: removing these chemicals from the reaction before they are degraded, maximizing the yield, and minimizing the power consumption.

Arc stabilization and cooling are largely solved. The remaining work is primarily hardware development and determination of variables for scaling up to a pilot plant.

Special Purpose Coal Preparation (Pennsylvania State University) $400,000

This work is being jointly funded. The University has contributed approximately $165,000 of the total project costs. The objective is the development of mining and preparation practices to make coal conversion processes (for liquefaction and gasification) more economic.

Recognizing the trend toward more exacting quality requirements, the contractor began a reorientation of its research program. Additional emphasis was placed on coal mining and coal preparation research, including development of innovations in coal mining systems which, while increasing efficiency, will yield coal possessing qualities suited to subsequent cleaning and beneficiation steps. Thus, the coal mining and preparation phases will become an integrated whole, one which will contribute to coal utilization with minimum damage to the environment.

Work under this contract already has shown that it is feasible to separate different coal-types from a total mined product. It has shown that these coal-types possess characteristics which render some types more suitable for certain processes than others. Properties that affect the potential use of the various coal-types in various processes under study by the Office of Coal Research have been investigated in depth and critical information has been made available. Consequently, the coal preparation research now has as its main thrust the development of new commercially feasible methods for manipulating the composition of coal-seam products in preparation and beneficiation plants; the objective is to provide raw materials which (a) have optimum properties for all the coal utilization processes and (b) are free of components deleterious to equipment and/or capable of producing pollution.

Western Coal Adaptation (University of Utah) $200,000

The work is being jointly funded. The University's contribution is $176,000 of the total contract cost. The objective is to study various catalyst systems to optimize product yields. This will include synthetic crude oil, fuel gases, and solid char fuel. The contractor will design a 6-inch diameter continuous reactor system and prepare an estimate of the economic feasibility of a full-scale commercial plant based on the experimentally developed process.

The contractor will then construct and operate the continuous reactor system for further determination and optimization of process variables. The work under this

changed. The additional programs to be pursued under the current contract are mine-ventilation-network analysis, power-systems-network analysis, cost projection analysis and mine development scheduling, rail-haulage simulation, and pumping systems analysis.

To facilitate structural continuity of a mining property, a ground movement simulator will be developed to determine the optimum mine layout in terms of over-all structural stability. Local geology, topography, mining conditions, etc., will be part of the input.

A program to evaluate the effect on current and future mining costs due to equipment and facility delays will be developed. It will allow determination of optimum equipment life.

The existing "Cost-SCHED" program will be refined to enable annual cash flow determination over the life of the property and expanded to enable calculation of the rates of return on equity and total investment for the total venture.

Field testing of the proposed programs to facilitate maximum industrial implications will be a significant and integral part of the above work.

Two-Stage Super-Pressure Gasifier (Bituminous Coal Research, Inc.) $600,000

This work represents a continuation of the existing laboratory bench-scale and process development unit work that will be carried on concurrently by the contractor during the design and construction phase of this gasification project. The continuation of this work is both necessary and should result in considerable cost savings in the subsequent pilot plant phase of the effort as a result of being able to currently perform relatively modest scale experiments prior to the time that such work is scaled up and becomes a part of the larger pilot plant effort.

Low-Ash/Low-Sulfur Coal Project (Pittsburg & Midway Coal Mining Co.) $1,000,000

This sum is required to continue the process development unit (PDU) scale of effort undertaken in FY-1971 at the University of North Dakota. The PDU work will be underway shortly and will require approximately three years of effort, including design and procurement of the specialized equipment and the subsequent operation of the PDU. The sum requested for FY-1972 will permit the completion of all construction costs in 1972 and the beginning of the operation phase of the effort.

Electric Power Generation

The demand for electric power is doubling every 10 years.[1/] The rapidly rising air pollution and thermal water pollution is causing widespread concern. In the search for reduced air pollution, there is increasing demand imposed on the limited reserves of low-sulfur coals which should be conserved for metallurgical purposes, or for export for balance of payments purposes. In addition, arid areas need a means of power generation which is not excessively dependent upon large volumes of water.

The Chairman of the Federal Power Commission estimated (August 10, 1970) that the use of coal by electric utilities may reach 472 million tons by 1980 and 613 million tons by 1990, compared with 304 million tons in 1970.

1/ Federal Power Commission Release, September 24, 1969, No. 16323 -- "The new forecast of power requirements of more than 5.8 trillion kilowatt-hours by 1990 compares with about 1.5 trillion kilowatt-hours expected to be consumed in 1970. Peak demands in 1970 are projected to be 277,921,000 kilowatts, compared with the estimated 1,056,000,000 kilowatts in 1990."

Electric utilities are the largest user of coal, taking about 60 percent of current coal production. As the use of coal for electric power increases, electric power represents an increasing proportion of the total annual coal consumption.

OCR is proposing to proceed to the pilot plant stage in its project for "solvent-refined coal" so as to provide conventional powerplants with a low-pollution fuel. OCR is also proposing to proceed more rapidly with research for magnetohydrodynamic (MHD) generation, for clean and efficient conversion of coal to power.

Magnetohydrodynamic (MHD) Power Generation $1,000,000

MHD electric generation research is proposed as a research program seeking early application to help relieve the Nation's power shortages, as well as to reduce the research cost in a clean environment. Essentially, the MHD method involves obtaining direct current power by a superconducting magnet from a high-velocity, high-temperature gas stream.

Fully developed MHD powerplants may have conversion efficiencies up to 60 percent compared with the 40 percent for today's best coal-steam plants and around 30 percent efficiency for nuclear plants.

Projected energy costs in mills per kilowatt hour based on 800-mw plant sizes showed a net advantage for an MHD char-steam system over a coal-steam system, a coal-gas turbine system, a char-gas turbine system, as well as a conventional steam or nuclear powerplant. Costs ranged from 3.32 to 4.01 mills per kwh.

MHD has major potentialities for reducing pollution from both stack gas emission and thermal pollution (of air and water) to only 44 percent (per kwh generated) of the level of today's best conventional powerplants; or only 28 percent as much thermal pollution as present day nuclear plants. It also carries the promise of eliminating completely all cooling water requirements, which is an important objective at most of the available powerplant sites, and an overriding objective in the arid coal-rich areas of the Western States.

MHD will also enable the use of high-sulfur coals for power generation, thereby conserving the short-supply low-sulfur coals for metallurgical purposes and for export.

Proposed Program for MHD:

First phase efforts (12 to 24 months) will be directed (beginning in FY-1971) toward analysis of the cycle or cycles that appear best from the viewpoint of technology and cost. These analyses would be made with the assistance of an engineering organization which is knowledgeable in the field of power generation and under the direction of a contractor familiar with MHD.

The studies will evaluate alternative proposals such as type of generator, the fuel to be used including char, or a gas produced from one of these products, the oxidant to be used in the combustion system, and the relative amount of plant power to come from the MHD generator and a convenient steam plant to be used in combination. Concurrently, there will be need for a small-scale experimental program that would answer certain questions concerning superconducting magnets, plasma properties, materials of construction, channel geometry, generator type, variations of efficiency as a function of seed or other factors, and experimental combustion of coal, char, and coal-gas.

Presuming the original program indicates success, the second and succeeding phases would be a program based on construction of a 250-kw, 2,500-kw, and 25,000-kw generator. A sequence such as this is reasonable; the actual sizing sequence will depend on the results as the work progresses. At each step a reassessment will

be made to insure that the program continues to indicate practical application of MHD. Such a continuing program up to the point of commercial application may extend over 10 years.

In the interim a continuing review will be made of technological progress to seek opportunities for reducing cost of research and increasing the speed of progress.

Personnel Summary

	1970 Actual	1971 Estimate	1972 Estimate
Total number of permanent positions.....	25	25	26
Full-time equivalent of other positions.	1	1	1
Average number of all employees.....	21	26	27
Average GS grade.....	10.6	10.6	10.4
Average GS salary.....	$16,669	$16,830	$16,869

Itemization of Estimate

Department of the Interior
Appropriation Title: Salaries and Expenses — Office of Coal Research

	Actual 1970	Estimate 1971	Estimate 1972	Increase (+) Decrease (-)
Program and Financing:				
Total obligations	$13,492,867	$19,177,000	$21,000,000	$ +1,823,000
Receipts and reimbursements .	- 8,337	--	--	--
Unobligated balance, start of year	- 201,530	-2,017,000	--	+2,017,000
Unobligated balance, end of year	+2,017,000	--	--	--
New obligational authority, appropriation	15,300,000	17,160,000	21,000,000	+3,840,000
Object classification:				
11 Personnel compensation	330,005	420,000	437,000	+ 17,000
12 Personnel benefits	24,890	29,000	30,000	+ 1,000
21 Travel and transportation of persons	34,182	27,000	37,000	+ 10,000
22 Transportation of things...	1,905	1,000	1,000	--
23 Rent, communications and utilities	12,911	16,000	17,000	+ 1,000
24 Printing and reproduction .	15,067	18,000	18,000	--
25 Other services	13,070,625	18,662,000	20,455,000	+1,793,000
26 Supplies and materials	2,243	2,000	2,000	--
31 Equipment	1,039	2,000	3,000	+ 1,000
Total obligations	$13,492,867	$19,177,000	$21,000,000	$ +1,823,000

FISCAL 1970 UNOBLIGATED BALANCE

Mrs. HANSEN. At the end of fiscal year 1970 you had an unobligated balance of $2,017,000. Yet you indicate no unobligated balances at the end of either fiscal year 1971 or 1972. What is the premise on which you anticipate the obligation of all of your available funds in fiscal years 1971 and 1972?

Mr. FUMICH. As you remember, Madam Chairman, the $2,017,000 represents three different items. One million represents a freeze we had on our pilot plant project in Rapid City.

Mrs. HANSEN. Why was this $1 million placed in reserve?

Mr. FUMICH. I guess the Bureau of the Budget thought we weren't ready to expend that much money at this particular time.

Mrs. HANSEN. Were you?

Mr. FUMICH. It was a congressional add on.

Mrs. HANSEN. It was a congressional add on because we saw a definite need for the continuation of this research.

Mr. FUMICH. I won't counter that statement, Madam Chairman.

Mrs. HANSEN. This committee has been very interested in your programs.

Mr. FUMICH. I agree that this committee has been one of our strong supporters, Madam Chairman.

Mrs. HANSEN. We are deeply concerned and interested in your programs and want you to achieve some success. We have tried to add funds, but every time we add funds they are put in the deep freeze.

CONTRACTS VS. GRANTS

All of your work is carried on under contract research, in fact, you make the statement in your budget presentation that "no grant research projects are carried on." Please explain for the committee the major differences between contract research as administered by your Office and research that would be conducted under grants.

Mr. FUMICH. We would envision that thusly, Madam Chairman. Grants are given institutions like a university. They work in an area they select, and there are no guideline strings attached.

On the other hand, we negotiate with the contractors that we deal with whether they are universities, private companies, or research centers. If they come up with an idea, then, of course, we both agree on what work is to be done and how it is to be conducted, and the length of time it should take and also how much it should cost. We monitor these projects religiously. If at a certain point in time we believe the researcher is not meeting the objectives outlined or promised, we would terminate the project.

CONTRACT RESEARCH PROJECTS TERMINATED

Mrs. HANSEN. How many contracts have you terminated?

Mr. FUMICH. We have terminated a few projects, Madam Chairman. I can furnish them for the record.

Mrs. HANSEN. Please do.

Mr. FUMICH. Yes.

(The information follows:)

Contracts terminated*by the Office of Coal Research prior to completion, reasons therefor, and the amounts expended on each:

Contractor and Location and Reasons for Termination	Contract Amount	Amount Expended
Gourdine Systems, Inc. Livingston, N. J. (Lack of progress, and large projected future costs if work was carried to completion).	$1,200,000	$1,163,730
Hydrocarbon Research, Inc. Trenton, N. J. (Work was technically successful. Next stage of development would have been more expensive. Rejection of funding request resulted in early termination).	2,114,000	1,763,750
M. W. Kellogg Company New Market, N. J. (Same as immediately above).	1,709,860	930,292
West Virginia Institute of Technology Montgomery, West Va. (Lack of progress on work).	16,800	11,800
TOTAL	$5,426,760	$3,949,147

* The above listed contracts were formally terminated. Others have expired without renewal, expansion, or extension of any further work.

Mr. FUMICH. On the other hand, if we see that the original goal can't be reached as a result of the continuing research and we feel they can do something else that is just as important to our program or possibly even more important, then we allow them to change direction.

Again, we monitor that very strictly, until we reach a point of decision. If it is a project in a feasibility stage and looks successful, then we have to make a decision on whether to go to the more expensive process development stage.

At that time we would utilize outside evaluators, our own advisory committee and, our own staff.

TECHNICAL CONSULTANTS

Mrs. HANSEN. Whom do you use as outside evaluators?

Mr. FUMICH. We have scientists in every line of discipline and if you wish, we can furnish the names for the record.

Mrs. HANSEN. Please do.

(The information follows:)

OFFICE OF COAL RESEARCH TECHNICAL CONSULTANTS

Conn, Arthur L., director, Government contracts, American Oil Co., Research and Development Department, 2500 New York Avenue, Whiting, Ind., (chemical engineer).

Edwards, Mark Wesley A., Bituminous Coal Operators' Assoc., 303 World Center Building, 918 16th Street NW., Washington, D.C., (economist).

Hill, George Richard (Dr.), dean, College of Mines and Mineral Industries, University of Utah, Salt Lake City, Utah, (chemist).

Hurwitz, Emanuel (Dr.), consulting engineer, 6833 N. Kedzie Avenue, Chicago, Ill., (retired) chemical engineer, Chicago Municipal Sanitary Commission, Chicago, Ill.

Jones, Malcolm S., Jr., California Scientific Laboratories, P.O. Box 1367, Newport Beach, Calif., (mech. engr./physicist).

Lloyd, Walter L., manager, Coal Research and Development, Pennsylvania Railroad Co., 1534 Transportation Center, Six Penn Center Plaza, Philadelphia, Pa., (mechanical engineer).

Long, John B., president, Long Airdox Co., P.O. Box 331, Oak Hill, W. Va., (mining engineer).

McGaughy, John, president, Lublin, McGaughy & Associates, 220 West Freemason Street, Norfolk, Va., (mechanical engineer).

Newman, Louis L., 4010 Galt Ocean Drive, Apartment 1212, Fort Lauderdale, Fla., (retired chemical engineer, U.S. Bureau of Mines).

Robinson, Myles E. (Dr.), director, marketing, transportation and logistics, American University, Washington, D.C., (economist).

Satkowski, John A., power branch, Office of Naval Research, Washington, D.C., (mechanical engineer).

Squires, Arthur M. (Dr.), professor and chairman, School of Engineering, Department of Chemical Engineering, The City College of The City University of New York, New York, N.Y., (phys. chem.).

Thompson, Burlock C. (Dr.), consultant, 3021 Ordway Street NW., Washington, D.C., (economist).

Thompson, James H. (Dr.), West Virginia University, Bureau of Business Research, Morgantown, W. Va., (economist).

Zahradnik, Raymond L. (Dr.), Department of Chemical Engineering, Carnegie-Mellon University, Pittsburgh, Pa., (chemical engineer).

JUSTIFICATION OF PROJECTS

Mr. FUMICH. If after the evaluation we get a positive confirmation of the work, then we, of course, justify that project through the executive branch and before the congressional committees. The next phase of effort in most cases would take about 2 years.

This would also be the length of the contract.

The same procedure would be followed in going through that stage before a decision was made to go into the final or pilot plant stage.

BASIC RESEARCH

Mrs. HANSEN. You also indicate in your budget presentation that "basic research is extremely limited—only insofar as a project may support other ongoing research."

May we have your further comments in this connection?

Mr. FUMICH. I don't really believe, Madam Chairman, that we get involved in what we would consider as basic research.

What we are really talking about is applied research and development work. I don't think that we are really involved in the basic research area.

My own definition of "basic research" is where you are involved in a search just to see what you can find in the way of pure knowledge, the results of which could land almost in any field. We try to get involved in areas more advanced than that which are targeted toward our mandate.

FUNDS IN BUDGETARY RESERVE

Mrs. HANSEN. You had $2 million held in budgetary reserve for carryover to fiscal year 1971. Have all of your funds now been released from budgetary reserve?

Mr. FUMICH. Yes, Madam Chairman.

NON-FEDERAL FUNDS FOR PROJECTS

Mrs. HANSEN. I notice that three of your pilot plant projects have been budgeted for 1972 on the basis of two-thirds of the funding being provided by you under contract with the remaining one-third to be sought from non-Federal sources.

First, I would like you to explain for the committee the factors responsible for this divergence from your usual funding pattern.

Mr. FUMICH. Madam Chairman, when we received our final budget authorization, we also received what you might call a directive or guideline to the effect that all new pilot plant starts or any modified pilot plant starts would require participation of approximately a third by outside sources.

Mrs. HANSEN. What do you deem to be outside sources?

Mr. FUMICH. We would consider any non-Federal governmental contributors as non-Government sources.

EFFECTS OF NONCONTRIBUTORS

Mrs. HANSEN. What happens if you don't find them. Does your research come to a crashing halt?

Mr. FUMICH. Madam Chairman, we have requested the high level management of the research groups we are dealing with for participating funding. At the proper time if we don't receive funding at that particular level, of course, we would propose a discussion with the secretariat to discuss some proposed action.

BCR PROPOSED FUNDING

I would have to say for the record that we have received a reply from Bituminous Coal Research, Inc., offering us a 1 percent contribution. In other words, they were going by the guidelines set up by the budget document which I believe is called OMB Circular A–100 which sets out voluntary guidelines.

Mrs. HANSEN. That is not a third of the costs.

Mr. FUMICH. No, Madam Chairman.

So we will have to take this under consideration and see what proposed course of action we will have to take.

POTENTIAL SOURCES OF CONTRIBUTED FUNDS

Mrs. HANSEN. Give me a list of the non-Federal sources you might expect to obtain this additional funding from.

Mr. FUMICH. Now?

Mrs. HANSEN. Yes.

Mr. FUMICH. Any members of the private industry, industries as a group, universities, research centers, trade associations, and State and local governments.

PROPRIETARY BENEFITS

Mrs. HANSEN. Supposing a private industry, such as a coal company, provides a third of the total amount, does he have a proprietary interest in the technology developed from the project?

Mr. FUMICH. That is a very good question.

Mrs. HANSEN. I think it is a fundamental question because you are developing processes and techniques.

Mr. FUMICH. We have already discussed this matter with our solicitor in the Department of Interior. At the present time he hasn't given us a direct answer. But I believe the feeling is that in the event we receive participation to a percentage degree, we might be able to offer patent rights to that percentage degree to the people that came in with the funding. We are not sure.

POSSIBLE DIFFICULTIES WITH CONTRIBUTED FUNDS

Mrs. HANSEN. That brings up the problem of which company will be allowed to participate and at what level of funding and also who will receive proprietary rights.

Will this new process of funding make a distinction of where and who receives benefits?

Mr. FUMICH. You bring up a serious matter.

Mrs. HANSEN. It is a serious matter.

Mr. FUMICH. I would answer it in this way, Madam Chairman: I would say if an industry came in, the total industry came in with fundings, they would receive no proprietary rights. On the other hand if a private company—I am just saying possibly, we don't know what the situation is. But I can say there would be no bidding as every company contribution would be accepted. As I said, this is an open question.

Mrs. HANSEN. I understand.

Mr. FUMICH. All of these matters would have to be considered and the decision would have to be made by the Secretariat. This would be out of our hands. But these are some of the matters we are seriously discussing because at this time there really would be no incentive for any individual company to participate in any of our research programs because they would have no better position than anyone else.

There would be no incentive whatsoever. So we have to find a sweetener some way. What, we don't know. This is new to us. We are trying to get involved and see how we can best suit this particular occasion with the type of decision that should be made.

Mrs. HANSEN. I think you had better get the Solicitor to issue a decision on this.

Mr. FUMICH. No decisions will be made without the Solicitor's recommendation.

WASHINGTON EVENING STAR, ARTICLE ON DYNALECTRON

Mrs. HANSEN. The Washington Star of the 17th of March had an article titled, "Dynalectron Study Gets New Funds."

It goes on to say:

Five major oil companies have agreed in separate contracts with Dynalectron Corp. of Washington to underwrite at least $2 million in research on a process to convert coal to liquid fuel in an effort to alleviate the Nation's energy crisis.

The contracts—representing half the total Federal and private funds which have gone into the development of "H-Coal" over the past 7 years—reflect the pressing need to find a substitute for the Nation's dwindling domestic oil reserves and brighter prospects of success on work conducted since 1963 by a Dynalectron subsidiary, Hydrocarbon Research, Inc. of Trenton, N.J.

Do you have any comments on this article?

Mr. FUMICH. Yes, Madam Chairman. We have been advised of this situation during our negotiations with the principals of HRI. We requested this particular consortium be brought into the contract with us and I think we had a tentative arrangement to this point, that possibly we would be able to receive the information that was developed as a result of that funding effort and that information would be given to the Government.

But we have not negotiated any further. We don't know what the situation will be. At this point things are kind of at a standstill.

Mr. OBEY. What do you mean HRI?

Mr. FUMICH. Hydrocarbon Research, Inc.

Mrs. HANSEN. The article continues:

Several trade publications have recently speculated that the Government, through Project Gasoline, is about to convert its Cresap, W. Va. pilot plant to H-Coal production under contract with Consolidated through the Interior Department's Office of Coal Research.

Dynalectron said that design, construction, and operation of a prototype of a commercial H–Coal plant are envisioned after the 2-year period of intensified research.

The process so far developed is patented, the company said, but will be offered "to responsible parties on reasonable terms."

The spokesman said several other oil companies, now the controllers of most of the major coal companies, have also discussed the research project with Dynalectron. Some of them are still in negotiations with the diversified engineering and service firm on contract terms, he said.

Research on the process was supported partially with funds from the Office of Coal Research from 1965 to 1967 at HRI. For the next 3 years, the project was

continued under contract with Atlantic Richfield at HRI and in Atlantic Richfield Laboratories.

More than $4 million in Federal and private funds have been spent in the last 7 years on the project, Dynalectron said.

In addition to Continental, two other oil companies will underwrite the concentrated research at Dynalectron through subsidiaries: Gulf through Gulf Resources Co. and Humble through Esso Research and engineering Co.

MODIFICATION OF PILOT PLANT FOR LOW SULFUR FUEL OIL

Mr. FUMICH. Madam Chairman, we were negotiating with Hydrocarbon Research, Inc. to change the target of our research effort at the pilot plant in Cresap, W. Va. in the direction of a low sulfur fuel oil. A direction which is badly needed in this country today because of the air pollution and clean energy problem.

Many people don't realize that of the 308 million tons of coal burned in the electric utility market last year, 93 percent was mined east of the Mississippi River and that 70 percent of the coal east of the Mississippi River is high sulfur and can't be utilized today in the electric utility market.

In other words, we have a lost resource, so to speak. What can we do to utilize this great resource? We have stack gas technology being developed. We have fuel gas technology being developed. We also have this other possibility of developing a low sulfur liquid fuel oil. We believe that it will be even more critically needed in the industrial market than in the electric utility market.

POSSIBLE FUTURE COURSES OF ACTION

Mrs. HANSEN. I understand the need. I want to know what the implications are. Would Hydrocarbon Research, Inc. be taking over the Cresap plant?

Mr. FUMICH. They would be utilizing and modifying the Cresap pilot plant to develop the H-Coal technology which was developed by the Government and Hydrocarbon Research, Inc.

Mrs. HANSEN. Are the oil companies sincere about this program?

Mr. FUMICH. Madam Chairman, we feel that the oil companies are sincere. We think that the stumbling block is the next stage where it is going to cost a lot of money. We find when participation calls for funding at less than the multimillion-dollar level, funding is easier to come by.

But when you request funding in the millions, of course that is a different situation.

FUTURE FEDERAL FUNDING

Mrs. HANSEN. Supposing they request from you a multimillion-dollar expenditure for the next phase of development?

Mr. FUMICH. My understanding, based on negotiations we have had, would be that the information developed as a result of the funding by the consortium would be cranked into the work at the pilot plant, so the work at the pilot plant would develop the best, most up-to-date research technology so the process could be optimized and would be able to compete in the marketplace within the shortest period of time.

PILOT PLANT, CRESAP, W. VA.

Mrs. HANSEN. Will there be any further demands for funds at the Cresap plant?

Mr. FUMICH. In order to move this project ahead we would have to modify the plant, which would take approximately a year, and then we would have to operate it for a minimum of 2 more years after that, Madam Chairman.

Mr. MCDADE. How much money was spent on the pilot plant?

Mr. FUMICH. Approximately $18.4 million.

Mr. MCDADE. You are going to turn the entire plant over on a two-thirds-one-third basis?

Mr. FUMICH. We wouldn't be turning the plant over, sir. We would be using the facility to develop technology that is badly needed.

Mr. MCDADE. You haven't answered the question at all. You are going to take this $18.4 million plant you had to close because it didn't perform its original function and now have it operated by this company?

Mr. FUMICH. The plant cost $6.3 million and the remaining part of the $18.4 million was used in the operation of the plant.

Mr. MCDADE. You are going to give $6.3 million worth of hardware for use by this company, are you?

Mr. FUMICH. And the technology would be in the public sector. In other words, the technology——

Mr. MCDADE. Will you answer this yes or no?

Mr. FUMICH. They would be operating the pilot plant, yes, sir. But the pilot plant is a Government facility. It would remain Government property. It wouldn't be given to anyone.

Mrs. HANSEN. Would the technology they develop belong to the consortium?

Mr. FUMICH. In the public domain.

Mrs. HANSEN. It wouldn't belong to the consortium?

Mr. FUMICH. That technology, the information would be given to the Government and this would be utilized and developed at the pilot plant also.

Mr. MCDADE. Is this their understanding?

Mr. FUMICH. Possibly I didn't understand your question, but the work that is being done at the HRI headquarters at Trenton, N.J., is work that is being funded by the consortium that you read of in the paper. We won't have a thing to do with the consortium in the effort developed there. We would have another effort at the Cresap pilot plant that would be developing the H-coal process technology, if we can get a third funding.

Mr. MCDADE. The question was why you are giving up the third. You don't have the third and are asking us to appropriate money and you can't tell us what you are going to give up to get the third. You talk about a third interest in a patent maybe.

PROPOSED CONTRACT STILL UNDER NEGOTIATION

Mr. FUMICH. We haven't offered them anything, sir. We are still negotiating. We are asking for a third. If we don't get it in a reasonable time, we will have to discuss this matter with the Secretariat and decide what decision should be made.

Mrs. HANSEN. Are you discussing this with the consortium?

Mr. FUMICH. No, madam.

Mrs. HANSEN. Who are you dealing with?

Mr. FUMICH. Hydrocarbon Research, Inc.

Mrs. HANSEN. Supposing they don't put up their third of the funds?

Mr. FUMICH. Then, as I mentioned, we would have to decide on what to do with the pilot plant at Cresap, W. Va., Madam Chairman.

Mrs. HANSEN. Have you obtained all of the answers that you wanted from that pilot plant?

Mr. FUMICH. No, Madam Chairman.

Mrs. HANSEN. Are you going to throw away your previous investment for a third of the total cost?

Mr. FUMICH. All I can reiterate, Madam Chairman, is that unless we get the third we are going to have to decide within a reasonable time on what we are going to do with that facility. These are our current instructions.

Mrs. HANSEN. What is a third of the total cost?

Mr. FUMICH. We figure that the total cost to modify and operate that Cresap facility with the H-coal process would be between $6 and $7 million. So we would need approximately $2 million from an outside source.

Mrs. HANSEN. You need $2 million for the pilot plant?

Mr. FUMICH. We would need the $2 million to go ahead with the pilot plant work.

Mrs. HANSEN. Would this $2 million literally save your $18,400,000 investment?

Mr. FUMICH. We feel since we have expended $18.4 million at that facility, we ought to try to go forward if we can.

PROBLEMS ENCOUNTERED IN OPERATION OF PROJECT GASOLINE PILOT PLANT AT CRESAP, W. VA.

Mrs. HANSEN. But you don't have all of the answers that you anticipated you would develop.

Mr. FUMICH. No, Madam Chairman; we don't.

Mrs. HANSEN. Why not?

Mr. FUMICH. As you know we had problems with the operation of the plant. We had problems on the extraction portion of the plant and also on the hydrogenation.

EVALUATION OF CRESAP PILOT PLANT PROJECT

We have had it evaluated by two outside sources, the National Academy of Engineering and the Foster Wheeler Corp., and both recommended that we go ahead with the original project at the Cresap facility after modifications.

Mrs. HANSEN. What happened between their recommendations and the decision to share the funding with a private company?

Mr. FUMICH. Madam Chairman, at this point in time it was decided that we would have more reason to go to a higher priority target area, the low sulfur fuel because of the air pollution regulations. This was a more near run priority; and we felt that, we should change our target and develop a low sulfur liquid fuel rather than go down the longer road to develop light fuels that could be refined to gasoline. This is one of the reasons.

OBJECTIVE OF WORK AT CRESAP, W. VA.

Mrs. HANSEN. What are you doing at the Cresap plant? What was your major goal?

Mr. COCHRAN. The purpose of the Cresap plant was to make a coal extract, filter it, hydrogenate the extract, and produce what we refer to as a synthetic liquid crude oil which was, with a one more commercially available processing step, capable of conversion to gasoline, and producing as a byproduct a char. In short, skimming something off the coal and converting it to gasoline and rejecting the balance to production of steam for generation of power.

Did I answer the question?

Mrs. HANSEN. You did. Are you now at the last stage of this project?

Mr. COCHRAN. Yes, ma'am.

LOW SULFUR FUEL OIL NOT PART OF ORIGINAL GOAL

Mrs. HANSEN. Does this have anything to do with a low sulfur fuel?

Mr. COCHRAN. In the process of extracting the coal you do produce an extract which is lower in sulfur than the coal, but it is not a direct hydrogenation of coal. The conversion or modification which is currently contemplated for the Cresap plant contemplates the use of only the hydrogenation section of the pilot plant.

In other words, the direct hydrogenation of coal to produce only one product, a low sulfur fuel oil rather than the char and gasoline.

Mrs. HANSEN. Then in essence would you say your goal was about the same as the consortium's goal?

Mr. COCHRAN. In general the objective after modification of the plant tends to be the same. They are complementary processes, yes.

LOW SULPHUR FUEL OIL THROUGH COMMON RESEARCH GOAL

Mrs. HANSEN. So that private research is going to do what Government research had previously done. Is this correct?

Mr. COCHRAN. Yes. In a complimentary effort going side by side. We were aware of the proposed HRI and industry activity operation when we were contemplating modification of the Cresap plant. The idea was, as Mr. Fumich has indicated, to have any results that emerged from the HRI and industry study made available to the Cresap operation so we could test at Cresap whatever the most up-to-date method was for the direct hydrogenation of coal.

Mrs. HANSEN. Is this plant working on this method?

Mr. COCHRAN. No, it does not. The intention, as George indicated, is a somewhat immediately higher priority item, the production of low sulfur fuel oil from coal.

Mrs. HANSEN. Is this a competing project?

Mr. COCHRAN. It is competing in the way, of course, because the method is capable of producing refined products, too.

Mrs. HANSEN. The difference is that your information would be available to anyone, and their information will be only available to them?

H-COAL PROCESS

Mr. COCHRAN. Yes. It is HRI property, it does not belong to the consortium. H-coal, itself is jointly owned. I have to be careful how I say this. The H-coal process was developed originally, by the Government with Hydrocarbon Research, Inc. Subsequent to our termination of the H-coal project, and that contract, which is one of the ones we will provide the information on, Hydrocarbon Research, Inc. sought additional outside funding. They then carried on the work they had done with the Government, which belonged to the people, further along. Results of that work are, of course, their property.

This consortium is going to advance that work still further. Concurrently with that——

Mrs. HANSEN. In other words, HRI is using the information developed by the Government to carry the process one step further.

Mr. COCHRAN. Yes, as a result of the work that HRI and Atlantic Richfield carried it complete after we parted company about 3 years ago. While this new work was going ahead at Trenton, the home lab of HRI, OCR proposed to convert the hydrogenation section of the Cresap plant, and we began discussions with HRI.

OCR/HRI PRIOR CONTRACT FUNDING

Mrs. HANSEN. How much has the Federal Government spent on the OCR/HRI contract?

Mr. FUMICH. Approximately $1,750,000.

Mrs. HANSEN. A public report on this project has been made. Upon the basis of that public report these five oil companies have gone ahead and formed the consortium to develop low sulphur fuel?

Mr. FUMICH. Yes, Madam Chairman.

Mrs. HANSEN. Whatever information they develop does not have to be shared with the Federal Government.

Mr. FUMICH. That is right, Madam Chairman.

Mrs. HANSEN. In other words, they could have proprietary rights?

Mr. FUMICH. That is right.

PILOT PLANT, CRESAP W. VA.

Mrs. HANSEN. What was the original objective of the Cresap plant?

Mr. FUMICH. Madam Chairman, the original objective there was to develop high octane gasoline.

Mrs. HANSEN. High octane gasoline?

Mr. FUMICH. Yes; Madam Chairman.

Mrs. HANSEN. You have invested $6.5 million in plant construction and $12 million for operations?

Mr. FUMICH. Yes.

CRESAP PILOT PLANT PROBLEMS

Mrs. HANSEN. What have you developed to date?

Mr. FUMICH. Neal, do you want to capsulize that just briefly?

Mr. COCHRAN. I believe that we have validated the general concept that was originally proposed for the plant. We have not achieved the fully integrated day-in day-out type of operation that we would like to have if we were going to——

Mrs. HANSEN. Why?

Mr. COCHRAN. A series of operating problems ranging from difficulties with original pieces of equipment to difficulties with individual sections of equipment.

Mrs. HANSEN. Whose fault was that?

Mr. COCHRAN. There was a combination of factors which were difficult, I would say, to pin down or assign a specific charge to.

Mrs. HANSEN. Such as?

Mr. COCHRAN. Well, choice of original equipment, poor quality in some cases.

Mrs. HANSEN. Who chose the equipment?

Mr. COCHRAN. The original design engineer or the contractor, and they were obtained in accordance with regular Government procedures for buying equipment. A specification was prepared. It was circulated and bids were received and in general the low bidders were chosen as the supplier for the equipment. The equipment was a matter of choice but I believe it is like a number of other factors. We have had some difficulties with the equipment just as I think all companies are experiencing today.

Then in addition, the plant was the first of its kind. The operation had never really been undertaken at this scale before and, in addition then to the purely mechanical problems and process problems, we had problems associated with the operators. In order to determine exactly what was to be done, it was decided that we would have a complete engineering survey of the plant made.

EVALUATIONS AND RECOMMENDATIONS RE PILOT PLANT

The plant was shut down and Foster Wheeler was retained to examine it. They decided, after a thorough examination of the plant, that some thing in excess of $2 million was reqiured to revise or reequip the plant.

Concurrently, the National Academy of Engineering estimated that those changes would require $3 million to put the plant in operating condition so that it would in fact run day-in and day-out as Project Gasoline. With an additional $5 million to $6 million required for operation, we would then require funds in the range of $8 million to $9 million, over and above the $18.5 million we had spent, to achieve the original purpose for which the plant was created.

At the same time, as Mr. Fumich indicated, we were having continuing discussions off and on at technical meetings and other places with other non-Government researchers. HRI informed us of the encouraging results they were obtaining on their own. It was felt within the Department that a more immediate need would be served if OCR could convert the plant from its original purpose to the production of low-sulphur oil which could find an immediate or ready market.

Mrs. HANSEN. So that you will be going down almost the same path researchwise as the private consortium except that your information would be public?

Mr. COCHRAN. Yes.

DIFFERENCES IN SCALE OF EFFORT

Mr. FUMICH. With one exception, Madam Chairman. I think that we have to clarify the situation a little more here. The consortium work will be carried out on a much smaller scale, and before that work enters the marketplace it is going to have to go through a much larger scale effort, like the one we have at Cresap. This is the reason that HRI had agreed and the consortium had agreed to make available the information developed at Trenton to the pilot plant at Cresap. In the event that OCR executes a contract based on an agreement that the HRI and industry information would be available to the proposed OCR/HRI contract work, then the information that is subsequently developed at Cresap would be available to everyone. This would include all of the information developed at Trenton. But this Cresap operation would be on a much larger scale of effort.

Mrs. HANSEN. Your previous contract with HRI was for $1,750,000?

Mr. FUMICH. Yes; our previous contract work with HRI was for $1,750,000, so this would be the difference. All of the independent research since the contract was terminated, and the $2 million that the consortium will now put in, so this would all be available for this next larger scale of effort.

Now, contrariwise, the other side of the coin, if we don't go ahead with the Cresap modification and operation with HRI, then this consortium is going to have to make a decision themselves on whether they are going to increase their effort. Of course, this is going to cost them at least the same amount of money that we would be spending at Cresap. In fact, it would cost more because they would have to build a pilot plant themselves.

This is the explanation. In other words, there is the HRI consortium effort at Trenton. OCR does not have anything now going on at Cresap. Now, the only way we would go ahead at Cresap with the HRI project would be on the basis that all of the information developed as a result of this $2 million being funded by the consortium would be fed into the work at Cresap.

Mrs. HANSEN. What guarantees do you have that they will give you the information developed?

Mr. FUMICH. This would be tied in to the contract and the inspections, and so forth. In other words, there would be no doubt about us getting all of the information, so then whatever finally flowed out of our effort at Cresap would all be in the public domain.

CRESAP PILOT PLANT MODIFICATION

Mrs. HANSEN. Do you propose to eventually enlarge this plant?

Mr. FUMICH. Well, this Cresap pilot plant is the larger construction.

Mrs. HANSEN. The construction has been completed?

Mr. FUMICH. That is right. In other words, HRI now is proceeding at a smaller scale of effort with the consortium knowing that at some point in time they are going to have to go through the larger scale of effort that OCR is proposing at Cresap.

Now, we have the pilot plant already there. We know that this is a critical area. We can save time and money by just modifying this plant and using the H-Coal process for low-sulfur fuel oil, including the information developed by the consortium.

Mrs. HANSEN. That depends on if they give you the information developed.

Mr. FUMICH. Well, if they don't, then of course we would not go ahead in that area.

Mrs. HANSEN. But you can't go ahead with the Cresap plant unless you receive $1 million from some other private company. Supposing that private industry is not interested?

VARIOUS ALTERNATIVES

Mr. FUMICH. Madam Chairman, we have two or three options. Let's say that a third party came in and said, "We will give you a third of the funding with the proviso that you go toward the original objective," the Cresap gasoline direction. OK. That would be one possibility. We would have discussions with the Secretariat to decide whether this was a road that should be followed.

On the other hand, our primary and highest priority target area right now, of course, would be the low-sulphur fuel oil thing. If some other people came in and said, "We will give you a third," then of course we would propose going down this road.

Mrs. HANSEN. What if nobody offers you a third of the total cost?

Mr. FUMICH. If no one offers us a third, then we go back to the Budget directive which says that if you go into a new pilot plant venture or a modified pilot plant venture you must get a third funding. On the other hand, like I said, there would be a possibility that we could go down the original road. In other words, without modifying the pilot plant we would go back to the original target.

EFFECT OF CONTRIBUTED FUNDING

Mrs. HANSEN. This is a very unusual stipulation. You are now including a third party in the funding process so that this committee has no way of knowing if actually the $2 million you are requesting will be expended as you say. The committee might have some hesitancy about approving funding in this type of arrangement.

Mr. MCDADE. I echo your sentiments, Madam Chairman, about the question of where we are going with these matching funds and what is going to happen to them. We have three contracts in here for the first time; right?

Mr. FUMICH. Yes, sir.

Mr. MCDADE. I am not at all sure where we are going on this particular project. No matter how you slice it, this is $6.5 million worth of hardware. There is $12 million worth of Government technique involved and you are now proposing an additional $2 million expenditure of taxpayer funds with a one-third match from some place and follow-on funding; right?

Mr. FUMICH. Yes, sir. They are not new contracts, but will require one-third non-Federal funding.

Mr. MCDADE. And we have no idea what the interest of the parties are at this stage. You mentioned a potential proprietary right but nobody seems to know where that exists at the present time. It is a mighty confusing situation.

(Discussion off the record.)

CONSOL-LIGNITE GASIFICATION PROJECT

Mrs. HANSEN. How much you have invested in the Consol-Lignite gasification project?

Mr. FUMICH. Madam Chairman, we have expended approximately $7,600,000 on the CO_2 acceptor project. As you know, we are requesting $3,420,000 this year to fund that project. It is about half way constructed. We hope that it will be finished sometime in late summer.

Mrs. HANSEN. Where is this located?

Mr. FUMICH. At Rapid City, S. Dak.

Mrs. HANSEN. Do you have private funds in this project?

Mr. FUMICH. No, Madam Chairman. This is all Government-owned and Government-funded. No stipulation whatsoever.

FMC CORPORATION PROJECT COED

Mrs. HANSEN. Where is the FMC Project COED?

Mr. FUMICH. Madam Chairman, that is in Princeton, N.J., and they are going through shakedown operations. They are very confident about successful operations, and we are requesting $3,035,000.

Mrs. HANSEN. That is what I heard about Cresap plant project.

Mr. FUMICH. I think they are realists. I don't want to call them optimists. They have run the major part of the plant for a period of over 30 days, and aside from the usual problems in trying to operate a new facility they don't believe——

Mrs. HANSEN. Is this facility completely operated by the Federal Government?

Mr. FUMICH. Yes, Madam Chairman. This facility is completely built and has no strings attached to it whatsoever. These are operating funds.

INSTITUTE OF GAS TECHNOLOGY GASIFICATION PROJECT

Mrs. HANSEN. Justify your request of $3,500,000 for the Institute of Gas Technology gasification project.

Mr. FUMICH. That plant has been constructed in Chicago, Ill. We have some funding that has been provided by the American Gas Association and the amount is $2.3 million, the contract amount. OCR is funding that to a level of $11.6 million. We are requesting $3.5 million and all but about $2 million of that would go toward the operation of the plant.

Mrs. HANSEN. Are there any strings attached through private funds on this project?

Mr. FUMICH. No, Madam Chairman; no strings attached whatsoever.

BITUMINOUS COAL RESEARCH, INC.

Mrs. HANSEN. You are requesting $2.2 million for bituminous coal research.

Where is this plant to be located?

Mr. FUMICH. That was proposed for Homer City, Pa. We are requesting $2.2 million as a two-thirds portion——

Mrs. HANSEN. Supposing you don't get the other third?

Mr. FUMICH. Again, after a reasonable period of time, we would have to discuss this matter with the Secretariat to decide what course of action to take, Madam Chairman.

PITTSBURG & MIDWAY COAL MINING CO., SOLVENT-REFINED COAL PROJECT

Mrs. HANSEN. Justify your request of $2.1 million for the Pittsburg & Midway Coal project.

Mr. FUMICH. Madam Chairman, as you know, we are proposing that pilot plant for Tacoma, Wash. We are requesting $2.1 million, which again would be the two-thirds portion of the requested amount.

Mrs. HANSEN. Where do you expect to get the other third from?

Mr. FUMICH. I understand that some of the utilities are considered possibilities. In other words, this is not firm or anything like that.

Mrs. HANSEN. What utilities?

Mr. FUMICH. Private utilities, Madam Chairman, are being considered. Whether anything will come out of it or not we don't know at this point in time.

Mr. MCDADE. How can you ask us to appropriate money on that basis?

Mr. FUMICH. All we can say is if we have the money available there is a better chance that we can get others to participate. If we don't have any money available then, of course——

Mrs. HANSEN. What would be the end products of each of the following projects?

THE CONSOL PROJECT

Mr. FUMICH. Gasoline and a low-sulfur fuel oil.

Mrs. HANSEN. Lignite gasification?

Mr. FUMICH. That would be pipeline gas.

Mrs. HANSEN. Project COED?

Mr. FUMICH. Project COED would be a multiple product line. We would have a gasoline-type product. We would have a char for a utility and then we would have either a fuel-type gas or possibly a pipeline quality gas that could be produced from that project.

Mrs. HANSEN. The Chicago plant.

Mr. FUMICH. That would be a pipeline quality gas, Madam Chairman.

Mrs. HANSEN. Is that industrial gas?

Mr. FUMICH. Not industrial. When we were mentioning industrial I said yes before, but really it is a pipeline quality. We would consider an industrial gas a fuel-type gas which wouldn't have the B.t.u.'s of a pipeline quality gas which are right around 1,000. A fuel-type gas which would be a gas which would be used for an electric utility. This would be of pipleine quality, used in residential heating.

Mrs. HANSEN. What is the primary goal of the bituminous coal research, incorporated project?

Mr. FUMICH. The primary target would be a pipeline quality gas, although that particular process can be changed so that it can produce an industrial or fuel-type gas.

Mrs. HANSEN. What is the goal of Pittsburg & Midway project?

Mr. FUMICH. Pittsburg & Midway is another multiple. It is very flexible process and we can either produce solvent refined coal or we might consider it pure fuel with about a half percent sulfur and one-tenth percent ash. We can produce liquid from it. We already have proposals to produce coke.

DUPLICATION OF PROCESSES

Mrs. HANSEN. Is there any duplication between these projects?

Mr. FUMICH. No, Madam Chairman.

Mrs. HANSEN. They are all different processes?

Mr. FUMICH. That is exactly right. We think the timing is so critical that we should go ahead with more than one process. It compares with cancer research. You have many roads to reach the same objective.

FURTHER COMMITTEE APPROVAL

Mrs. HANSEN. I understand. Following approval by the Office of Management and Budget on whom you select for these projects do you have any objection to sending the selections to the Appropriations Committee for approval?

Mr. FUMICH. The committee has always been friendly to us. Frank, what do you say?

Mr. WILES. You mean like a reprograming letter if they get someone?

Mrs. HANSEN. Yes.

Mr. WILES. I could see no objection to that.

Mr. FUMICH. Knowing we have to come up here all the time, I would certainly hesitate to put the committee in the position to say that we wouldn't want to do it, but the Secretary of course would make the final decision.

Mrs. HANSEN. This process of anticipating a third of the funding from private sources is very vague. This committee should have the opportunity to review these contracts. Please make a comment for the record on this after you have conferred with the budgetary people. You understand there isn't any compulsion on your part to do this. I have a feeling that the committee should at least have some safeguards about authorizing into the unknown.

Mr. FUMICH. Madam Chairman, you control our pursestrings and we are not about to do anything that you wouldn't want us to do. I am not going to say no. I would recommend that, but, like I say, that will be up to the Secretariat.

(The statement follows:)

U.S. DEPARTMENT OF THE INTERIOR,
OFFICE OF COAL RESEARCH,
Washington, D.C., March 31, 1971.

Hon. JULIA BUTLER HANSEN,
Chairman, Subcommittee on Interior and Related Agencies Appropriations,
House of Representatives,
Washington, D.C.

DEAR MRS. HANSEN: At the time of our testimony before your committee on March 23, 1971, relative to the Office of Coal Research (OCR) budget request for fiscal year 1972, there was an exchange of questions and answers relative to the requirement for one-third funding from non-Federal sources. We indicated that we would supply a further statement for the record on page 3137 of the transcript.

The matter has been discussed further within the Department and with the Office of Management and Budget. There is no objection to a procedure wherein we will advise the committee by letter of the nature of a proposed OCR action on those contracts that contain the requirement for non-Federal funding.

As indicated in direct testimony, we are, of course, anxious to keep the committee apprised of our program, and this merely constitutes one more effort toward that end.

Sincerely yours,

GEORGE FUMICH, JR.,
Director of Coal Research.

DECISIONS RE COST SHARING REQUIREMENT

Mrs. HANSEN. What were the factors that led to your decision to select a particular three out of the total of six pilot plants for the sharing of the costs?

Mr. FUMICH. You are asking the wrong person that question.

Mrs. HANSEN. Who made the decision.

Mr. FUMICH. I was being facetious. I am sorry. OCR didn't make any selection. OCR received a directive from OMB that all new pilot plant starts or modified pilot plant starts would have to get one-third funding.

Mrs. HANSEN. Whom did you receive that from?

Mr. FUMICH. Office of Management and Budget.

Mrs. HANSEN. Not the Secretary?

Mr. FUMICH. No, Madam Chairman.

Mrs. HANSEN. Isn't this a strange policy departure for OMB to make this decision?

Mr. FUMICH. Madam Chairman, it is my understanding that the administration feels that if the industry is to participate in the fruits of the research they should participate in the funding.

Mrs. HANSEN. I couldn't agree with you more, but there should be some specific guidelines established on who receives proprietary rights. How much have you spent to date on the gas technology project in Chicago?

Mr. FUMICH. The contract amount is approximately $14.1 million at this time. OCR has spent approximately $9.2 million and IGT's portion has been approximately $2.2 million, Madam Chairman, or a total of $11.4 million.

Mrs. HANSEN. Was there any stipulation for proprietary rights on this project?

Mr. FUMICH. No; no stipulation, no restriction, for special proprietary rights to IGT or the gas industry.

BITUMINOUS COAL RESEARCH, INC.

Mrs. HANSEN. How much have you spent on your Bituminous Coal Research project?

Mr. FUMICH. We have spent just about $3 million on that project, Madam Chairman.

Mrs. HANSEN. Have any private industries participated in this project?

Mr. FUMICH. No, Madam Chairman.

PITTSBURG & MIDWAY COAL MINING CO. PROJECT

Mrs. HANSEN. How much have you spent on the Pittsburg & Midway project?

Mr. FUMICH. That is pretty close to $2.7 million.

Mrs. HANSEN. Have any private industries participated in this project?

Mr. FUMICH. No, Madam Chairman.

Mrs. HANSEN. I still do not have an answer as to why you chose these three projects?

Mr. FUMICH. These were the directions that we received, Madam Chairman, to the effect that all new pilot plant starts or major pilot plant modifications would require one-third funding by outside sources.

SOLICITOR'S OPINION

Mrs. HANSEN. Please insert in the record the Solicitor's opinion on the effect this funding arrangement will have?

(The information follows:)

U.S. DEPARTMENT OF THE INTERIOR,
OFFICE OF THE SOLICITOR,
Washington, D.C., March 30, 1971.

Hon. JULIA B. HANSEN,
House of Representatives, Washington, D.C.

DEAR MRS. HANSEN: The question of rights to inventions and data arising out of research with the Office of Coal Research of the Department of the Interior, in cases where industry contributes a significant share of the funding, was raised at a hearing before the appropriations subcommittee. So far as OCR is concerned, this is a novel problem. However, its solution does not pose any unusual difficulties.

Under section 6 of the Office of Coal Research Act, 30 U.S.C. 666, all information, uses, products, processes, patents and other developments resulting from research under the act must be made available to the general public. This has been interpreted by the Department of the Interior to mean available to the public free of any royalty payments.

However, when industry provides a significant portion of the funding it wishes to be assured of some proprietary rights in the results, reflecting its contributions. This is not regarded as an unreasonable position under the circumstances. Our view has been that consistent with the act, industry can be granted rights in proportion to its share of the funding. Thus, if industry contributes one-third and the Government's total contribution is two-thirds, industry can be granted title to any foreground inventions made and be required to license such inventions at a one-third royalty rate. The Government's two-thirds share toward the making of the invention would thus be available to the public royalty free. Information and data developed would not be proprietary to the contractor but would be published in a final report when the research is terminated, or sooner.

In summary, the Department's policy is to require compulsory licensing of inventions made under such R. & D. contracts, with the royalty rate reduced to reflect the Government's contribution, and with all data and information developed under the contract available free of charge to the public.

I trust this answers the questions you have on this subject. Please do not hesitate to call on us for any further information on this matter.

Sincerely yours,

MITCHELL MELICH,
Solicitor.

CRESAP PILOT PLANT FUNDING

Mrs. HANSEN. Please insert in the record the total funding provided for research at the Cresap plant.

Mr. FUMICH. We will do that.

(The information follows:)

The total funding of $18,377,000 has been provided for research at the Cresap, W. Va. pilot plant (including preliminary laboratory work and supporting activities conducted at the contractor's facilities at Library, Pa.) under the Office of Coal Research contract with the Consolidation Coal Co.

The pilot plant costs are as follows:

Engineering design	$450,000
Construction costs (including site development and utilities, buildings, substructures, foundations, process structures, piping and instrumentation, electrical facilities, insulation, painting, equipment installation)	3,997,083
Other capital costs (including rerouting of utilities, land purchase, data logger, equipment modification, maintenance equipment, additional capital equipment)	1,762,345
Taxes	75,000
Total plant cost	6,284,428

Remaining funds have been used for preliminary and other laboratory work, subsequent "shakedown" operations at the pilot plant and eventual plant operation costs approximating the sum of $12,000,000.

This plant contains all the necessary processing equipment to extract coal, separate the resulting liquids, solids, and gases, with recovery of all three phases. The liquid extract portion can be hydrogenated to produce "synthetic crude" and the solid fraction can be carbonized to yield a char. As indicated in our budget request, we were planning to convert the plant to the H-coal process. This typifies the sort of use that could be made of the plant. It might be converted to an extraction system that produced coal extract. Char or other products from the plant could be upgraded to yield gas, hydrogen, or refined liquids. Sufficient space is available to add these units at minimal cost.

Mrs. HANSEN. How much of this investment will be salvagable to the extent that your present facilities can be utilized in the "H-Coal" process. Please insert the information in the record.

Mr. FUMICH. Yes, we will put that in the record, Madam Chairman.

(The information follows:)

A substantial portion of the work that has been performed at the Cresap pilot plant will find application in future research work to be performed there. Likewise, many of the equipment items which are presently a part of the Cresap facility are common to the work that would be done under the HRI low sulfur fuel oil contract. We estimate that fully four-fifths of the present facility and the various equipment items located there can be utilized in the prospective HRI work with only relatively minor modifications. The remainder of the items are not common to the proposed future work and would require replacement.

DECISION TO CONVERT CRESAP PILOT PLANT TO LOW-SULFUR FUEL OIL PROJECT

Mrs. HANSEN. Insert in the record any additional comments you have on the considerations which led you to decide to convert this plant to the H-Coal process.

Mr. FUMICH. We will furnish that for the record.

(The information follows:)

The Cresap pilot plant contains equipment that can be adapted to the H-Coal process for much less than the cost of similar new equipment. Additionally, the long delivery time for such equipment would be eliminated. This means that the Cresap plant could be in operation sooner and produce experimental results in a timely fashion. These results could be transplanted into commercial scale plants capable of producing low-sulfur fuel oil for powerplants and the industrial market to reduce air pollution. There is an immediate need for such fuel. Much of the coal (70 percent) east of the Mississippi is high sulfur and this same coal is used in the utility market. Production of low-sulfur fuel oil will reduce the need for imports of low sulfur fuel.

Mr. FUMICH. The main reason and the only reason, is that we believe that we have a higher priority near term target because of the air pollution requirements. In fact, we will be losing a tremendous reserve of coal unless we can do something about it.

AVCO CORPORATION

Mrs. HANSEN. Justify your $300,000 request for arc processing.

Mr. FUMICH. Yes. Madam Chairman, we are trying to produce acetylene from coal which can be a base for a plastics industry. So far this work has been very successful. What we have been trying to do is heat coal in microseconds, without degrading the coal and optimize the product with the least amount of power. We have been able to do that.

EXPENDITURES ON NONPILOT PLANT PROJECTS

Mrs. HANSEN. Please insert in the record expenditures to date on your nonpilot plant projects.

Mr. FUMICH. Yes, Madam Chairman.

(The information follows:)

Expenditures to date on the current nonpilot plant projects up through most recent voucher submitted are in the amounts indicated below:

	Nonpilot Plant Projects	Contract Expenditures Since Inception
1.	Avco Corporation Wilmington, Mass. Contract 14-01-0001-493	$ 1,492,646
2.	Bituminous Coal Research, Inc. Monroeville, Pa. Contract 14-01-0001-324	3,162,761
3.	Iowa State University Ames, Iowa Contract 14-01-0001-479	208,702
4.	Pennsylvania State University State College, Pa. Contract 14-01-0001-390	827,502
5.	The Pittsburg & Midway Coal Mining Company Grand Forks, North Dakota Contract 14-01-0001-496	1,411,367
6.	University of Utah Salt Lake City, Utah Contract 14-32-0001-1200	487,165
7.	Virginia Polytechnic Institute Blacksburg, Virginia Contract 14-01-0001-410	324,797
8.	West Virginia University Morgantown, West Virginia Contract 14-01-0001-488	539,262
9.	University of Wyoming Laramie, Wyoming Contract 14-01-0001-1196	102,088
10.	Magnetohydrodynamic (MHD) Coal/Power Research	------
11.	Westinghouse Electric Corporation Pittsburgh, Pennsylvania Contract 14-01-0001-303	3,599,317
12.	Pope, Evans and Robbins New York, New York Contract 14-01-0001-478	849,449
TOTAL		$13,005,056

PENNSYLVANIA STATE UNIVERSITY

Mrs. HANSEN. What is the major goal of the project at Pennsylvania State University?

Mr. FUMICH. This is a project that is being carried on at Penn State. What we are trying to do here is tie this effort in with our various pilot plant efforts. We are trying to separate the various parts of coal seam constituents so that only the best parts will be utilized in the pilot plant streams, and at the same time take away the inert and other parts of the seam that cannot be used. Incidentally, the Commonwealth of Pennsylvania put in about $134,000 on the Penn State project.

IOWA STATE UNIVERSITY

Mrs. HANSEN. What is the major goal of your project at Iowa State University?

Mr. FUMICH. Iowa State University is a good example of what a supporting type project can do for some of our main efforts. As a result of the Iowa State effort we are now incorporating an electrothermal unit into the IGT project in Chicago. Use of this unit will produce hydrogen so that we can cheapen the price of pipeline quality gas. We are still working on this smaller phase of the effort at Iowa State. We are carrying on this particular work so that we can optimize that process.

Mrs. HANSEN. Is IGT participating in this project?

Mr. FUMICH. They are doing the work at Iowa State, but the results of this technology are already apparent at our Chicago——

Mrs. HANSEN. Are they financially participating?

Mr. FUMICH. No; not Iowa State, Madam Chairman.

PITTSBURG & MIDWAY PROCESS DEVELOPMENT UNIT

Mrs. HANSEN. What research are you doing at the Pittsburg & Midway development unit?

Mr. FUMICH. This is the process development work that we have been pushing ahead. This is concurrent research trying to optimize the Pittsburg & Midway process.

UNIVERSITY OF UTAH WESTERN COAL ADAPTATION

Mrs. HANSEN. University of Utah?

Mr. FUMICH. University of Utah is a project where the work is all being directed on western coals. We are trying to optimize processes and catalysts that would lower the price of hydrogenation either in synthetic gaseous or liquid fuels from coal. Again, the University of Utah is putting in about $176,000 on that project, Madam Chairman.

Mrs. HANSEN. Are they participating financially?

VIRGINIA POLYTECHNIC INSTITUTE

Mr. FUMICH. Yes. Excuse me. Virginia Polytechnic Institute, VPI, is doing some computer work which is being utilized already in the industry. They are carrying on this work even further, and we have received about $38,000 in outside funding.

Mrs. HANSEN. What type of work are they doing?

Mr. FUMICH. This is optimizing different mining processes. As a result of some of underground mining problems this is one of the more critical project efforts. OCR has received contributions for this project. It hasn't been large but for the rate of our effort it is about $30,000 to $40,000.

WEST VIRGINIA UNIVERSITY

Mrs. Hansen. West Virginia University?

Mr. FUMICH. This is the brick project that we have justified before. We know that because of the environmental problems and the ecology, most of the mine operators are going to have to be more and more concerned about the waste products that are being produced as a result of the primary mining operations. This problem is going to become more and more important and more and more costly. We are trying to see what we can do to alleviate this particular situation.

MULTIPLE CATALYST FLUIDIZED REACTIONS (UNIVERSITY OF WYOMING)

Mrs. HANSEN. University of Wyoming?

Mr. FUMICH. At the University of Wyoming we are trying to study the reactions of coal and char with steam, with various multiple catalysts up to pressures about 400 pounds per square inch. Again, what we are trying to do is optimize the conversion effort.

MAGNETOHYDRODYNAMIC (MHD) POWER GENERATION

Mrs. HANSEN. What is the major goal of your magentohydrodynamics project?

Mr. FUMICH. About 2 years ago the Office of Science and Technology recommended a joint program between Government and industry to develop this new method of producing electricity. As a result of that, OCR received $600,000 last year, and are requesting $1 million for fiscal year 1972.

Mrs. HANSEN. Where is this experiment going to be located?

Mr. FUMICH. Well, it won't go up anywhere yet. There will be about 4 or 5 years of effort before anything will be constructed on a major scale.

WESTERN INTEREST IN MHD POWER

Mrs. HANSEN. Why do you suppose the State of Montana is so interested?

Mr. FUMICH. They are interested, and they should be interested, Madam Chairman. I think all of the Western States should be interested because the efficiency of this process would be up around 60 percent. This means that the process would have only about 44 percent of the thermal pollution of a regular fossil fuel plant and only 28 percent that of an atomic or nuclear powerplant. Also the second-generation type of plant with this technology would never need any cooling water.

Mrs. HANSEN. How far are you from receiving an answer?

Mr. FUMICH. Well, unfortunately, it would be about 10, 12 years, I think, to develop that technology.

Mrs. HANSEN. Why?

Mr. FUMICH. By going along with the recommendations of the Office of Science and Technology it will take about $4 million each year for about 4 years to fill in the answers to all of the problem areas with knowledge that will seek to resolve these things. Then it would take a major pilot plant facility to test MHD.

Mrs. HANSEN. How much would that cost?

Mr. FUMICH. Well, the first program would cost between $12 to $16 million. A pilot plant program would cost a minimum of $75 million.

Mrs. HANSEN. So after you have done this work for 8, 9, 10 years, you still have to have a pilot plant?

Mr. FUMICH. No, Madam Chairman. What I am saying is that if the first 4 years of effort are funded on a proper level, it should be possible to build a pilot plant. Then it would have to be operated.

Mrs. HANSEN. At the end of 4 years will you have enough knowledge to say you will either scrub the project or ask for a pilot plant?

Mr. FUMICH. Yes. Let's put it this way, Madam Chairman. If we were funding this on a level of $4 million a year, at the end of 4 years we would either have enough information to go ahead or to forget about it. At the level of funding that we are operating on now, it will take a longer period of time.

MHD PROJECTS—AVCO AND MIT

Mrs. HANSEN. Is anyone participating with you on this project?

Mr. FUMICH. We have a study with MIT. A task force set up by the Energy Research Council is trying to recommend a national program. OCR has funded a study with MIT to recommend a national program to this task force. Hopefully, this report will be concluded around May 1971. After that it would be promulgated, and we would find out more about what kind of a program we should have. Let me give you one final summary on MHD. We are currently negotiating with Avco; and if this contract is executed, OCR would receive 50 percent or approximately that amount of funding from industry on this particular MHD contract.

Mrs. HANSEN. Are there any proprietary rights involved?

Mr. FUMICH. No; at this point in time, no. Not with respect to future work, only with respect to Avco's prior non-Federal work.

MHD DEVELOPMENT PROGRAM

Mrs. HANSEN. Mr. Fumich, what is the status of the MHD development program?

Mr. FUMICH. The Office of Coal Research received a fiscal 1971 appropriation of $600,000 for MHD research. We have executed two relatively small study contracts, one with the Massachusetts Institute of Technology and the other with the University of Tennessee. We are negotiating actively with the Avco Corp., with the Massachusetts Institute of Technology, and the University of Tennessee for additional contract work, as well as with others. Under the proposed Avco and University of Tennessee contracts we expect to receive substantial non-Federal contributions. We expect the Massachusetts Institute of Technology study to help both the Office of Coal Research and the Electric Research Council (ERC) by providing guidelines for our future efforts in the MHD areas.

We are hopeful of awarding contracts for all or a substantial part of the present funds before the end of this fiscal year.

Mrs. HANSEN. Mr. Fumich, as I understand it, MHD would allow the use of coal to generate electricity in water-scarce areas. And MHD would cause much less air pollution. In light of the energy crisis and the emphasis on a cleaner environment, shouldn't MHD be developed as soon as possible?

Mr. FUMICH. Madam Chairman, we concur with what you have said about MHD as a potential for generation of electricity at higher efficiencies, without pollution, and as an ideal source of power production in water-scarce areas. The President's Panel on MHD, in their Office of Science and Technology Report in 1969, recognized these important considerations.

We believe that MHD should be actively pushed, and developed as soon as possible. A proper level of activity, now, could provide the desired results without going into a more costly crash-type program at some later date.

Mrs. HANSEN. Mr. Fumich, could you use more than $1 million for MHD in fiscal 1972? You wouldn't be opposed to an increase in your requested amount?

Mr. FUMICH. Madam Chairman, we are here to defend the President's budget request of $1 million for fiscal 1972. As I stated previously, the MHD panel report recommends an MHD program of $4 million a year. I would have to say that anything over $1 million and within the $4 million level would certainly fall within the guidelines. We believe we could very properly utilize such additional funds if they become available. We would continue to work closely with the ERC, with our proposed contractors, and the Office of Science and Technology.

Getting back to the Westinghouse fuel cell process, last year we mentioned to you that we thought it was good work and we haven't changed our minds. However, with our small funding base and the fact that we are going into other major efforts, we have to set up priorities, and knowing that this would be a long-term effort——

Mrs. HANSEN. How long will this effort last?

Mr. FUMICH. Well, based on the rate of progress that we were having, it would have amounted to at least 10 years of effort and would have——

Mr. COCHRAN. Developed a central station powerplant, using coal to produce electricity directly, in a fuel converter for very high efficiency, low cost, of course, and no pollution whatsoever.

Mrs. HANSEN. Why is it so low on your priority list?

Mr. COCHRAN. As Mr. Fumich indicated, when we went back to the contractor to utilize these additional funds after 7 years of effort, Westinghouse requested another 3 or 4 years of effort at the same scale as we have been pursuing. We would have preferred to address ourselves to solving the engineering problems associated with the manufacture of the fuel cells, and their assembly in a workable system concurrent with the laboratory development.

Mrs. HANSEN. How much has been spent to date?

Mr. FUMICH. $3.7 million.

Mrs. HANSEN. Does this require a pilot plant?

Mr. COCHRAN. Ultimately it would. We had a proposal for a future pilot plant in which we estimated the program would cost approximately $30 million.

POPE, EVANS AND ROBBINS

Mrs. HANSEN. What is the status of your Pope, Evans and Robbins contract?

Mr. FUMICH. Madam Chairman, we received a $90,000 appropriation for fiscal year 1971. We have expended a total of about $830,000 on that project to date. This again, is good technology, but——

Mrs. HANSEN. What is the goal of this project?

Mr. FUMICH. This is aimed at the electric utility market. It would have resulted in less air pollution. And it would have application to many of the coals that are now causing trouble with the boilers because of their low sulphur content.

Mrs. HANSEN. Then why is it a low priority?

Mr. FUMICH. We knew that in order to carry on this technology it would have cost us up to $10 million over a period of 5 years. With the rest of the program being what it is, we didn't think we should spread our efforts so thin at this time in order to carry it forward.

NEWSSTORY ABOUT POWERPLANT POLLUTION

Mrs. HANSEN. I have an article titled, "Power Goliath Trails Soot Across West," from the Christian Science Monitor of January 26, 1971.

It states, "And the pollution they saw when they couldn't see any other manmade landmark was the plume of smoke and fly ash drifting away from the electric powerplant outside Farmington, near where four States meet—Arizona, New Mexico, Utah, and Colorado.

"Every day the 2.1 million-kilowatt capacity, coal-fired electric powerplant blows out 250 tons of particulate matter (ash and dust).

"That is as much as Los Angeles (110 tons) and New York City (140 tons) produce together on an average summer day."

The article goes on to say, "The Salt River project boasts of the $90 million it will spend on pollution abatement * * * But none of it was in the original $309 million budgeted for the plant."

May we have your comments in this regard.

Mr. FUMICH. Madam Chairman, you are taking me down Salt River with that question.

Really we have no good answer to your question.

Mrs. HANSEN. You sure don't.

Mr. FUMICH. I must accept the responsibility for setting up the priority areas and take it on my own shoulders.

ESTIMATES OF FUNDS NEEDED

Mrs. HANSEN. Please insert in the record the amount you would need per year for the Westinghouse Electric Corp., and Pope, Evans & Robbins contracts.

Mr. FUMICH. We will be happy to do that.

(The information follows:)

Present estimates for funding to continue the Westinghouse Electric Corporation coal-based fuel cell project would run approximately as follows:

Laboratory development phase	$ 5,000,000	
Process equipment development	15,000,000	
Sub-total		$20,000,000
Pilot Plant Development:		
Plant design, site engineering, construction, and equipment	$15,000,000	
Plant operation and maintenance	10,000,000	
Design of Full-scale plant	5,000,000	
Sub-total - Pilot plant		30,000,000
Grand total - Fuel Cell Project		$50,000,000

Estimated time: 12 - 15 years

The above estimate is based on a process plant of about 100 KW capacity; pilot plant of 10,000 - 20,000 KW capacity; pilot plant operation for 2 - 3 years. Final design to be for central station fuel cell power plants of 100,000 KW and 1,000,000 KW capacity.

Estimated funding requirements by years:

1st year -	$ 750,000
2nd year -	1,000,000
3rd year -	1,250,000
4th year -	2,500,000
5th year -	5,000,000
6th year -	8,000,000
7th year -	8,000,000
8th year -	5,000,000
9th year -	4,000,000
10th year -	3,500,000
11th year -	3,500,000
12th year -	3,500,000
13th year -	2,000,000
14th year -	1,000,000
15th year -	1,000,000
Total	$50,000,000

The estimated future funding requirements to permit continuation of the Pope, Evans and Robbins fluidized-bed boiler project and scale-up to pilot sized effort would be approximately as follows:

Fiscal 1972	Design phase	$ 400,000
Fiscal 1973	Equipment and construction	2,700,000
Fiscal 1974	Operations and maintenance	1,200,000
Fiscal 1975	Operations and maintenance	1,200,000
Fiscal 1976	Operations and maintenance, final commercial designs, and final technical reports	500,000
	Total	$6,000,000

POTENTIAL ACCOMPLISHMENTS FROM DEVELOPMENT OF SUCCESSFUL COMMERCIAL FLUIDIZED-BED COAL-FIRED BOILER

1. Boiler would have ability to burn any grade of coal from lignite through anthracite without slagging.

2. The unit could burn high sulfur coals with minimal air pollution and with sulfur oxide captures at lower costs than with other means of control.

3. Size and cost of fluidized bed boilers is expected to be considerably lower than for other types of coal-fired units.

4. Industrial-size boilers could burn high-sulfur coal satisfactorily. Presently, air-pollution control equipment is not economic for such boilers, but oil and gas is being increasingly restricted from this market.

5. Coals of high ash content can be burned satisfactorily.

6. Minus 1/2-inch run-of-mine coal can be burned without pulverization, thus reducing operating and maintenance costs.

7. Fluidized bed boilers would be ideal for burning the chars produced by coal-conversion processes.

8. Since a minimum of excess air is required, the volume of air pollutions of all types emitted from the stack is lower than for other coal-fired boilers. No carbon monoxide is produced.

POLICY REGARDING OVERHEAD COSTS

Mrs. HANSEN. What is your general policy with regard to the allowance of overhead costs in approving billings submitted to you by the various contractors performing research for your office?

Mr. LARSON. Madam Chairman, we have got a situation that sees us negotiating each separate contract on its own merits, and our experience shows us that in the case of educational institutions, for example, that these normally have a very low rate of overhead, relatively low compared to a profit organization.

Mrs. HANSEN. Please give us an approximation of these costs.

Mr. LARSON. An approximation would be in the range of 50 to 70 percent overhead with nonprofit organizations like educational institutions. With a profit corporation we find the overhead rate may go as high as 110 to 125 percent for work in the laboratory stage or process development stage of an effort. Normally these are much lower if the work is done in our pilot plants.

For example, in one of our pilot plants we have a rate of 15 percent, and in another, zero percent.

Mrs. HANSEN. So in the end your pilot plants despite the large investment, will pay for themselves?

Mr. LARSON. Not really, because overhead attaches itself only to direct labor costs. We have taken the position in the Office of Coal Research that, since the pilot plant represents a Federal investment and is totally a Federal effort, all of the employees that work in that plant are, in effect, on the Federal payroll to the extent that we are reimbursing the contractor for every cent of the direct labor dollar expended. Therefore, we say there shouldn't be any overhead or very low overhead that would attach itselt to the employment of these people.

An example might be that the contractor supplies certain essential service such as maintaining a personnel office, a purchasing office, and a patent office. These are still overhead costs and they would be allowable items in the computation of the overhead pool to develop a rate of overhead.

RESOLUTION RE MHD FROM SOUTH DAKOTA LEGISLATURE

Mrs. HANSEN. Preliminary to my next question, I would like to insert in the record a resolution from the South Dakota Legislature on the implementation and construction of a large MHD pilot powerplant.

(The resolution follows:)

SOUTH DAKOTA STATE LEGISLATURE,
Pierre, S. Dak., March 10, 1971.

CHAIRMAN,
Interior Subcommittee of the Appropriations Committee,
House of Representatives,
Washington, D.C.

DEAR SIR: Enclosed herewith is House Concurrent Resolution No. 516 which was adopted by the House and concurred in by the Senate of the State of South Dakota during this, the 46th session of the Legislature of the State of South Dakota.

It expresses the desire on the part of the members of the legislature and the people of South Dakota for the necessary steps to be taken for the implementation and construction of a large magnetohydrodynamics pilot powerplant.

Your efforts in behalf of the requests of this resolution will be much appreciated.

Thanking you for your kind attention to this matter, I remain,

Sincerely,

PAUL INMAN, *Chief Clerk.*

HOUSE CONCURRENT RESOLUTION NO. 516

A concurrent resolution, to the Congress of the United States, South Dakota congressional delegation, Interior Committee of the U.S. Senate, Interior Committee and the Interior Subcommittee of the Appropriations Committee of the U.S. House of Representatives, requesting the passage of legislation and appropriations supporting the construction of a large magnetohydrodynamics (MHD) pilot powerplant to implement the techniques which have been developed through intensive research since 1957.

Be it resolved by the House of Representatives of the State of South Dakota, the Senate concurring therein:

Whereas magnetohydrodynamics (MHD) power generation would provide new opportunities for utilizing the vast, untouched coal resources of the State of South Dakota and the Northwest region; and

Whereas MHD power generating plants operate without the need for the large amounts of water required by conventional steam and turbine systems, MHD electric power generating plants would offer new opportunities for developing the economic resources of the State of South Dakota and other areas lacking water needed to sustain conventional generating systems; and

Whereas the MHD method of producing electrical energy would raise the efficiency use of coal from 40 percent by conventional methods to 60 percent; and

Whereas there are present or planned convention power generating plants in the region to which a MHD pilot plant could be attached for experimental testing as well as switchyard facilities; and

Whereas this more economical method of producing electrical energy is also being advanced by other nations such as Japan, West Germany, and Russia where a pilot plant is now nearing completion; and

Whereas the MHD electric generating system eliminates water and air pollution common to conventional steam turbine and nuclear systems and reduces air pollution to a minimum: Now, therefore, be it

Resolved, by the House of Representatives of the 46th Legislature of the State of South Dakota, the Senate concurring therein, That the Congress of the United States appropriate funds for the development work leading to the construction, at the earliest possible time of a MHD pilot plant: Be it further

Resolved, That copies of this concurrent resolution be forwarded by the chief clerk of the House of Representatives of the State of South Dakota to the chairman of the Interior Committee of the U.S. Senate, the chairman of the Interior Committee and the Interior Subcommittee of the Appropriations Committee of the U.S. House of Representatives, and to each member of the South Dakota congressional delegation.

Adopted by the House: February 26, 1971.

Concurred in by the Senate: March 10, 1971.

DONALD OSHEIM,
Speaker of the House,
WILLIAM DOUGHERTY,
President of the Senate.

Attest:

PAUL INMAN,
Chief Clerk of the House,
BILL BERGUIN,
Secretary of the Senate.

HANDLING OF RESEARCH PROPOSALS

Mrs. HANSEN. You get many more research proposals than you have funds to perform the work. Please review for the committee the general procedure you follow in drawing priorities and making the award of contracts.

Mr. FUMICH. We haven't had any problems with that in the last few years because of a dearth of new projects to justify through our standard procedures.

But if a project is directed toward a new area not involved as a supporting type project, then, of course, if it is in one of these clean energy areas, it would receive high priority as against something that

wasn't considered in that area. If in addition the proposer is willing to contribute some funding at the same time, then, of course, we would give his proposal higher priority than another proposal that possibly was just as good but where the proposer wasn't willing to make a contribution. That simply is the way we go about making an award.

This is when we first get interested. We then send these proposals to consultants I mentioned before, a list of which will be submitted for the record.

We get evaluations from these people and also send a copy of the proposal to the Bureau of Mines to see if they are involved in similar research areas, or have been involved, and where they have technical expertise. They evaluate it not only on a technical basis but also to check for possible duplication.

If after all of this the proposal receives positive evaluations, we, of course, go through our standard justifying procedure. We justify it before the Secretariat, the Office of Management and Budget, and finally end up here before the congressional committees.

Mrs. HANSEN. To what extent are your contracts awarded on a cost-plus-fixed-fee basis?

Mr. LARSON. Madam Chairman, I think a substantial portion of the contracts are on a cost-plus-fixed-fee basis, at least with the profit organizations. Obviously the ones with nonprofit organizations whether by virtue of the statutory requirements or State law that preclude their acceptance of a fee or a profit, such as educational institutions, Bituminous Coal Research, Inc., all of these organizations receive no fee.

So these are cost reimbursable contracts, not cost-plus-fixed fees type. We do have smaller contracts, and these are usually a supporting type research contracts, that are fixed-price contracts, not cost-plus-fixed fee. We have had a fair number of these over the years. We also have had some cost incentive type contracts.

Mrs. HANSEN. Please insert some examples in the record at this point.

Mr. LARSON. We will be glad to do that.

(The information follows:)

The following are representative of the various types of current and past contracts the Office of Coal Research has awarded.

COST-PLUS-FIXED-FEE TYPE

AVCO Corp., Consolidation Coal Co., Institute of Gas Technology, Pittsburg & Midway Coal Mining Co., Pope, Evans and Robbins, Westinghouse Electric Corp.

COST REIMBURSABLE TYPE

Bituminous Coal Research, Inc., Iowa State University, Pennsylvania State University, University of Utah, University of Wyomlng, Virginia Polytechnic Institute, West Virginia University.

FIXED PRICE TYPE

Air Products and Chemicals, Inc., Foster Wheeler Corp., Massachusetts Institute of Technology, National Academy of Engineering, University of Tennessee.

Mrs. HANSEN. Mr. McDade.

Mr. MCDADE. Thank you, Madam Chairman.

You have been in existence now about 10 years?

Mr. FUMICH. Yes, sir.

Mr. MCDADE. And you have spent about $100 million, roughly?

Mr. FUMICH. We have spent around $75 million.

Mr. MCDADE. Tell me what your major accomplishments are.

Mr. FUMICH. We feel, because of the leadtime that we have been able to get involved in, that because of the critical nature of the oil and gas supplies, our program is in the forefront as far as developing technology to meet this particular problem.

Mr. MCDADE. Have you closed out any projects you have rated a success in that 10-year period?

Mr. FUMICH. We have had some economic studies that we feel have been a success, but as far as hardware technology is concerned, most of it is still in the development stage, sir.

Mr. MCDADE. That is all I have, Madam Chairman.

Mr. FUMICH. Could I make one insertion for the record? I understand that NAPCA has the same requirement as we have for funding for pilot plants. This evidently is uniform policy. I just thought maybe the record should show that.

POLUTION ABATEMENT AND ENVIRONMENTAL PROTECTION

Mrs. HANSEN. Will you please place in the record a statement showing the amount of funds in your fiscal year 1972 estimate for pollution abatement and environment protection.

(The information follows:)

DEPARTMENT OF THE INTERIOR

Office of Coal Research

Bureau

Activities in Pollution Abatement and Environmental Protection

(In thousands of dollars)

	Description of project or activity	Location	Estimate F.Y. 1972
1.	Consolidation Coal Co./Hydrocarbon Research, Inc. (Fuel Oil Project)	Cresap, W.Va./Library, Pa.	$ 2,000
2.	Consolidation Coal Co. (Lig. Gasif.)	Rapid City, S.D./Library, Pa.	3,420
3.	FMC Corporation (C O E D)	Princeton, N.J.	3,035
4.	Institute of Gas Technology (Gasif.)	Chicago, Ill.	3,500
5.	Bituminous Coal Research, Inc. (Gasif.)	Homer City, Pa.	2,200
6.	Pittsburg & Midway (LA/LS Solvent Refined Coal)	Tacoma, Wash.	2,100
7.	Bituminous Coal Research, Inc. (Gasif. PDU) ..	Monroeville, Pa.	600
8.	Pennsylvania State University	State College, Pa.	400
9.	Pittsburg & Midway (Low-Ash Coal PDU)	Grand Forks, N.D.	1,000
10.	University of Utah	Salt Lake City, Utah	200
11.	Virginia Polytechnic Institute	Blacksburg, Va.	200
12.	West Virginia Univ. (Flyash Util.)	Morgantown, W.Va.	200
13.	University of Wyoming	Laramie, Wyoming	200
14.	Magnetohydrodynamic (MHD) Coal/Power Research	Various	1,000
	Total		$20,055

The aspect of insuring a clean environment while minimizing or eliminating pollution causing energy products is an important consideration in all of the above research projects.

Mrs. HANSEN. Thank you very much and we appreciate the information.

Mr. FUMICH. We appreciate the reception.

Mrs. HANSEN. The committee will stand adjourned.

WEDNESDAY, MARCH 24, 1971.

GEOLOGICAL SURVEY

WITNESSES

DR. WILLIAM T. PECORA, DIRECTOR
WILLIAM A. RADLINSKI, ASSOCIATE DIRECTOR
FRANK E. CLARKE, ASSISTANT DIRECTOR, ENGINEERING
WILLARD F. McCORNACK, ASSISTANT DIRECTOR, ADMINISTRATION
DR. HAROLD L. JAMES, CHIEF GEOLOGIST
ERNEST L. HENDRICKS, CHIEF HYDROLOGIST
DR. RUSSELL G. WAYLAND, CHIEF, CONSERVATION DIVISION
DR. ARCH C. GERLACH, CHIEF GEOGRAPHER
FREDERICK E. STEARNS, BUDGET OFFICER
HOLLIS M. DOLE, ASSISTANT SECRETARY FOR MINERAL RESOURCES
FRANCIS M. WILES, DIRECTOR OF BUDGET, INTERIOR DEPARTMENT

Mrs. HANSEN. The committee will come to order.

We have this morning the Geological Survey and the committee is particularly pleased to welcome back Dr. William T. Pecora, the Director of the Geological Survey. It is always a pleasure to have you testify, Dr. Pecora. I think the committee gets a better education from you than with anyone else in the Department. I am sure you want to introduce your associates.

INTRODUCTION OF ASSOCIATES

Dr. PECORA. Madam Chairman, it is a pleasure and a delight to appear before your committee not only because your committee, as well as the Geological Survey, is dedicated to the whole principle of natural resources in balance with activities of the United States, but because of your knowledge in this area we feel that we are speaking to a group that understands what we are attempting to do on a short term and long term basis. We are extremely grateful to you for permitting members of my staff to appear because these are the people who are the dedicated public servants who are administering the program. If I may enter the names in the record, Madam Chairman, I would be delighted.

Mrs. HANSEN. Please identify them for us.

Dr. PECORA. Mr. William A. Radlinski, who is Associate Director of the Geological Survey; Mr. Frank E. Clarke, who is Assistant Director for Engineering; Mr. Joel M. Johanson, who is Assistant Director for Program; Mr. Willard F. McCornack, who is our Assistant Director for Administration; Mr. Robert H. Lyddan, who is our Chief Topographic Engineer; Dr. Harold L. James, who is our Chief Geologist; Mr. Ernest L. Hendricks, our Chief Hydrologist; Dr. Russell G. Wayland, Chief of our Conservation Division; Mr. William A. Fischer, who is our Program Manager for the EROS

program; Dr. Arch C. Gerlach, who is our Chief Geographer; and Mr. Frederick E. Stearns, our Budget Officer. In addition we are delighted to have the presence of our Assistant Secretary for Mineral Resources, Mr. Hollis M. Dole; and the Budget Officer from the Department of the Interior, Mr. Francis Wiles.

Mrs. HANSEN. We are delighted to have Secretary Dole here this morning. I may say yesterday morning the Office of Oil and Gas acquitted themselves with distinction.

Mr. DOLE. I am pleased to hear that.

Mrs. HANSEN. They did an excellent job. We were delighted with the information which we were able to secure from them. May I also compliment you, Mr. Secretary, on the testimony from the Director of the Bureau of Mines. I think he did a tremendous job.

Mr. DOLE. Thank you, Mrs. Hansen.

Mrs. HANSEN. These were two of the most informative hearings we have ever had.

Mr. DOLE. I think you will find that Dr. Osborn will be one of our really great Directors down there if he has the opportunity to perform his duties. He has a very distinguished career, and of course what we are always trying to do is to try to get a parallel to Dr. Pecora. We would like to have in our other bureaus the same type of leadership that Dr. Pecora has shown.

JUSTIFICATION MATERIAL

Mrs. HANSEN. We will insert pages 1 through 59 of the justifications in the record.

(The pages follow:)

Funding of Geological Survey Programs (Obligations)

	Actual 1970	Estimate 1971	Estimate 1972
Special resource and environmental projects:			
Direct appropriation	-	$ 750,000	$ 1,750,000
Department of Housing and Urban Development	$ 181,994	458,000	403,000
Total	181,994	1,208,000	2,153,000
Alaska pipeline related investigations:			
Direct appropriation	709,197	1,320,000	1,320,000
Miscellaneous Federal agencies	30,000	30,000	30,000
Total	739,197	1,350,000	1,350,000
Topographic surveys and mapping:			
Direct appropriation	28,492,579	30,390,000	32,869,000
States, counties, and municipalities	4,525,904	4,000,000	3,900,000
Miscellaneous non-Federal sources	285,918	269,000	290,000
Bureau of Reclamation	1,089,259	879,000	-
Office of Territories	408,451	279,000	-
National Aeronautics and Space Administration	245,985	243,000	150,000
National Science Foundation	356,075	202,000	200,000
Miscellaneous Federal agencies	290,710	262,000	300,000
Total	35,694,881	36,524,000	37,709,000
Geologic and mineral resource surveys and mapping:			
Direct appropriation	30,649,310	30,571,000	31,161,000
States, counties, and municipalities	1,291,783	1,315,000	1,300,000
Kingdom of Saudi Arabia	2,245,724	1,500,000	1,500,000
Miscellaneous non-Federal sources	14,355	11,000	10,000
Department of Defense:			
Military	2,136,006	3,119,000	3,080,000
Civil	207,577	195,000	200,000
Agency for International Development	1,555,118	1,500,000	1,500,000
Atomic Energy Commission	1,944,629	1,668,000	1,700,000
National Aeronautics and Space Administration	5,924,471	5,750,000	4,859,000
National Science Foundation	127,141	999,000	1,442,000
Miscellaneous Federal agencies	293,085	108,000	100,000
Total	46,389,199	46,736,000	46,852,000
Minerals discovery loan program:			
Direct appropriation	407,338	534,000	268,000
Water resources investigations:			
Direct appropriation	31,769,239	33,926,000	35,875,000
States, counties, and municipalities:			
Matched Federal funds	15,626,294	17,867,000	19,100,000
Unmatched	1,654,327	1,750,000	1,850,000
Permittees and licensees of the Federal Power Commission	499,191	500,000	500,000
Miscellaneous non-Federal sources	59,969	87,000	87,000

	Actual 1970	Estimate 1971	Estimate 1972
Water resources investigations (cont'd):			
Bureau of Land Management	$ 98,401	$ 108,000	$ 110,000
Bureau of Reclamation	1,427,935	1,429,000	650,000
Federal Water Quality Administration	570,085	554,000	550,000
National Park Service	413,781	438,000	450,000
Office of the Secretary	116,675	56,000	55,000
Department of Agriculture	290,114	259,000	265,000
Department of Defense:			
Military	316,462	418,000	425,000
Civil	3,617,403	4,146,000	4,200,000
Department of State	205,328	213,000	212,000
Agency for International Development	511,048	600,000	600,000
Atomic Energy Commission	1,454,850	1,324,000	1,325,000
National Aeronautics and Space Administration	492,575	495,000	600,000
Tennessee Valley Authority	159,755	210,000	200,000
Miscellaneous Federal agencies	508,011	318,000	312,000
Total	59,791,443	64,698,000	67,366,000
Conservation of lands and minerals:			
Direct appropriation	7,496,617	9,458,000	10,029,000
Miscellaneous non-Federal sources	2,203	3,000	3,000
Miscellaneous Federal agencies	27,623	31,000	31,000
Total	7,526,443	9,492,000	10,063,000
Earth resources observation systems:			
Direct appropriation	1,101,019	1,911,000	5,179,000
National Aeronautics and Space Administration	683,685	1,110,000	1,100,000
Total	1,784,704	3,021,000	6,279,000
General administration:			
Direct appropriation	2,683,000	2,761,000	2,761,000
Miscellaneous services to other accounts:			
Miscellaneous non-Federal sources	27,845	26,000	26,000
Computer services for other bureaus and agencies	1,691,117	2,345,000	1,789,000
Miscellaneous Federal agencies	470,167	434,000	436,000
Total	2,189,129	2,805,000	2,251,000
Summary:			
Direct appropriation	103,308,299	111,621,000	121,212,000
States, counties, and municipalities	23,098,308	24,932,000	26,150,000
Miscellaneous non-Federal sources	3,135,205	2,396,000	2,416,000
Other Federal agencies	27,845,516	30,180,000 [a/]	27,274,000
Total	157,387,328	169,129,000	177,052,000

[a/] Reflects $426,000 reduction from the funding level shown in the Budget, due to unanticipated mid-year reduction in current year funding by NASA of natural resource remote-sensor programs.

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Surveys, Investigations, and Research

Appropriation, 1970	$ 95,755,000	
Supplemental appropriation, 1970	700,000	
Second supplemental appropriation, 1970	5,565,000	
Total appropriation, 1970		$102,020,000
Transferred from "Operating expenses, Public Building Service", General Services Administration		+ 22,852
Transferred from "Education and Welfare Services", Bureau of Indian Affairs		+ 852,000
Transferred from "Operations and Maintenance", Southeastern Power Administration		+ 15,000
Total available, 1970		102,909,852
Appropriation, 1971	106,392,000	
Pay cost supplemental, 1971	4,958,000	
Total appropriation, 1971		111,350,000

Summary of Increases and Decreases, 1972

	Base for 1972	Increase 1972	
Special resource and environmental projects:			
To initiate interdisciplinary programs in selected urban areas and augment the San Francisco Bay area study	$ 450,000	$+ 1,000,000	+ 1,000,000
Topographic surveys and mapping:			
Standard quadrangle mapping - increase in standard 1:24,000 scale mapping and continue development of a National Cartographic Information Center	24,105,000	+ 1,800,000	
To continue mapping program in Missouri River Basin previously accomplished with Bureau of Reclamation funds	-	+ 786,000	
Program savings in public relations	-	- 29,000	
Program savings in paper work management	-	- 78,000	+ 2,479,000
Geologic and mineral resource surveys and mapping:			
For an additional 8,000 square miles of geologic surveys, primarily on public lands	12,630,000	+ 300,000	
For seismological and geological studies to reduce potential losses from earthquakes	1,465,000	+ 200,000	

Geologic and mineral resource surveys and mapping (continued):				
For systematic reconnaissance geologic mapping of the continental shelves	$ 1,310,000	$+	200,000	
Program savings in public relations	-	-	36,000	
Program savings in paper work management	-	-	74,000	$+ 590,000
Water resources investigations:				
To provide urgently needed water data in which Federal interest is paramount	11,973,492	+	399,469	
To match offerings for data of mutual interest to State and Federal Governments	18,785,000	+	500,000	
To intensify hydrologic investigations of major critical national water problems	2,284,000	+	300,000	
For reimbursement to Bureau of Employees' Compensation	219,508	+	83,531	
For water data needed for Missouri River Basin development program, previously accomplished with Bureau of Reclamation funds	-	+	786,000	
Program savings in public relations	-	-	34,000	
Program savings in paper work management	-	-	86,000	+ 1,949,000
Conservation of lands and minerals:				
To increase capability to analyze proposed development and inspect oil and gas operations on the Outer Continental Shelf	3,041,000	+	292,000	
To analyze proposed surface mine developments and inspect operations for coal to improve environmental protection	4,251,000	+	50,000	
To acquire and interpret OCS geophysical data for pre-sale tract selection and resource evaluation and inventory	1,113,000	+	108,000	
To increase capability to evaluate, classify and inventory coal resources in Federal lands	1,053,000	+	150,000	
Program savings in public relations	-	-	5,000	
Program savings in paper work management	-	-	24,000	+ 571,000
Earth resources observation systems:				
To conduct aircraft remote sensing and space data-use studies for a national inventory of resources and land	1,911,000	+	3,300,000	
Program savings in public relations	-	-	20,000	
Program savings in paper work management	-	-	12,000	+ 3,268,000
Net increase, 1972				+ 9,857,000
Budget estimate, 1972				121,207,000

SURVEYS, INVESTIGATIONS, AND RESEARCH

Analysis by Activities

Activity	Fiscal Year 1970 Amount Available	Fiscal Year 1971 Total Appropriation	Fiscal Year 1971 Pay Cost Supplemental	Fiscal Year 1971 Amount Available
1. Special resource and environmental projects	-	$ 750,000	-	$ 750,000
2. Alaska pipeline related investigations ----	$ 709,197	1,300,000	$ 20,000	1,320,000
3. Topographic surveys and mapping ----------	28,492,579	28,788,000	1,602,000	30,390,000
4. Geologic and mineral resource surveys and mapping ----------	30,649,310	29,200,000	1,371,000	30,571,000
5. Minerals discovery loan program ----------	257,338	253,000	10,000	263,000
6. Water resources investigations ----------	31,469,239	32,542,000	1,384,000	33,926,000
7. Conservation of lands and minerals --------	7,496,617	9,055,000	403,000	9,458,000
8. Earth resources observation systems -------	1,101,019	1,900,000	11,000	1,911,000
9. General administration ----------	2,683,000	2,604,000	157,000	2,761,000
Unobligated balance lapsing ----------	51,553	-	-	-
Total ----------	102,909,852	106,392,000	4,958,000	111,350,000

SURVEYS, INVESTIGATIONS, AND RESEARCH

Analysis by Activities

	F.Y. 1970 Amount Available	F.Y. 1971 Amount Available	F. Y. 1972 Estimate	Increase (+) or Decrease (-) 1972 Compared with 1971	Page Reference
1. Special resource and environmental projects	-	$ 750,000	$ 1,750,000	$ + 1,000,000	7
2. Alaska pipeline related investigations	$ 709,197	1,320,000	1,320,000	-	11
3. Topographic surveys and mapping	28,492,579	30,390,000	32,869,000	+ 2,479,000	12
4. Geologic and mineral resource surveys and mapping	30,649,310	30,571,000	31,161,000	+ 590,000	22
5. Minerals discovery loan program	257,338	263,000	263,000	-	34
6. Water resources investigations	31,469,239	33,926,000	35,875,000	+ 1,949,000	36
7. Conservation of lands and minerals	7,496,617	9,458,000	10,029,000	+ 571,000	44
8. Earth resources observation systems	1,101,019	1,911,000	5,179,000	+ 3,268,000	53
9. General administration	2,683,000	2,761,000	2,761,000	-	59
Unobligated balance lapsing	51,553	-	-	-	
Total	102,909,852	111,350,000	121,207,000	+ 9,857,000	

1. Special Resource and Environmental Projects

FY 1971, $750,000; FY 1972, $1,750,000; increase, $1,000,000. The increase consists of:

Increase (+) or Decrease (-) Amount	Positions	Total Program	Total Positions	Explanation
$+1,000,000	+28	$1,450,000	38	To initiate interdisciplinary programs in selected pilot areas, and augment the San Francisco Bay area study.

Cost Factors Involved in Increase

28 permanent positions, including incidental costs such as family moving, $486,000; travel and subsistence, $37,000; office rental, supplies and equipment, $182,000; computer services, drilling and other service contracts, $215,000; research grants and contracts, $80,000.

Analysis by Subactivities

Subactivity	FY 1970 Amount Available	FY 1971 Amount Available	FY 1972 Estimate	Increase (+) or Decrease (-) 1972 Compared with 1971	Page Reference
(a) Urban pilot area studies ------	-	$ 450,000	$1,450,000	$+ 1,000,000	9
(b) Arctic Alaska resource investigations ----------	-	300,000	300,000	-	10
Total ----------	-	750,000	1,750,000	+ 1,000,000	

(a) Urban Pilot Area Studies: FY 1971, $450,000; FY 1972, $1,450,000; increase, $1,000,000.

Need for increase: The increase will be used partially to augment the project already underway in the San Francisco Bay Area and partially to initiate additional interdisciplinary programs in other selected areas.

Program of work: In FY 1972 the San Francisco Bay Area study will continue, augmented with USGS appropriations as required to meet its scheduled 3-year completion date without significant reduction in study scope and concept.

Feasibility investigations and preliminary studies in the 6 new study areas--Pittsburg, Connecticut Valley, Puget Sound, Denver, Phoenix-Tucson, and Baltimore-Washington--will be advanced to a point that selections of those areas to be fully investigated can be made.

The number of new studies, selected from the six now under preliminary investigation, which can be undertaken will depend upon the extent, complexity, and character of problems and related investigations defined for each in the feasibility studies. However, we hope that full scale studies can be started in most, or all, in FY 1972.

Status of program: The San Francisco Bay Region Environment and Resources Planning Study is a study of both the physical environment and the resources of the region and of their significance to urban and regional planning. The study is being conducted cooperatively by the U.S. Department of Housing and Urban Development and the U.S. Geological Survey. The study emphasizes the disciplines of geology, geophysics, hydrology, geography, and topography--disciplines which represent the core expertise of the U.S. Geological Survey--and their application to improved regional urban planning and decision making.

The goal of the study is to develop earth-science concepts, products, and procedures which can significantly improve regional planning and development. Additional critical data are to be gathered and basic geologic, geophysical, hydrologic, geographic, and topographic data are to be translated into documents that will be useful in the planning and decision-making process. The avenues of communication and coordination in the planning process are to be explored to find the most appropriate channels and methods for effectively applying the data.

The project is designed to meet major national as well as regional needs. By focusing this first pilot study on the Bay region, the Geological Survey hopes to identify those earth-science parameters most important to urban development, to evaluate the priorities of those parameters, and thereby guide in developing procedures to assure optimum use of earth resources. The Department of Housing and Urban Development hopes both to learn and to demonstrate the significance of physical resource and environmental data in the regional urban planning process. HUD is particularly in need of guidelines on geologic hazards in their housing, planning, and capital-grants programs.

During FY 1971, feasibility studies and limited natural resources investigations were commenced in 6 other urban pilot areas--Pittsburgh, Connecticut Valley, Puget Sound, Denver, Phoenix-Tucson, and Baltimore-Washington. These areas were chosen on a basis of a variety of factors including the kind of environmental problems and factors involved, availability of data, and local willingness to cooperate. In each of these areas, program designs will be developed so that the increased funds anticipated for FY 1972 may be utilized with the greatest degree of efficacy in each of these pilot urban areas. All of the pilot area studies involve participation by the State Geologist concerned. Research grants made to State Geologists are matched in approximately equal amounts by contributions in their particular areas of expertise.

(b) Arctic Alaska Resource Investigations: FY 1971, $300,000; FY 1972, $300,000; no change.

Program of work: The FY 1972 program continues the work begun in FY 1971 to provide data required by the Federal Government to make critical management decisions necessary to manage wisely those lands and minerals remaining under continued Federal ownership and trust which will be made accessible by the petroleum development and pipeline related activities. (Investigations related specifically to the Trans-Alaska Pipeline are provided for separately in the activity "Alaska Pipeline Related Investigations".)

1) Topographic surveys and mapping - In FY 1972, field control operations will be completed on about 7,200 square miles, and photogrammetric and map finishing operations will be completed on approximately 750 square miles.

2) Geologic investigations - Multi-purpose surficial and bedrock geologic mapping to evaluate mineral resource potential and to define and evaluate permafrost and other geologic hazards to economic development (exclusive of the pipeline).

3) Water resources investigations - Investigate water availability and quality, and engineering problems related to water resources in potential areas of development (non-pipeline) in the Arctic.

Status of program: The 1968 Prudhoe Bay oil discoveries have induced a high level of intensive, mechanized and varied human activity in what has been a largely uninhabited Arctic wilderness. This sudden development of the Arctic is now occurring without the basic topographic, geologic, and hydrologic data that generally are available elsewhere in the country. Petroleum discoveries and the eventual production will trigger a variety of activities affecting Federal resources, public health, general commerce and transportation and the land itself.

While general development of Arctic Alaska is not inevitable, neither is it improbable. Though the Federal involvement may be reduced with the eventual lifting of the "land freeze" and native and State selection of lands on the North Slope, the Federal Government will continue to hold significant lands and resources including those of NPR-4, the Arctic Wildlife Range and the OCS. Finally, though the Arctic is far from the American urban centers, a pattern of development of these lands compatible with the fragile Arctic ecology is a basic concern of all Americans. The fore-described program represents application of a modest multidisciplinary capability to deal with the most critical of the integrated resource land-use problems as they arise.

2. Alaska Pipeline Related Investigations

FY 1971, $1,320,000; FY 1972, $1,320,000; no change.

Program of work: The FY 1972 program continues the FY 1971 program of providing the topographic, geologic, and hydrologic data needed by the Federal Government for critical engineering and management decisions concerning possible right-of-way permits and construction (route, design characteristics, and construction practices) of a Trans-Alaska oil pipeline. These pipeline related investigations fall into three categories:

1) Topographic surveys and mapping - The project area is about 16,000 square miles of the Brooks Range where 1:63,360-scale mapping is not now available. Planned FY 1972 accomplishments of 1:63,360-scale mapping are as follows:

Description of Work	Square Miles
Complete horizontal and vertical geodetic control (field)	5,000
Continue photogrammetric map compilation (office)	6,000
Continue cartographic map finishing (office)	6,000

2) Geologic investigations - Further evaluation of the extent, character, and thermal regime of permafrost in unconsolidated deposits along the probable pipeline route between Prudhoe Bay and Valdez in order to assure that pipeline design takes fully into account the potential consequences of disrupting the existing thermal equilibrium; define potential geologic hazards to a pipeline from seismic activity and landslides along the potential pipeline route; and delimit the occurrence of construction materials along the potential pipeline route.

3) Water resources investigations - Investigations in drainage basins traversed by the probable pipeline route, including studies of a) stages, discharges, scour depths, and ice-jam characteristics of major Arctic rivers at probable pipeline crossings, relative to safe design of structures; b) sedimentation and gullying processes in permafrost to enable the development of protective measures; and c) quantity, quality, and biological characteristics of lakes and streams at probable construction camp and maintenance stations for their potential use for water supply and/or waste disposal. In addition, monitoring of the water environment along the probable pipeline route will provide a "base" from which changes resulting from development can be detected.

Status of program: In response to the increasing activity in the Arctic and the need for Federal decisions concerning environmental protection and management of the public lands and resources, the Geological Survey redirected ongoing activities in late FY 1969 and FY 1970 to start basic investigations in the Arctic. A $700,000 supplemental appropriation in FY 1970 permitted the Survey to take full advantage of the 1970 summer work season to gather data related specifically to potential Trans-Alaska Pipeline routes. The investigations are continuing through FY 1971. Of particular concern is the group of decisions regarding a right-of-way permit for the possible construction of an oil pipeline from Prudhoe Bay across largely Federal lands to Valdez. Selection of a route, source of borrow material, design concepts compatible with the environment, and adequate safeguards against possible pollution and environmental damage are critical facets of the problems.

3. Topographic Surveys and Mapping

FY 1971, $30,390,000; FY 1972, $32,869,000; increase $2,479,000. The increase consists of:

	Increase (+) or Decrease (-) Amount	Positions	Total Program	Total Positions	Explanation
(1)	+1,800,000	+26	$25,905,000	1,417	Standard quadrangle mapping--increase 1:24,000-scale mapping & continue development of National Cartographic Information Center.
(2)	+ 786,000	+43	786,000	43	To continue mapping program in Missouri River Basin previously accomplished with transfer funds.
(3)	- 29,000	--	--	--	Program savings in public relations.
(4)	- 78,000	--	--	--	Program savings in paper work management.
	+2,479,000	+69			

Cost Factors Involved in Increases

(1) $455,000 is needed for 26 new positions at an average rate of $17,500, which includes salaries, operating expenses, travel and subsistence, supplies, wages for field assistants and other normal expenses. $200,000 is needed to more closely match the rate of equipment obsolescence. Within-grade advancements and the attendant increase in average salary rates that occurs with a fairly stable work force are expected to increase personnel expenses about $765,000. Other increases are expected for aerial photography contracts, $60,000, and additional field expenses for travel and field assistant salaries, $220,000, and laboratory supplies, $100,000.

(2) $786,000 is the amount needed for the ongoing Missouri River Basin mapping program heretofore funded by transfer from the Bureau of Reclamation: 43 positions at an average rate of $18,300. This rate includes all normal expenses ((1) above).

Analysis by Subactivities

	FY 1970 Amount Available	FY 1971 Amount Available	FY 1972 Estimate	Increase (+) or Decrease (-) 1972 Compared with 1971	Page Reference
(a) Standard quadrangle mapping-------	$22,388,245	$24,105,000	$26,584,000	$+2,479,000	14
(b) Map revision and maintenance -----	3,829,951	4,330,000	4,330,000	--	16
(c) Small scale and special mapping --	2,274,383	1,955,000	1,955,000	--	17
Total -------------------------	28,492,579	30,390,000	32,869,000	+2,479,000	

(a) Standard Quadrangle Mapping: FY 1971, $24,105,000; FY 1972, $26,584,000, increase, $2,479,000. The increase consists of:

	Increase (+) or Decrease (-) Amount	Positions	Total Program	Total Positions	Explanation
(1)	+1,800,000	+26	$25,905,000	1,417	Standard quadrangle mapping--increase 1:24,000-scale mapping, continue development of National Cartographic Information Center.
(2)	+ 786,000	+43	786,000	43	To continue mapping program in Missouri River Basin previously accomplished with transfer funds.
(3)	- 29,000	--	--	--	Program savings in public relations.
(4)	- 78,000	--	--	--	Program savings in paper work Management.
	+2,479,000	+69			

Need for increase: (1) About $1,650,000 of the increase is needed to begin mapping on 500 standard quadrangles at 1:24,000-scale. This mapping will increase output per year by 4,500 square miles thus establishing a new production rate that will advance the date of completion of the basic mapping coverage 1/ of the Nation (1:24,000-scale). About $150,000 of the increase will be used for the continued development and operation of the National Cartographic Information Center (NCIC) begun in FY 1971, to provide a more complete service of disseminating cartographic data. The increase in funds will permit the Survey to conclude initial studies regarding the equipment required and procedures necessary for the most efficient operation of the NCIC.

(2) The $786,000 will provide for mapping to support the continuation of multiagency investigations within the Missouri River Basin. During FY 1972 work will be continued on approximately 20,000 square miles. New mapping will be started on an additional 2,500 square miles requested by the Bureau of Reclamation, other Interior Bureaus, and other Federal agencies.

Program of work: The available funds will provide for about 1,650 new starts and continuation of work on the 7,700 quadrangles in progress. The FY 1972 program for standard quadrangle mapping involves work in all States not completely mapped at 1:24,000-scale. These quadrangles represent the highest priority mapping needs of the Federal, State and local agencies. The work is in various stages of progress, such as aerial photography, field control surveys, field completion, stereocompilation and map finishing.

1/ Basic mapping--1:24,000-scale (2,000 ft. to the inch) in 7½-minute quadrangle units. 1:62,500-scale (about one mile to the inch) in 15-minute units. For Alaska, 1:63,360-scale (one mile to the inch) in 15-minute units.

	Direct Appropriation	State coop programs (50% State and 50% Federal funds)	Total
New Starts	1,375	275	1,650
Continuation of work underway	6,000	1,700	7,700
Total 7½' quads	7,375	1,975	9,350

The National Cartographic Information Center (NCIC) is being established to provide an improved and expanded central collection and dissemination point for a vast amount of cartographic information produced by Federal, State and local agencies and industry. In FY 1972 studies will be continued to determine the type of data needed, the volume of requests, and the speed required to satisfy the users. The types of equipment for storage and retrieval will then be determined and acquisition will begin.

Status of program: The topographic map is a key implement for maintaining an inventory of man's physical environment. The Nation is beginning a decade marked by a need to better accommodate an increasing population and demands for improvement of the environment. Vigorous action will be needed in many fields and careful analysis and planning should be encouraged. Topographic maps will be important in water resource management, mineral resource investigations, land use inventories and planning and development of transportation and communication systems and many other programs.

The demand for 1:24,000-scale mapping remains strong both in unmapped areas and those mapped at the smaller scale of 1:62,500. Current progress is not adequate to provide required support of programs for the inventory, development, and management of the Nation's resources, as evidenced by nearly 19,000 quadrangles requested for new starts in FY 1972. Combined priority requests received from federal agencies and the added needs of state and local agencies will determine the areas programed. This system assures a thorough review of current needs and priorities for most effective project selections.

In 1968 an analysis of the topographic mapping program was made by the System Development Corporation. Results of this study were extended in-house with a sample analysis of map sales. This analysis provided an estimate of total annual benefits of $900 million to the national economy from the use of maps already completed. This amount compares with a total expenditure by the Geological Survey of only $430 million for all topographic mapping accomplished from 1896 to 1970. In brief, total annual benefits are about double the total cost of the topographic mapping program to date.

At the end of FY 1970, published mapping at 1:24,000-scale standards was available for 48 percent of the 49 States for which complete 7½-minute mapping was planned. Advance copy of mapping in progress is available for another 10 percent. Mapping was in progress for an additional 9 percent, but had not reached the stage where advance map copy is available. Twenty-four percent of the 49 States is mapped at 1:62,500-scale, but this mapping will be replaced by 1:24,000-scale mapping to provide a common base for the orderly presentation and use of topographic mapping data. Figure 1 shows status of 7½- and 15-minute standard quadrangle mapping.

Most quadrangle mapping in Alaska is being done at the scale of 1:63,360 (1 inch = 1 mile). Published mapping at this scale or larger is available for 75 percent of the State. Advance map copy is available for another 3 percent. Mapping is in progress for a 26,700-square-mile area which covers

the proposed pipeline as well as highway and transportation routes. (For programing details, see the activities "Special Resource and Environmental Projects", and "Alaska Pipeline Related Investigations".

Coverage of the Missouri River Basin by published standard quadrangle mapping of the 7½- and 15-minute series as of June 30, 1970 was 59 percent which is far short of the 75 percent available for the conterminous 48 States. Mapping progress in many of the other major river basins of the Nation has been greatly facilitated by State cooperative programs. Thirty-five States contribute to cooperative mapping programs in the total amount of about $4 million annually (figure 2), of which $3,250,000 is for standard quadrangle mapping (the remainder is for map revision). Only about $300,000 of these funds are for work within the MRB area. Much of the land in the Missouri River Basin is under federal jurisdiction. Consequently, State support for cooperative programs is understandably small, leaving a more pressing federal obligation to complete the mapping in these areas. For FY 1971, $879,000 was transferred from the Bureau of Reclamation for topographic mapping. By direction of the House Appropriations Committee, mapping requirements for FY 1972 and the future are being justified in U.S. Geological Survey's budget. Topographic mapping serves as a base for the comprehensive plan of development of the basin and provides the information for advance planning on additional units of construction as well as supporting the studies and management of all natural resources.

The U.S. Geological Survey has historically had the major responsibility of providing a central point of information on maps and related cartographic information. Through an Executive Order, the Survey has administered the map information function for the Federal government since the early 1900's.

On May 6, 1967, the Bureau of the Budget issued a revised Circular A-16 placing government-wide leadership in the Department of the Interior for coordinated planning and execution of national topographic mapping, including map information activities. This responsibility was then assigned, to the Geological Survey. A Federal Mapping Coordination Conference was held in September 1967, at which strong support was developed for a National Cartographic Information Center.

The continued development of the National Cartographic Information Center will be through the expansion of the present Map Information Office. The FY 1971 studies are to provide information about other data centers, the type and kinds of service the NCIC should provide and the necessary organizational structure. Liaison has been established with many of the agencies holding cartographic data.

The FY 1972 NCIC studies and developments will be based on the FY 1971 findings. Determinations will be made of the volume of data to be handled and systems for classifying and evaluating data. Suggested schedules for acquisition of equipment and personnel will be prepared. These studies will determine the types of equipment needed for data storage and retrieval.

Through research and experimentation, new mapping products are being perfected. An example is the orthophotomap. By using photographic imagery, the orthophotomap portrays more ground detail that can be shown by conventional line symbols in the normal cartographic procedure. Orthophotomaps of selected areas are being incorporated into the standard quadrangle mapping program. Standard orthophotomapping is presently published or in progress for more than 200 quadrangles covering such areas as the Great Salt Lake area, Utah; Okefenokee Swamp; the Florida Everglades; and the Prudhoe Bay Area, Alaska.

(b) Map Revision and Maintenance: FY 1971, $4,330,000; FY 1972, $4,330,000; no change.

Program of work: Funds will provide primarily for continuing the revision of maps of both metropolitan and rural areas. This includes the all-Federal revision program and the $750,000 matching funds under various State cooperative programs. The ongoing program involves about 1,500 maps in various stages of progress. Nearly 800 of these maps will be completed in FY 1972.

Status of program: The backlog of maps needing revision continues to grow and is estimated to exceed 8,000 maps. The current level of effort is not sufficient to reduce this backlog. It is estimated that about 1,300 maps are becoming outdated annually. As new and revised maps are completed they add to the inventory of maps that will eventually need revision. This need will continue to grow as the mapping coverage of the Nation continues toward completion.

There will be about 53,600 1:24,000-scale maps of the conterminous 48 States when the series is completed. Revision cycles vary from 5 years in urban areas to 20 or more years in remote regions. When the 1:24,000-scale mapping is completely published, it is estimated that about 4,000 maps a year will require revision. The current annual revision production of about 800 quadrangles can be expected to increase gradually to this level.

By the end of FY 1972, the inventory of maps in major urban areas will be reasonably up-to-date. There are about 3,500 of these urban maps at 1:24,000-scale. Approximately a 5-year cycle is planned between revisions--this means that about 700 of these maps are subject to revision each year to maintain the inventory. Before work is started, areas considered for revision are reviewed to insure that only those maps which need revision are added to the program. Currently about 70 percent of the maps in the revision program are in urban areas.

As maps are sold and distributed stock on hand is reduced. Based on the rate of distribution, maps are generally reprinted shortly before the stock is depleted. Map reprinting is carefully coordinated with the map revision and replacement programs. Maps are being distributed at a rate of about 7.4 million copies per year. Funds returned to the Treasury from the sale of maps in FY 1970 totaled more than $1.8 million.

Figure 3 shows revision work in progress.

(c) Small-Scale and Special Mapping: FY 1971, $1,955,000; FY 1972, $1,955,000; no change.

Program of work: The summary of work for FY 1972 follows:

-- 1:250,000-scale series. Complete 60 of the maps now in work; begin updating and improving 60 maps.

-- National Atlas. Update and print maps for separate sales; and begin additional printing of original volume if required by sales. Additional funds to complete the printing of the remainder of the 30,000 volumes will be required in future years. All monies from sales are returned to the U.S. Treasury.

-- State Map series. Complete six maps in progress; begin revision of four maps. The series presently consists of 47 maps; three of these maps show two or three States.

-- International Map of the World (IMW). Complete three maps in progress; begin compilation of two maps. Fifty-seven of the 71 maps in the series are complete. Many of these were produced by the Army and are considered provisional until modified to meet the IMW specifications.

-- National Park Series. Complete seven maps in progress; begin work on three others. About 40 maps are in the current series.

-- Geodetic Control Diagrams. Complete 40 additional diagrams. About 350 of the 468 diagrams in the series are complete. This is a joint program with the Coast and Geodetic Survey.

-- Thematic maps. Develop methods for collecting, processing, categorizing, and presenting data to illustrate geographical concepts.

Status of program: The Small-Scale and Special Mapping program includes the cartographic and printing operations necessary to compile various series of small-scale maps, special-purpose maps, and related products. Preparation of these maps generally depends on the availability of recent standard quadrangle coverage.

The 1:250,000-scale maps (one inch equals about four miles) are the largest scale series currently available for the entire country. They provide complete topographic coverage at one uniform scale and format. They are made in 1° by 2° quadrangle units. Many Federal and State departments and agencies depend upon the maps of the 1:250,000-scale series to provide basic copy for current and future project planning. The maps are also widely used as topographic bases for preparing such products as aeronautical charts, State geologic maps, flood-plain maps, and defense planning maps. Currently 123 of the 473 maps covering the conterminous United States and Hawaii are being revised. Revision is begun on about 60 maps each year which results in a revision cycle of about 8 years. Maps in areas of extensive cultural, water, and recreational development that have a high rate of distribution and use are given priority for revision.

The thematic mapping program includes the preparation of maps to portray distributional patterns of man-environment interactions. Specific examples of products resulting from this program include maps showing land use, industrial growth, and urban change.

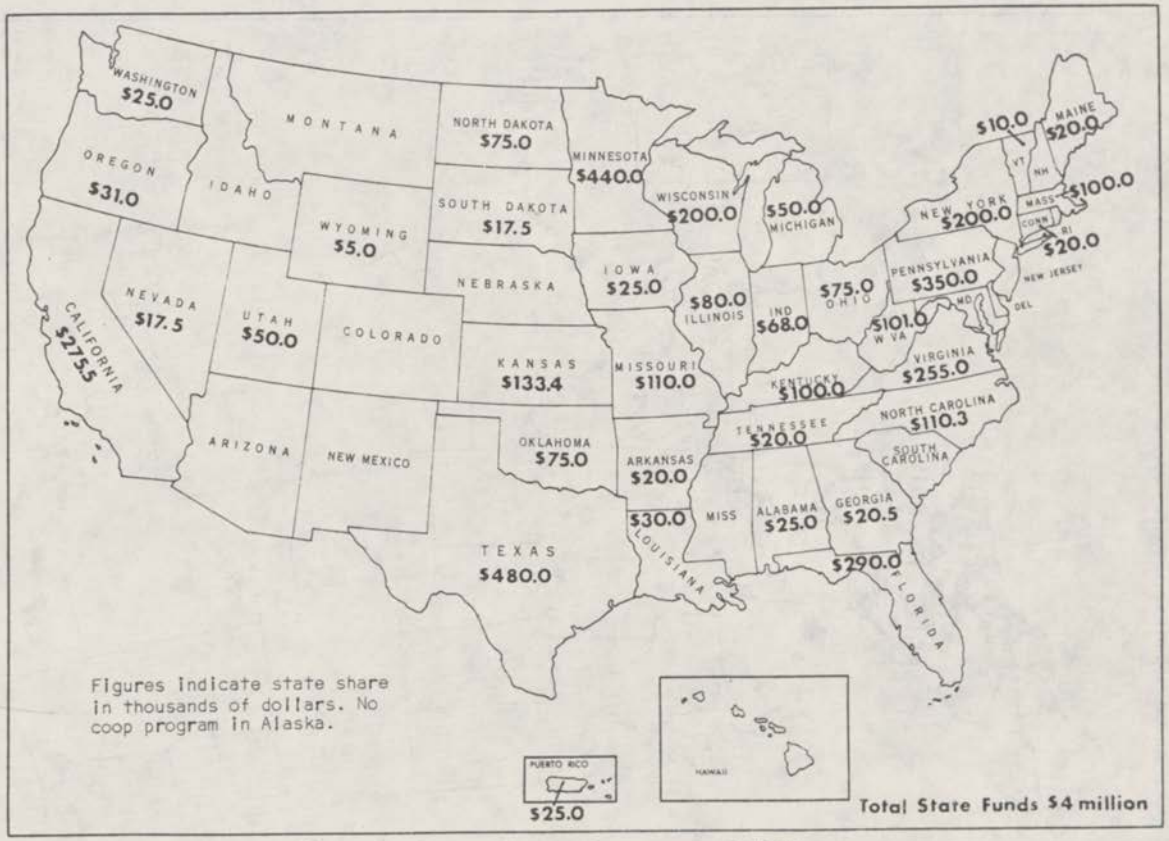

Figure 2.- Cooperative mapping program, FY 1971.

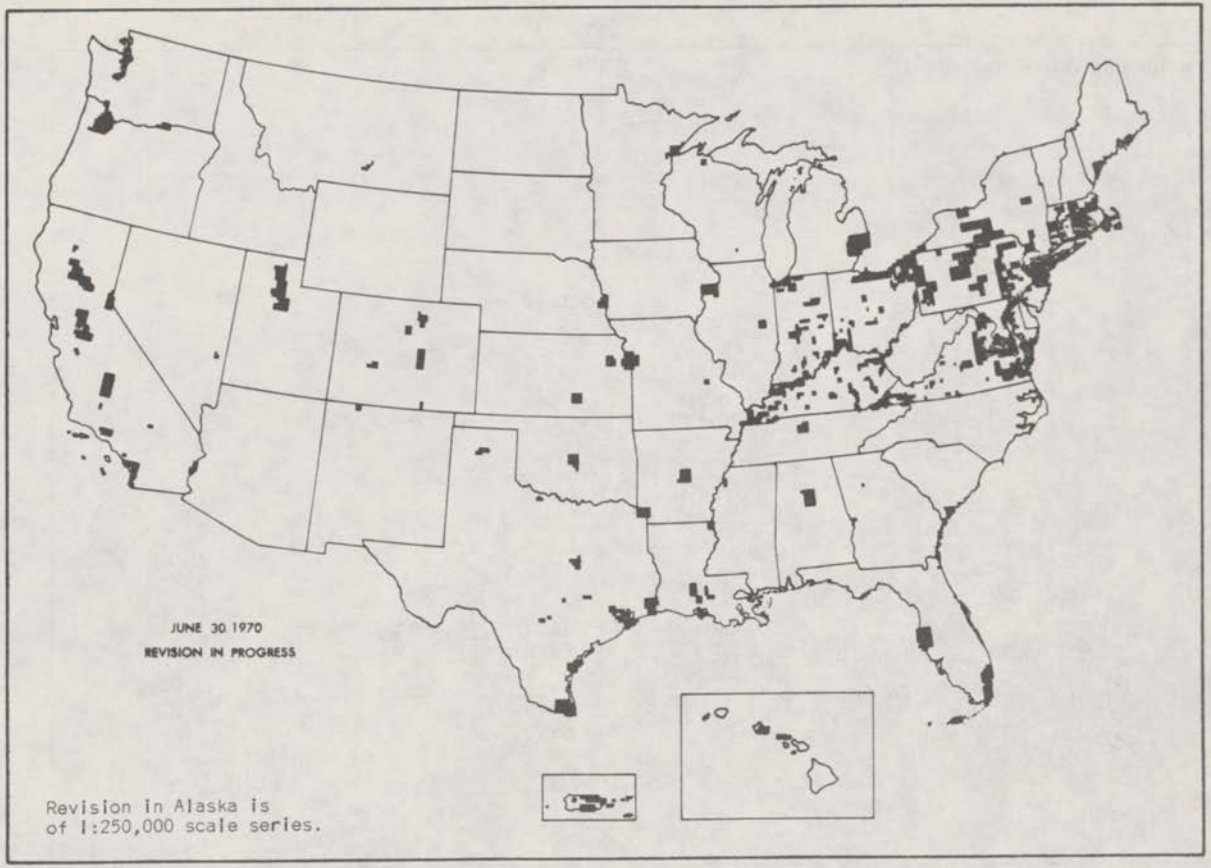

Figure 3.- Revision in progress.

4. Geologic and Mineral Resource Surveys and Mapping

FY 1971, $30,571,000; FY 1972, $31,161,000; increase, $ 590,000. The increase consists of:

	Increase (+) or Decrease (-) Amount	Positions	Total Program	Total Positions	Explanation
(1)	$+300,000	+4	$12,930,000	658	For an additional 8,000 square miles of geologic surveys, primarily of public lands.
(2)	+200,000	+2	1,665,000	54	For seismological and geological studies to reduce potential losses from earthquakes.
(3)	+200,000	+2	1,510,000	37	For systematic reconnaissance geologic mapping of the continental shelves.
(4)	- 36,000	-	-	-	Program savings in public relations.
(5)	- 74,000	-	-	-	Program savings in paper work management.
	+590,000	+8			

Cost Factors Involved in Increases

(1) Salaries and benefits for 4 man years, $70,000; travel, per diem and incidental cost of field studies, $25,000; helicopter services, $40,000; laboratory equipment and data reduction, $165,000.

(2) Salaries and benefits for 2 man years, $35,000; travel and subsistence, $15,000; seismic and strain instrumentation, $75,000; data transmission, $50,000; data reduction, $25,000.

(3) Salaries and benefits for 2 man years, $35,000; shiptime $75,000; coring devices, samplers, and geophysical equipment, $50,000; travel costs and shipment of gear, $15,000; laboratory costs and data reduction, $25,000.

Analysis by Subactivities

Subactivity	FY 1970 Amount Available	FY 1971 Amount Available	FY 1972 Estimate	Increase (+) or Decrease (-) 1972 Compared with 1971	Page Reference
(a) Land resource surveys---------	$15,040,798	15,705,000	$16,148,000	$+ 443,000	25
(b) Mineral resource surveys------	14,352,877	13,551,000	13,503,000	- 48,000	29
(c) Offshore geologic surveys-----	1,255,635	1,315,000	1,510,000	+ 195,000	32
Total----------	30,649,310	30,571,000	31,161,000	+ 590,000	

FY 1972 Subactivities

(Estimated funds, in thousands of dollars)

FY 1971 Subactivities	(a) Land Resource Surveys	(b) Mineral Resource Surveys	(c) Offshore Geologic Surveys	Total
(a) National land and mineral resource surveys----------	12,767	5,697		18,464
(b) Special mineral resource investigations				
(1) Oil shale resource appraisals-------		251		251
(2) Primary mineral supply----------	163	6,512		6,675
(3) Wilderness area mineral surveys-----		1,043		1,043
(c) Geologic hazards				
(1) Earthquake and crustal studies------	1,665			1,665
(2) Volcanic hazards----------	528			528
(3) Engineering geology----------	1,025			1,025
(d) Marine geology----------			1,510	1,510
Total----------	16,148	13,503	1,510	31,161

(a) LAND RESOURCE SURVEYS: FY 1971, $15,705,000; FY 1972, $16,148,000; increase, $443,000. The increase consists of:

Increase (+) or Decrease (-) Amount	Positions	Total Program	Total Positions	Explanation
(1) $+300,000	+4	$12,930,000	658	For an additional 8,000 square miles of geologic surveys, primarily of public lands.
(2) +200,000	+2	1,665,000	54	For seismological and geological studies to reduce potential losses from earthquakes.
(3) - 19,000	-	-	-	Program savings in public relations.
(4) - 38,000	-	-	-	Program savings in paper work management.
+443,000	+6			

Need for increase: $300,000 will be used to carry out geologic surveys of an additional 8,000 square miles, with major focus on public lands. Priority will be given to areas that are poorly known geologically as a first step in providing information needed for various kinds of land-use planning as well as to appraise the mineral resource potential of the areas surveyed.

$200,000 will be applied to the Earthquake Hazards program. An expanded program is needed both to aid in immediate reduction of potential losses from quakes and to conduct research on basic causes which can lead to more effective means of reducing losses. The expanded program will include geologic surveys of high-risk areas, seismological and soils engineering investigations of ground motion and failure, assistance in land-use planning and pre-disaster emergency planning, and geophysical monitoring and geologic analysis of earthquake faults.

Program of work:

Regional mapping and analysis:

Eastern States	$1,420,000	
Central States	955,000	
Rocky Mountain States	1,790,000	
Pacific States	1,070,000	
Alaska	495,000	
Paleontology and Stratigraphy	2,215,000	
Geophysical Surveys	2,525,000	
Geochemical Surveys	825,000	
Geologic Processes	1,000,000	
Geochronology	635,000	$12,930,000
Earthquake Hazards		1,665,000
Volcano Hazards		528,000
Engineering Geology		1,025,000
Total		16,148,000

Status of program: The purpose of geologic mapping and its supporting activities is to provide the essential base for appraisal of resource and land-use potential. These surveys provide the basic knowledge prerequisite for maps and reports that focus on specific problems such as landslide hazards and foundation conditions. Geologic maps become a permanent public record which serve as a basis in the future for other special analyses.

Geologic maps are prepared and published at various scales. Large scale maps (1 mile to the inch or 2,000 feet to the inch) are needed in populous areas or areas undergoing any kind of intensive land development. They are available in a little more than 22 percent of the country and are produced at a rate less than 1 percent per year. Maps at smaller scales are also made, particularly in Alaska where some areas are still virtually unknown geologically. Because of the increasing demand for more extensive coverage, geologic surveys are programmed to make the most effective use of available personnel and equipment to meet the most urgent needs.

About 65 percent of the total program is in the Western States and Alaska and is primarily aimed at facilitating resource discovery although environmental problems are becoming increasingly more important as objectives. Because of somewhat greater emphasis for many years on surveys of the Public Lands, the geologic map coverage west of the Rocky Mountains is more complete than the average for the Nation. Twenty-eight percent of the Federal Lands of the conterminous U.S. are covered by large-scale maps as compared with 22 percent for the whole of the country. In Colorado and California detailed geologic programs are underway in areas having foundation problems and other serious geologic hazards.

About 35 percent of the geologic mapping is in the mid-continent and eastern regions where the work has direct engineering and environmental as well as resource applications. Priorities here are set in considerable part by requests of individual states accompanied by offerings of matching funds. Half the annual cost of the geologic mapping program in Kentucky, for example, is supported by a State appropriation of .5 million dollars. Over 2/3 of the State of Kentucky is now mapped in detail at a scale of 2,000 feet to the inch and the remainder is being completed at the rate of about 1,800 square miles each year. Other areas in which cooperative programs are expected to provide complete coverage at large scale are in Massachusetts, Connecticut, and Puerto Rico. Considerable progress is being made in the unravelling of the geology of the Blue Ridge and Piedmont of the southeastern U.S., where the bedrock is obscured by deep weathering, and until recently the geology has been poorly understood.

The geophysical program consists largely of investigations and interpretation of local variations in the earth's magnetic and gravitational fields, although certain other physical properties are also studied. Aeromagnetic surveys at very low cost per unit area provide data for interpreting subsurface geologic conditions, for synthesizing the geologic framework of large regions, and for appraising mineral resource potential. They are particularly valuable for areas that are covered by surficial deposits concealing the underlying geology or that are inaccessible. Thus, they are especially useful for evaluation of resource potential of Wilderness areas and other undeveloped public lands. Gravity and electrical properties supplement the magnetic data and further delineate subsurface structure. Detailed measurements on rocks provide data on past changes in the earth's magnetic field and movements of major crustal blocks. Investigations are conducted on the rates of flow of heat from the earth's interior in different areas and on the physical properties of rocks at high pressures--factors that are essential to the understanding of earthquakes, volcanoes and other geologic phenomena of potential destructiveness or usefulness.

Fundamental geochemical properties and processes of the earth's crust are determined in field and laboratory studies. Such studies furnish essential information on the different rock types, their chemistry, distributions, relationships in time and space, and processes of origin. Complex rocks that are the products of events and processes deep within the crust are investigated by field studies in selected areas throughout the Nation and by laboratory examination, analysis and synthesis. Ages of rocks and ores are determined by isotopic analysis and new methods are developed and tested. Geochemical surveys examine the distribution and variation of metals and related elements in rocks, soils and plants. The Survey's past experience in this field has recently been of unexpected benefit to medical researchers investigating the odd geographic distribution of incidence of heart disease, congenital malformation, and other health problems. Currently, a state-wide collection of geochemical data in Missouri is being coordinated with studies by medical scientists. Such geochemical data also provide a basis for assessing chemical pollution of the environment by elements such as mercury, lead, arsenic, cadmium, etc. When mercury pollution recently became a public concern, the Survey was able to provide data on the amounts of mercury occurring naturally in the environment.

Earthquake hazards studies have been conducted at the Survey's National Center for Earthquake Research (NCER) in Menlo Park, California, since 1965. This is a major geological and geophysical program to discover what causes earthquakes and what can be done to decrease their dangers. Investigations are centered on the seismic belt of the western United States and Alaska, with current focus on the San Andreas fault zone of California, the most dangerous earthquake fault in the United States. A great earthquake (magnitude larger than 8) in the densely populated areas of the Pacific Coast would cause damages in the range of 5 to 20 billion dollars and the loss of 1,000 to 10,000 lives. It is estimated that there is a 70 percent probability of such a quake within the next 30 years. Great earthquakes cause the most spectacular losses, but smaller shocks occur more frequently and are capable of causing serious damage and loss of life, especially in densely populated urban areas. The pressure of increasing population in major urban centers is causing the spread of residential developments into areas considered to have greater susceptibility to severe earthquake damage, a trend that gives urgency to the need for action against earthquake hazards. The potential losses from a great earthquake can be substantially reduced through an effective action program on earthquake hazards, as recommended recently by the Federal Council for Science and Technology Ad Hoc Interagency Working group for Earthquake Research, by the National Academy of Sciences Committee on the Alaska Earthquake and by the Office of Science and Technology Task Force on Earthquake Hazard Reduction. The Geological Survey's program is designed to provide the basic information needed in an effective action program.

The augmented earthquake hazards program will consist of two main elements:

1. Earthquake effects and immediate measures for hazard reduction. Studies under this element include:

--Seismological investigations of the influence of local ground conditions on earthquake motion.

--Soils engineering investigations to develop techniques for predicting earthquake induced ground motion.

--Geologic mapping to delineate areas of high risk for earthquake induced landslides, detailed mapping of fault traces, and preparation of special maps for land-use planning.

--Special studies on the implementation of hazard reduction measures.

2. Behavior of fault zones

--Instrumental monitoring of earthquakes, crustal strain, and related phenomena, with initial emphasis on the San Andreas fault zone of California--to determine rates and patterns of earthquakes and strain accumulation to improve estimates of earthquake probability, improve methods of predicting earthquakes, and to provide the basis for an operational prediction system if a successful method for prediction is developed.

--Studies of the geological structure and history of earthquake fault zones with initial emphasis on the San Andreas fault zone--to determine the geology and deep structure of fault zones and relate this to strain accumulation and earthquake occurrence and to determine long-term prehistoric rates of fault displacement.

Volcano hazards pose potential threats in many areas near active or temporarily dormant volcanoes. A system of prediction is essential to alleviate these hazards. The major effort is carried on at the Hawaiian Volcano Observatory, where long-term monitoring has warned local residents of past eruptions, has advanced our understanding of volcanic processes as well as the development of predictive systems, and has provided a record of activity which serves as a basis for future fundamental studies. During the last year, Kilauea has been in almost continuous eruption, and lava flows have covered roads and ranch lands. Progress has continued to be made in the monitoring networks and our understanding of the "plumbing" of the volcano: the seismic network has been expanded to the active volcano Mauna Loa and partially converted to radio telemetry; the ground deformation network, which monitors the swelling of the volcano as lava forces its way upward prior to eruption, has been greatly expanded using new equipment and techniques; data from both networks are routinely analyzed using automatic data processing. During the coming year, continued emphasis will be placed on improving the monitoring networks and also on developing monitoring systems that could relay signals via satellites. In the Cascade Range emphasis will be placed on continued investigations of the volcanic hazards of Mt. Saint Helens. During the past year, field investigations were completed at Mt. Lassen and both seismic monitoring and augmented volcanic hazards studies were carried out at St. Helens. Progress was made during the past year in correlating ancient volcanic ash deposits using neutron activation analyses at the Geological Survey's Denver Reactor Facility; such correlation is essential in establishing the history of volcanism during the past few million years in the western United States as a guide to future volcanism.

The Engineering Geology program has at its core detailed geologic mapping and studies in urban areas that provide information of foundation conditions, stability of slopes, drainage characteristics, and engineering properties of rocks and soil. Such studies are continuing in Los Angeles, San Francisco, Denver, Salt Lake City, Boston, Rapid City, Anchorage, and Juneau. Studies in the San Francisco Bay area have recently been strengthened as part of a program in cooperation with the Department of Housing and Urban Development that has the aim of improving planning and zoning in the area. In addition, longer range research in engineering geologic problems is carried on both in the laboratory and in the field. In the laboratory at Menlo Park, California, ground motion studies of unconsolidated materials are underway and have been expanded in the past year in order to better predict the effects of earthquakes in areas having different geologic conditions. In the Denver area research in rock mechanics includes observations in mines and tunnels as well as laboratory investigations. This work is aimed at providing a better understanding of conditions that lead to rock failure in engineering. In the San Francisco Bay area study and the pilot areas to be started, engineering geologic maps and analyses will be further interpreted and synthesized with data from other disciplines for particular application in regional, urban and land-use planning.

(b) MINERAL RESOURCE SURVEYS: FY 1971, $13,551,000; FY 1972, $13,503,000; decrease $48,000, for program savings in public relations and paper work management.

Program of work:

Energy investigations:		
Organic fuels	$1,700,000	
Uranium-thorium	700,000	
Geothermal energy	195,000	$2,595,000
Mineral investigations:		
Metallic minerals	4,755,000	
Non-metallic minerals	655,000	
Geochemistry of ore deposits	1,945,000	
Exploration research	1,800,000	
Mineral resources inventory	710,000	9,865,000
Wilderness investigations		1,043,000
Total		13,503,000

Status of program: The mineral resource surveys program focuses on problems related to mineral raw materials--supply and domestic resource management--and it consists of a wide range of scientific investigations pertaining to the origin, occurrence, and distribution of fuel and non-fuel minerals and mineral raw materials in nature, to the development and improvement of mineral exploration concepts and techniques for locating new deposits of minerals, and to the evaluation of known and potential mineral resources of the public domain and of the Nation. Data generated by such research are essential to the Federal Government in meeting its responsibilities for: (1) assuring that adequate and dependable supplies of mineral raw materials are available to domestic consumers at the lowest possible cost consistent with other national objectives, (2) insuring the orderly and efficient development of domestic mineral resources with a minimal detrimental effect on the environment, and (3) judiciously managing the public lands and their contained resources. The redefined mineral resources program represents a consolidation of the extensive scientific research and resource appraisal activities of the Geological Survey in the field of fuel and non-fuel minerals that were formerly conducted under six separate program subactivities or elements.

The high standard of living in the United States requires an enormous consumption of energy, and the need for energy raw material is expected to double in the next 20 years. Although the total domestic reserves and resources of energy minerals are about five times the projected demand for the next 30 years, the largest percentage of these reserves are high-sulfur coals, and severe supply problems exist for the low polluting fuel minerals--low-sulfur coal, oil, natural gas, and uranium. Program emphasis is being placed on these "clean" energy sources through geological studies of fuel raw material districts or provinces and topical studies bearing on the origin of deposits of energy raw materials. In the past year, Geological Survey scientists have authored 32 reports and maps on organic and radioactive energy sources including several on the new petroleum province of northern Alaska, a report on the famous Raton coal field of New Mexico, an evaluation of the uranium resources of northwestern New Mexico, and a compilation of the sources of information on U.S. and world energy resources.

Geothermal energy is a nearly pollution free and inexpensive form of energy that is fairly abundant in the Western United States but which has not been

fully utilized. Worldwide development of geothermal energy in the last decade has risen sharply and with it the need for understanding the movement of underground thermal waters and steam in order to develop efficient low-cost methods for prospecting and evaluating new geothermal areas. Several years of research in Yellowstone Park have not only clarified our understanding of geysers and hotsprings, but have resulted in a new comprehension of the puzzling "dry steam" geothermal systems which, though they form less than 5 percent of the drilled systems, have extremely high potential for economic development as power sources. Larderello, Italy, the world's largest producer of geothermal electricity, is this type of system, as is The Geysers, California, which will surpass Larderello by 1975. The Survey's work has shown that "dry steam" systems can be recognized from the chemistry of their waters, which will aid in the search for such energy sources.

Each year, the United States consumes nearly $12 billion worth of non-energy mineral raw materials, and consumption is growing at a faster rate than population as we attain progressively higher standards of living. By the year 2000, the total value of minerals consumed annually in the country is expected to be four to five times that of today. To help meet these enormous demands, the Geological Survey conducts studies of known and potential mineral-bearing districts or provinces, investigates methods for improving mineral exploration programs, and maintains a continuing inventory of U.S. and world mineral resources.

Particular program emphasis is given to these commodities for which a shortage exists or is anticipated and for which there is a high probability of increasing domestic production through the application of geologic knowledge. Although the metals comprise only about half of our mineral consumption, they account for the bulk of our non-fuel mineral imports. Thus, a large part of our mineral resource investigations is directed toward the study of metallic mineral districts. All sections of the country are being investigated, with active field projects in 19 States and Puerto Rico covering a broad range of base, ferrous, and precious metals. A similar program is conducted in the field of non-metallic mineral deposits with emphasis on the fertilizer raw materials and saline deposits. In the past year, the Geological Survey has published 69 maps and reports on mineral districts and provinces in 17 States covering a wide range of commodities and areas such as gold in the famous Fairbanks district of Alaska, phosphate in Montana, the Carlin gold deposit of Nevada, iron in northern Michigan, lead-zinc-silver deposits in eastern New Hampshire and southwestern Maine, and potential new deposits of rutile, the scarce ore of titanium, in Virginia.

The easily found, high grade deposits in the United States have been discovered, and new ore bodies must be sought in areas that provide few and at best subtle clues to their existence. Searching for these clues has become a highly sophisticated process involving the application of geological, geochemical, and geophysical data from a variety of sources, and if the search is to be successful, new mineral exploration concepts and techniques must be developed. New developments in this field come from a thorough understanding of the formation of ore deposits, their behavior in the weathering cycle, and the geochemical and geophysical methods by which they can be detected. Investigations of the geochemistry of ore deposits provide information that is basic to improving the efficiency and effectiveness of the search for new ore deposits. Such investigations include detailed studies and sample analysis of selected ore deposits and areas in which ore deposits occur; identification and examination of minerals to determine their significance as indicators of past conditions; analysis of stable isotopes in rocks and minerals as indicators of geologic sources of metals; development and testing of new methods of chemical assay and analysis and of new geophysical instruments. An outstanding recent development is the use of californium-252 for chemical analysis of rocks and ores in

place; further experimentation is under way to develop methods for analysis in boreholes and on the ocean bottom. Highly sensitive laboratory techniques are being developed that permit the measurement of minute background traces of many metals; these techniques are applicable not only to the understanding and search for new deposits but also are of value to recognition of pollution problems. Exploration research, which is the field testing and application of laboratory-derived concepts, is the essential final stage of this facet of the program, and continuing studies of mineral exploration concepts and techniques are being conducted in representative mineral districts in different climatic belts in the country. Work in the Coeur d'Alene district of Idaho has shown that certain "pathfinder" elements occur at great distances above the ore and can be used to detect deeply buried deposits. Private industry has shown great interest in our research on mercury in air as an indicator of buried metal deposits and work in this field is continuing.

The formulation of sound mineral policies by Government and the solution of mineral supply and land use problems require knowledge of the known and potential mineral resources. Mineral resource inventories or appraisals of resource potential are synthesized from regional geologic data for the area being evaluated, detailed knowledge of its contained mineral districts, and an understanding of the ore forming processes; the foundation for the appraisal or evaluation is geologic knowledge accumulated over the years, plus that generated by Geological Survey ongoing programs. Significant resource inventory and related reports published during the past year include a comprehensive survey of the iron resources of the United States and Mexico (published by the United Nations as part of a review of world iron resources), a map of the molybdenum deposits of the U.S., and a bibliography on the resources of vanadium. In addition, Geological Survey resource specialists were invited to prepare annual summary articles on world phosphate resources for the "Mining Congress Journal" and on bentonite and fuller's earth for "Mining Engineering".

Pursuant to the Wilderness Act of 1964 (P.L. 88-577), the Geological Survey, together with the Bureau of Mines, has the responsibility for making mineral surveys of 34 Primitive areas and such other Department of Agriculture lands as may be recommended for inclusion in the National Wilderness Preservation System, and of 54 Wilderness areas already in the System. In our wilderness investigations to date, priority has been given to surveys of the Primitive areas because the Act requires that recommendations on these areas be made within 10 years after passage of the Act. Surveys of 21 Primitive areas have been made and published, field work has been completed in 7 other areas and reports are in preparation, and field studies are under way in the remaining 6 areas. Field studies of Primitive areas will be completed in FY'72. Studies of Wilderness areas which are planned for completion within 20 years of passage of the Act, commenced in FY'70 and 6 such areas are currently being studied.

Additional study areas of the National Forest that have wilderness value but are not defined in the Wilderness Act, are being designated for consideration for inclusion in the Wilderness System. One such area is currently being studied and requests have been received from the Forest Service for study of 6 others, and additional requests are expected. Areas for study that have been brought to our attention aggregate about 6 million acres, an acreage approximating that of the Primitive areas.

(c) OFFSHORE GEOLOGIC SURVEYS: FY 1971, $1,315,000; FY 1972 $1,510,000; increase, $195,000. The increase consists of:

Increase (+) or Decrease (-) Amount	Positions	Total Program	Total Positions	Explanation
$+200,000	+2	$1,510,000	37	For systematic reconnaissance geological mapping of the continental shelves.
- 5,000	-	-	-	Program savings in public relations and paper work management.
+195,000	+2			

Need for increase: To support systematic and detailed reconnaissance three dimensional geologic mapping of the U.S. continental shelves at an intermediate scale[1/] of 1:250,000. Maps showing distribution of bottom sediments and structure of subbottom strata are critically needed to appraise the mineral resource potential of the submerged continental margin and to provide fundamental geologic background for a variety of other National needs such as engineering planning, earthquake hazard identification, waste disposal and pollution studies and ecological investigations.

Program of work: Continuing investigations are contributing to a planned long-term program that will result in regional geologic information and reconnaissance (small scale[1/]) geologic maps of significant parts of the U.S. continental margins and that ultimately will contribute geologic analyses and maps of the submerged continental margins at the intermediate scale of 1:250,000. Such analyses are assisting the Department in fulfilling its obligations of providing the necessary geologic data for managing resources in the public land of the OCS and in producing geologic maps for all of the continental U.S. Major projects are underway in the following geographic areas: the Alaska Shelf; Pacific Coast Margin; Gulf of Mexico-Caribbean Sea; and the Atlantic Shelf. Most projects are cooperative with other organizations, including both federal agencies and non-profit institutions under research contracts.

Status of program: The basic need for geologic analysis, mapping and resources appraisal of the submerged continental margins is the same as for the land areas, and similarly, a suitable mixture of small, intermediate, and large-scale geologic maps are required. Our knowledge of the submerged continental margins and deep sea areas is still very meager. The geology of the continental shelves and that of the adjacent land areas is intricately related. Consequently, geologic study of the continental shelves is a natural extension of the Geological Survey's long-established on-land mapping programs in coastal areas, inasmuch as the geologic framework of one cannot be understood without knowledge of the other. Progress within each major geographic area is described briefly as follows:

Alaska Continental Margin--This large area (more than 500,000 square miles) contains known placer deposits of gold, tin, and platinum, and has impressive known and potential oil and gas reserves. Sedimentary basins suitable for

1/ Large scale: 1 mile to the inch; 1:62,500
Intermediate scale: 4 miles to the inch; 1:250,000
Small scale: 8 miles to the inch; 1:500,000

accumulation of petroleum recently were located on the Bering Shelf and studies are planned that will outline their size and internal structure. Intermediate scale geologic mapping of the nearshore area in the central part of the Gulf of Alaska and on the Arctic Shelf is needed to serve Interior's responsibility for assessment and management of areas that are subject to future leasing.

Pacific Continental Margin--Analysis of the Pacific Shelf is a prerequisite to solution of diverse problems that range from mineral resource appraisal to proper land use in a seismically active region. A program of large-scale geologic mapping of San Francisco Bay is providing information that will be instrumental in planning for construction engineering and land use, parks or wildlife refuges. Studies of the central California Shelf and the southern California Borderland to locate active faults and unstable sea floor sediments may also delineate target areas that could contain strata and structures favorable for the accumulation of petroleum or other mineral commodities.

Gulf of Mexico and Caribbean--Regional geologic and geophysical analyses of the entire Gulf being done in cooperation with the Naval Oceanographic Office will lead to a better understanding of the structural framework and resource potential of the region. Detailed sediment work is underway along Padre Island and in Laguna Madre. Sediment composition, transport, and deposition peripheral to the Mississippi River delta and in the northwest part of the Gulf are also being investigated. Work on the southern shelf of Puerto Rico and in Mona Passage has resulted in the recognition of the offshore extension of major faults and in further information on a large submarine canyon off the south coast that may be suitable for low-cost disposal of mining wastes. This project is directed toward a comprehensive interpretation of the geologic structure and sediment distribution on the shelf. Participation in TEKTITE II has contributed to understanding nearshore sedimentary processes and underwater mapping techniques.

Atlantic Margin--A broad geologic reconnaissance of the Atlantic Shelf has identified several resource target areas that require intermediate scale mapping for assessment of their resource potential. Mining companies are continuing to explore sand and gravel deposits off southern New England. The Survey's joint program with the Woods Hole Oceanographic Institution has resulted in the publication of over 100 scientific reports since the beginning of this program in 1962. Investigations of the distribution and mineralogy of sediments of the southeastern part of the Shelf are continuing.

Other Studies--The Geological Survey is participating in the Deep Sea Drilling Project (JOIDES), and is planning to take part in the International Decade of Ocean Exploration (IDOE). Studies will continue in the Territorial Islands, Gulf of Mexico, and Caribbean Sea to insure a firm geologic base for assessing the resource potential; and for analyzing the structural evolution of these areas which in turn aid our understanding of the development of the U.S. continental areas.

5. Minerals Discovery Loan Program

FY 1971, $263,000; FY 1972, $263,000; no change.

Program of work: The minerals exploration loan program authorized by Public Law 85-701 (1958) involves granting and administering financial assistance contracts to explore for specified mineral commodities. The program comprises the processing of applications, conducting geologic and engineering field examinations, preparing and monitoring contracts, and collecting royalties on production from certified projects and projects with royalty agreements.

The Office of Minerals Exploration (OME) also administers contracts with royalty obligations remaining from a similar program conducted by the former Defense Minerals Exploration Administration (DMEA) under section 303(a) of the Defense Production Act of 1950, as amended.

Status of program: Administrative work on prior DMEA contracts; completed, active, and proposed OME contracts; and handling correspondence and inquiries from the public will occupy the full time effort of our staff, which remains at the same level as in fiscal year 1971. Requests for financial assistance for projects estimated to cost $1.8 million were received in FY 1970, and 8 new contracts were executed with the Government's share totalling $229,000. Payments totalling nearly $600,000 were made on active contracts. Royalties received on production from OME projects totalled about $168,000, a record for the program, and $125,000 from DMEA projects. Certifications of 6 OME projects during the year raised the total estimated value of ore reserves discovered on projects certified through June 30, 1970 to $52,000,000. A forecast of funding follows:

Minerals Discovery Loan Program

Subactivity	FY 1970 Amount Available	FY 1971 Amount Available	FY 1972 Estimate	Increase (+) or Decrease (-) 1972 Compared with 1971
(a) Financial assistance	$229,000	$350,000	$ 84,000	$ - 266,000
(b) Technical and administrative expense	178,338	184,000	184,000	-
Total obligations	407,338	534,000	268,000	- 266,000
Financing:				
Unobligated balance available, start of year	21,415	150,000	-	- 150,000
Recovery of obligations (contracts) not completed	278,585	121,000	5,000	- 116,000
New obligational authority	257,338	263,000	263,000	-
Total amount available	557,338	534,000	268,000	- 266,000
Unobligated balance available, end of year	- 150,000	-	-	-
Total obligations	407,338	534,000	268,000	- 266,000

6. Water Resources Investigations

FY 1971, $33,926,000; FY 1972, $35,875,000; increase, $1,949,000. The increase consists of:

	Increase (+) or Decrease (-) Amount	Positions	Total Program	Total Positions	Explanation
(1)	$+ 399,469	+ 10	$12,372,961	687	To provide urgently needed water data in which Federal interest is paramount.
(2)	+ 786,000	+ 49	786,000	49	For water data needed for the Missouri River Basin development program (accomplished previously with transfer funds).
(3)	+ 500,000	+ 38[a/]	19,285,000	865	To match an increase in State offerings for data of mutual interest to State and Federal governments.
(4)	+ 300,000	+ 13	2,584,000	123	To intensify hydrologic investigations of major critical national water problems.
(5)	+ 83,531	--	303,039	--	For reimbursement to Bureau of Employees' Compensation.
(6)	- 34,000	--	--	--	Program savings in public relations.
(7)	- 86,000	--	--	--	Program savings in paper work management.
	+1,949,000	+110			

Cost Factors Involved in Increases

(1) 10 permanent positions at an average annual rate of $12,500, $125,000; transportation and subsistence in connection with field investigations, $15,000; supplies and materials, $15,000; equipment, $70,000; contractual services, $175,000.

(2) Ongoing program in Missouri River Basin heretofore funded by transfer from Bureau of Reclamation; includes 49 permanent positions at average annual rate of $12,500, $610,000; transportation and subsistence in connection with field investigations, $75,000; supplies and materials, $46,000; equipment, $30,000; contractual services, $25,000.

(3) 38 permanent positions at an average annual rate of $8,750, 21 of these funded by $185,000 direct appropriation, the other 17 funded by State and local matching funds; transportation and subsistence in connection with field investigations, $75,000; gaging, monitoring, and other equipment, $50,000; supplies and materials, $50,000; test drilling and other contractual services, including direct services by cooperators, $140,000.

(4) 13 permanent positions at an average annual rate of $12,500, $165,000; transportation and subsistence in connection with field investigations, $20,000; equipment, supplies, and materials, $5,000; research contracts and other contractual services, $110,000.

[a/] Includes 17 positions funded by State and local matching funds.

Analysis by Subactivities

Subactivity	FY 1970 Amount Available	FY 1971 Amount Available	FY 1972 Estimate	Increase (+) or Decrease (-) 1972 Compared with 1971	Page Reference
A. Coordination of National Water Data Activities	$ 555,537	$ 664,000	$ 664,000	--	39
B. National Water Data System:					
(1) Federal Program	11,719,456[a/]	11,973,492	13,038,961	$+1,065,469[b/]	39
(2) Federal-State Program	17,301,024	18,785,000	19,285,000[c/]	+ 500,000	40
C. Critical National Water Problems	1,709,078	2,284,000	2,584,000	+ 300,000	42
D. Employee Compensation Payments	184,144	219,508	303,039	+ 83,531	43
Total	31,469,239	33,926,000	35,875,000	+1,949,000	

a/ Excludes $300,000 appropriated for 1969-70 for work related to storm damage.

b/ Includes $786,000 for Missouri River Basin investigations funded in prior years by transfer from Bureau of Reclamation.

c/ Includes $185,000 for administration of the cooperative program and $19,100,000 for matching State offerings.

FY 1972 Subactivities
(Estimated funds, in thousands of dollars)

FY 1971 Subactivities	A. Coordination of Nat'l Water Data Activities	B. Nat'l Water Data System (1) Federal Program	B. Nat'l Water Data System (2) Fed-State Program	C. Critical Nat'l Water Problems	D. Employee Compensation Payments
A. Federal Program:					
(1) National water data					
(a) Coordination	664				
(b) Data collection and analysis		4,565			
(c) Improvement in accuracy, coverage and usefulness of data		1,820			
(d) Water-use data				110	
(2) Regional resource appraisals		570			
(3) Investigations and research for water planning and management					
(a) Urban hydrology				212	
(b) Ground-water recharge				1,080	
(c) Delimiting flood hazards				433	
(d) Core program of hydrologic investigations and research		3,195			
(e) Subsurface waste storage				749	
(f) Soil and moisture conservation		240			
(4) Supporting services		2,460			
(5) International Hydrological Decade		189			
B. Federal-State Program			19,285		
C. Employee Compensation Payments					303
Totals, FY 1972	664	13,039	19,285	2,584	303

The Water Resources program of the Geological Survey proposed for 1972 will require direct appropriation of $35,875,000 (53% of total program). In addition, the Survey performs extensive water-data acquisition for other Federal agencies under a reimbursable arrangement ($10,541,000; 16% of total program), and receives fiscal support from the States through the Federal-State program of cooperative work ($20,950,000; 31% of total program), making a total projected program of $67,366,000 for 1972.

A. Coordination of National Water Data Activities

FY 1971, $664,000; FY 1972, $664,000; no change.

Program of work: The FY 1972 funds will provide for continuation of coordination activities, including refinements in water-data network design, maintenance and expansion of a public catalog of information on network and specialized data-acquisition activities, and expansion of field coordination efforts, first funded in FY 1971, to prepare more complete annual regional plans for Federal water-data acquisition in each of 21 water-resources planning regions and incorporate the regional plans into a consolidated Federal plan.

Status of program: Under this program the Department of Interior is responsible for exercising leadership in achieving a balanced and adequate national water-data program through effective coordination of water-data acquisition activities among Federal agencies. A corollary responsibility is to evaluate the entire national water-data activity (National Water Data System), including State and local agency efforts because of their interface with Federal responsibilities and programs. The network design, cataloging, and field coordination activities undertaken in this program are prerequisite to carrying out these dual responsibilities.

B. National Water Data System

The National Water Data System embraces the total effort of government (Federal, State, local) to acquire, process, store, and disseminate water-resources and water-use information. The Geological Survey is the principal Federal water-data agency. As such, its programs constitute a major part of the System.

(1) FEDERAL PROGRAM: FY 1971, $11,973,492; FY 1972, $13,038,961; increase, $1,065,469. The increase consists of:

	Increase (+) or Decrease (-) Amount	Positions	Total Program	Total Positions	Explanation
(a)	$+ 399,469	+ 10	$12,372,961	687	To provide urgently needed water data in which Federal interest is paramount.
(b)	+ 786,000	+ 49	786,000	49	For water data needed for the Missouri River Basin development program (accomplished previously with transfer funds).
(c)	- 34,000	--	--	--	Program savings in public relations.
(d)	- 86,000	--	--	--	Program savings in paper work management.
	+1,065,469	+ 59			

Need for increase: (a) To initiate studies of return flow to the Lower Colorado River required in administration of the Supreme Court decree in the Colorado River litigation ($100,000); support research and development in hydrologic instrumentation and techniques of modeling hydrologic systems ($200,000);

and provide for more timely publication of results of water investigations ($99,469).

(b) To provide water data needed by agencies directly concerned with the development and management of the Missouri River Basin (formerly funded by transfer from Bureau of Reclamation).

Program of work: The water-data collection, resources investigation, and research activities included in this program support that segment of the National Water Data System in which the Federal interest is paramount, including the public domain, river basins and aquifers that transcend State boundaries, and other areas of international or interstate concern. Major program segments are: streamflow, ground-water, and water-quality data acquisition, storage, and dissemination ($3,779,000); Missouri River Basin investigations ($786,000); automation of data services, development and application of modern scientific methods, techniques, and instrumentation ($1,820,000); regional resource appraisals ($570,000); basic and applied research aimed at increased understanding of the operation of hydrologic systems ($3,195,000); hydrologic investigations on public lands managed by Bureau of Land Management ($240,000); training, publication, and other supporting services ($2,460,000); International Hydrological Decade ($189,000).

Status of Program: Data and information on the continually changing quantity and quality of water resources are needed for effective planning, design, development, management, and use of the resources.

Although many data have been and are being collected, there are major gaps and deficiencies both geographically and in types of data. In part, this is because the increasing development and use of water requires more and better supporting water data.

The following table indicates the approximate level of adequacy of principal kinds of water-data and information activities on a nationwide basis.

	% of current need being met
Surface water:	
Average streamflow	80
Floods	50
Low flows	25
Stream systems studies	10
Ground water:	
Resource appraisal	40
Subsurface waste storage	5
Systems studies	20
Water quality:	
Resource appraisal	40
Monitoring	20
Urban hydrology	10
Estuaries	5
Water use	20

In keeping with the Survey's national leadership role in water data, the 1972 Federal program component of the National Water Data System is aimed at alleviating partially the most critical of these deficiencies in areas of primarily Federal interest.

(2) FEDERAL-STATE PROGRAM: FY 1971, $18,785,000; FY 1972, $19,285,000; increase, $500,000.

Need for increase: The increase is needed to match, in part, anticipated increased cooperative offerings for the operation of a major segment of the National Water Data System. Activities included in this program are those of mutual interest to both Federal and non-Federal agencies. The increase is required chiefly for expansion of station-type data acquisition with emphasis on

WATER RESOURCES INVESTIGATIONS: FEDERAL-STATE PROGRAM
ESTIMATES OF STATE AND MUNICIPAL OFFERINGS FOR FY 1972
(Thousands of dollars)

State	State Offerings to be Matched 1971	Estimated Offerings for Matching 1972	Increase (+) Decrease (-)
Alabama	340	359	+ 19
Alaska	188	273	+ 85
Arizona	399	424	+ 25
Arkansas	185	274	+ 89
California	1,638	1,807	+ 169
Colorado	413	568	+ 155
Connecticut	201	213	+ 12
Delaware	36	40	+ 4
Florida	1,186	1,680	+ 494
Georgia	301	358	+ 57
Hawaii	296	360	+ 64
Idaho	299	458	+ 159
Illinois	253	390	+ 137
Indiana	372	405	+ 33
Iowa	193	257	+ 64
Kansas	516	547	+ 31
Kentucky	292	327	+ 35
Louisiana	471	530	+ 59
Maine	50	52	+ 2
Maryland	261	316	+ 55
Massachusetts	210	241	+ 31
Michigan	290	351	+ 61
Minnesota	267	348	+ 81
Mississippi	220	256	+ 36
Missouri	302	297	- 5
Montana	173	268	+ 95
Nebraska	229	337	+ 108
Nevada	157	208	+ 51
New Hampshire	43	50	+ 7
New Jersey	367	460	+ 93
New Mexico	398	462	+ 64
New York	815	1,277	+ 462
North Carolina	325	396	+ 71
North Dakota	267	282	+ 15
Ohio	353	413	+ 60
Oklahoma	207	323	+ 116
Oregon	252	292	+ 40
Pennsylvania	679	698	+ 19
Rhode Island	39	41	+ 2
South Carolina	149	192	+ 43
South Dakota	153	177	+ 24
Tennessee	213	245	+ 32
Texas	1,226	1,547	+ 321
Utah	388	411	+ 23
Vermont	48	73	+ 25
Virginia	265	310	+ 45
Washington	828	791	- 37
West Virginia	103	147	+ 44
Wisconsin	389	468	+ 79
Wyoming	228	261	+ 33
American Samoa	32	40	+ 8
D.C.	6	1	- 5
Guam	12	20	+ 8
Puerto Rico	295	299	+ 4
Trust Terr.,Pacific	45	50	+ 5
Virgin Islands	4	4	--
SUBTOTAL	17,867	21,674	+3,807
Adjstmts.to be made	---	-2,574	-2,574
Pay raise costs	+751	--	- 751
Program admin.	+167	+ 185	+ 18
TOTAL Federal Funds, Coop Program	18,785	19,285	+ 500

water-quality monitoring, and for collection and interpretation of data on areal hydrologic systems as a basis for improved decision-making.

Program of work: Cooperative projects are jointly planned by State and Federal representatives at grass-roots level, which assures optimum melding of Federal and State priorities. Major program activities and estimated 1972 funding are:

	Federal matching funds	State and local funds
Collection, analysis, and dissemination of streamflow ground-water, and sediment data	$9,500,000	$10,100,000
Areal resource appraisal	6,600,000	6,600,000
Studies related to critical water problems	2,000,000	2,000,000
Other data collection and applied research	1,185,000	2,250,000
Total	19,285,000	20,950,000

At present, the total increase in offerings for matching by the more than 440 cooperating agencies for FY 1972 is expected to approximate $3,800,000. Because budgetary constraints will allow matching of less than 15 percent of the anticipated increase in offerings, only higher priority activities will be funded. Projects approved for cooperative funding contribute simultaneously to solution of urgent State and local problems and to the accomplishment of National Water Data System objectives.

Status of program: Efficient and effective conservation, development, and utilization of the nation's water resources is impossible without an adequate data base. This program provides the major part of that base; it is a continuing program that grows in direct response to increasing mutual needs of Federal and local governments for data in support of water resources decision-making. The program is funded jointly by Federal, State, and local governments. The proposed increase in Federal matching funds will reaffirm the Federal government's support of the financial partnership principle to provide for a single water-data activity to meet multipurpose needs for water information.

C. Critical National Water Problems

FY 1971, $2,284,000; FY 1972, $2,584,000; increase, $300,000.

Need for increase: The increase is required to initiate a nationwide assessment of the present extent of underground waste disposal practices, including the development of preliminary geologic and hydrologic guidelines for determining the merits of well disposal as a waste management alternative.

Program of work: The activities included in this program are directed toward providing water data needed for the more urgent and pressing critical national water problems. Major program components and estimated funding are as follows: continue planning and design of unified national program for collection, analysis, storage, and retrieval of water-use data ($110,000); continue ongoing research that relates hydrologic parameters to rates and degrees of urbanization ($212,000); continue field investigations to evaluate feasibility of recharge techniques in different geohydrologic environments, and research on chemical and physical phenomena that control artificial recharge ($1,080,000); delimit flood hazards on about 1,000 standard quadrangle maps ($433,000); begin nationwide assessment of existing subsurface waste disposal and storage practices, design a storage and retrieval system for the information obtained, and continue research on fundamental problems related to waste injection ($749,000).

Status of program: The water-use data component was funded initially in FY 1971. The current effort is directed toward planning and design of a long-range program, mainly toward a survey of specifically what water-use data are required by the data users and of practical accuracy requirements. The FY 1972 effort will complete this survey. The lack of a unified national program for collection, analysis, storage, and retrieval of quantity and quality data on water use represents a major national water-data deficiency.

The objective of the urban hydrology component is to provide water information of special use for urban facilities planning and design. Numerous, diverse activities, ranging from housing to highway construction, require specialized water data and knowledge of water resources of urban areas. Funds provided in FY 1971 and FY 1972 will be utilized for continuation of ongoing basic research projects that relate hydrologic parameters to rates and degrees of urbanization. In addition, pilot-city investigations relating to urban land-use planning are being undertaken as part of a Bureau-wide program budgeted in activity number 1, "Special resource and environmental projects."

The objective of the ground-water recharge component is to determine to what extent ground-water storage can be used to supplement that in surface reservoirs as a basic water-management tool. To that end, field investigations are in progress to evaluate feasibility of recharge techniques in three areas representing different geohydrologic environments posing different problems. Investigations in progress include one at Lubbock, Texas, begun in FY 1968, representing conditions in the High Plains of Texas and New Mexico; one on Long Island, begun in FY 1970, for studies of injection of storm runoff; and one in the Minneapolis-St. Paul area, begun in FY 1970, representing problems of artificial recharge of fissured rocks.

The objective of the flood-hazard mapping component is to provide flood information as a guide for flood-plain management. The program was developed in response to recommendation 1(B) of the Task Force on Federal Flood Control Policy (House Document 465, pages 21-22). The mapping program, originally planned as a 3-year effort, was begun in FY 1969, but has undergone revisions in scheduling in accord with budget constraints. Twenty-nine percent of the maps will have been completed by June 30, 1971, and at the 1972 level of funding about thirty-six percent of the maps will be complete by June 30, 1972. Beginning in FY 1970, the scope of this project was altered at the request of the Department of Housing and Urban Development. The area inundated by the 100-year flood is now being outlined on maps instead of the area inundated by an occasional flood. This change, which was approved by the Bureau of the Budget, will increase the value of the maps and will not greatly increase the total cost of the program.

The subsurface waste storage component, initially funded in FY 1971, has as its objective providing an information base for decision-making on use of the subsurface for waste storage without endangering valuable fresh-water and potentially valuable saline-water resources. The program is directed at the most urgent problems associated with subsurface waste storage, and includes: a) compilation of pertinent information on existing subsurface waste practices and the establishment of a storage and retrieval system for this information; b) delineation of major subsurface systems that will be targets for waste storage; c) initiation of regional studies to evaluate the deep fresh- and saline-water resources that may be affected by subsurface waste storage; and d) supporting research on fundamental problems, such as waste-rock-water interactions, geologic and hydrologic principles as applied to waste injection, and reactivity of organic substances.

D. Employee Compensation Payments

FY 1971, $219,508; FY 1972, $303,039; increase, $83,531.

Need for increase: The increase is required to reimburse the Bureau of Employees' Compensation, Department of Labor, for payments made during FY 1970 on account of Geological Survey employees injured since December 1, 1960 (Public Law 86-767, Section 209).

7. Conservation of Lands and Minerals

FY 1971, $9,458,000; FY 1972, $10,029,000; increase $571,000. The increase consists of:

	Increase (+) or Decrease (-) Amount	Positions	Total Program	Total Positions	Explanation
(1)	$+292,000	+11	$3,313,000	130	To increase capability to analyze proposed development and inspect oil and gas operations on the OCS.
(2)	+ 50,000	+ 2	4,301,000	261	To analyze proposed surface mine developments and inspect operations for coal to improve environmental protection.
(3)	+108,000	+ 1	1,212,000	34	To acquire and interpret OCS geophysical data for pre-sale tract selection and resource evaluation and inventory.
(4)	+150,000	+ 5	1,203,000	66	To increase capability to evaluate, classify and inventory coal resources in Federal lands.
(5)	- 5,000	-	-	-	Program savings in public relations.
(6)	- 24,000	-	-	-	Program savings in paper work management.
	+571,000	+19			

Cost Factors Involved in Increases

(1) Salaries and benefits for 11 new positions (10 man years at $11,000) and for costs of within grade and other promotions ($21,000), $131,000; travel, transportation, and subsistence $16,000, rents, communications, and utilities, $10,000; printing, supplies and equipment, $10,000; helicopters and other contractual services $125,000.

(2) Salaries and benefits for 2 new positions (1.8 man years at $16,000, $29,000) and for costs of within grade and other promotions ($11,000), $40,000; travel, transportation and subsistence, $6,000; rents, communications, and utilities, $1,000; printing, supplies, and equipment, $3,000.

(3) Salaries and benefits for 1 (one) new position (one man year at $20,000) and for costs of within grade and other promotions ($15,000), $35,000; travel, transportation and subsistence, $4,000, rents, communications and utilities, $1,000; printing, supplies, and equipment, $3,000; contractual services (geophysical data purchase), $65,000.

(4) Salaries and benefits for 5 new permanent positions (5 man years at $13,000, $65,000),6 temporary positions (2-3/4 man years at $5,800, $16,000),and for within grade and other promotions ($11,000), $92,000; travel, transportation, and subsistence, $22,000; rents, communications and utilities, $3,000; printing and supplies, $5,000; equipment, $10,000; contractual services, $18,000.

Analysis by Subactivities

Subactivity	FY 1970 Amount Available	FY 1971 Amount Available	FY 1972 Estimate	Increase (+) or Decrease (-) 1972 Compared with 1971	Page Reference
A. Mineral Lease Management					
(1) Outer Continental Shelf---------	$1,598,920	$3,041,000	$3,313,000	$+272,000	48
(2) Federal and Indian Lands--------	3,874,801	4,251,000	4,301,000	+ 50,000	49
B. Resource Evaluation and Classification					
(1) Outer Continental Shelf---------	994,950	1,113,000	1,212,000	+ 99,000	50
(2) Federal and Indian Lands--------	1,027,946	1,053,000	1,203,000	+150,000	51
Total	7,496,617	9,458,000	10,029,000	+571,000	

FY 1971 Subactivities	FY 1972 Subactivities (thousands of dollars) A. Mineral Lease Management (1) Outer Continental Shelf	A. Mineral Lease Management (2) Federal and Indian Lands	B. Resource Evaluation and Classification (1) Outer Continental Shelf	B. Resource Evaluation and Classification (2) Federal and Indian Lands
OUTER CONTINENTAL SHELF				
(a) Resource management-Marine minerals	3,313			
(b) Resource evaluation-Marine minerals				
(1) Geologic data			568	
(2) Geophysical data			644	
ONSHORE				
(c) Resource management-Oil and gas				
(1) Federal lands		2,451		
(2) Indian lands		637		
(d) Resource management-Minerals other than oil and gas				
(1) Federal lands		918		
(2) Indian lands		295		
(e) Resource evaluation-Mineral land classification				839
(f) Resource evaluation-Water resources				364
Totals, FY 1972	3,313	4,301	1,212	1,203

Revenues from Leased Mineral Lands

Land Category	1969		1970		1971[1/]		1972[2/]
	Royalties	Bonuses	Royalties	Bonuses	Royalties	Bonuses	Royalties
Outer Continental Shelf	$217,430,000	$194,621,000	$259,256,000	$66,908,000	$310,000,000	$943,000,000	$360,000,000
Federal Lands Onshore	102,029,000	754,000	105,408,000	705,000	108,000,000	700,000	110,000,000
Indian Lands	18,601,000	7,000,000	18,943,000	6,000,000	19,000,000	6,000,000	22,000,000
Total	338,060,000	202,375,000	383,607,000	73,613,000	437,000,000	949,700,000	492,000,000

1/ Royalties and bonuses estimated

2/ Royalties estimated, but no projection of bonuses

A. Mineral Lease Management

(1) Outer Continental Shelf: FY 1971, $3,041,000; FY 1972, $3,313,000; increase, $272,000. The increase consists of:

	Increase (+) or Decrease (-) Amount	Positions	Total Program	Total Positions	Explanation
(a)	$+292,000	+11	$3,313,000	130	To increase capability to analyze proposed development and inspect oil and gas operations on the OCS.
(b)	- 20,000	-	-	-	Program savings in public relations and paper work management.
	+272,000	+11			

Need for increase: The increase will permit 1) two inspections in FY 1972 of operations on an estimated 60 new multi-well producing platforms and one inspection of 100 more exploratory and production wells than were drilled in FY 1971, 2) structural design evaluation of proposed new oil or gas production platforms, and 3) the manning of the offshore radio communications network planned for full operation by the end of FY 1971.

Program of work: In FY 1972 there will be about 800 multi-well production platforms on the Outer Continental Shelf. Approximately 1150 new exploratory and development wells will be drilled. In addition there will be about 1000 other OCS facilities, such as single well structure and platforms for production handling only. The proposed program of work includes:

-- Analysis of geologic and engineering conditions prior to approval of proposed drilling and casing procedures and equipment for each of the 1150 new wells to assure adequate safeguards against blowouts and to assure safety and protection of the marine environment and other resources.

-- In the Gulf of Mexico there will be an average of one inspection of each new drilling well and one complete inspection of each multi-well production platform. In Santa Barbara Channel all drilling and producing operations in the Dos Cuadras Field (2 leases) will be inspected daily. In this connection one inspector is permanently assigned for one shift each day (8 hours average) to Sun Oil Company's Hillhouse platform and another inspector is similarly permanently assigned to Union Oil Company's lease where he alternates as required between Platforms A and B. All drilling operations elsewhere in the Channel will be inspected at least once each week. Producing operations there where drilling has been successfully completed will be inspected twice weekly. Surface pollution inspections of exposed water and land areas of the Channel will be made weekly by aircraft, boat traverse, and by "walking beaches" in areas where oil accumulation has been most extensive. Surface pollution inspections in the Gulf of Mexico will be made rarely except in those areas which are traversed in flying to and from and between day to day inspection targets.

-- Geologic and engineering analysis of approximately 3,000 lessee proposals such as well spacing, well workovers and recompletions,

unitization, and transportation allowances for royalty accounting purposes.

-- Maintenance of about 1,200 royalty production accounts, and 700 accounts relating only to minimum royalties or rentals, to account for more than $300 million in revenues. About 750 of these accounts will be audited in FY 1972.

Status of program: Production of oil on the OCS will have increased threefold in the seven year period 1966-1972. Natural gas production will have increased nearly fivefold in the same period. In 1969, OCS production was 313 million barrels of oil and 1.95 trillion cubic feet of natural gas - 10% and 11% respectively of that year's domestic production of these commodities. Accompanying this increased production has been proliferation of producing structures and transportation facilities which increase the potential for pollution. Public concern over pollution incidents, particularly over the Santa Barbara spill and the Chevron fire and spill, has required that increased program emphasis be focused on the safety and environmental aspects of OCS operations. This has necessarily resulted in increased funding and staff support for review of industry plans and inspection of activities in FY 1970 and FY 1971. The program increases here proposed for FY 1972 will provide for the additional workload from increased leasing and production. A systems study, provided for in the Amendment to the FY 1971 budget, is underway to assess and define the need for an intensified and/or modified management effort.

(2) Federal and Indian lands: FY 1971, $4,251,000; FY 1972, $4,301,000; increase, $50,000.

Need for increase: The increase will provide about 2-1/4 additional man years of analytical and inspectional capability to improve recovery, safety, environmental protection, and rehabilitation of coal mining operations, underground or surface, on Federal and Indian mineral leases. It will permit about 125 additional field examinations in connection with applications under the Department's surface mine reclamation regulations approved January 1969.

Program of work: About 12,000 lease inspections will be made on an estimated 11,800 oil and gas and 400 coal or other mining leases under Survey supervision in FY 1972. Geologic and engineering analyses will be made in the interests of assuring safety and control of pollution on more than 2,000 industry proposals to drill new oil and gas wells. About 1,000 of these new wells will be inspected while drilling is in progress.

Approximately 11,000 noncompetitive oil and gas lease applications will be reviewed to determine if the lands involved should more appropriately be leased competitively. An estimated 95,000 acres of Federal lands will be evaluated prior to being offered for competitive oil and gas, coal, or other mineral leasing.

Approximately 800 investigations and reports in response to coal and other mineral prospecting permit applications will be made to determine whether the deposits are subject to the prospecting or leasing provisions of the Mineral Leasing Act. About 600 prospecting operations will be inspected.

Approximately 950 applications will be received requiring examinations and reports under the surface mining regulations relative to recommending measures to control erosion, prevent water and air pollution, protect wildlife, and prevent hazards to the public. About 750 field examinations will be made in connection with these applications.

During 1972, 14,750 oil and gas, coal, and other mining royalty accounts will be maintained. About 3,000 of these will be audited.

Status of program: Oil production on Federal and Indian lands continues to increase at a modest rate of about 2% per year and should reach a total of about 260 million barrels in 1972. Natural gas production is increasing at a rate of about 7% and is expected to reach about 1,480 million cubic feet in the same year. The average production of other minerals remains relatively stable except for coal. Coal production increased 18% in FY 1970 and is expected to double to about 24 million tons by the end of FY 1972 due to the greatly increasing demand for coal for electric power generation. Much of the increased production will come from strip mining operations on Navajo Indian lands and from Federal coal lands in Wyoming and Montana.

While oil and gas and mineral production, except coal, are increasing slowly, the impact on workload continues to grow steadily. The number of producing oil and gas leases and accounts increases by about 300 to 400 per year. Secondary recovery operations are being employed in many oil fields. Mining operations are getting larger to take advantage of the economics of scale. These and other factors act to increase the analytical, inspectional, and accounting complexity and consequently the staff and funding requirements of the onshore lease management program.

A major impact on workload stems from the provisions of the Department's surface mine reclamation regulations. Added requirements of administration, geological and engineering data analysis, and operations inspections have been imposed with the increasing awareness of the relationship between the development of resources and the environment in which they occur.

B. Resource evaluation and classification

(1) Outer Continental Shelf: FY 1971, $1,113,000; FY 1972, $1,212,000; increase, $99,000. The increase consists of:

	Increase (+) or Decrease (-) Amount	Positions	Total Program	Total Positions	Explanation
(a)	$+108,000	1	$1,212,000	34	To acquire and interpret OCS geophysical data for pre-sale tract selection and resource evaluation and inventory.
(b)	- 9,000	-	-	-	Program savings in public relations and paper work management.
	+ 99,000	1			

Need for increase: The increase will permit the addition of one geophysicist for analysis and interpretation of geophysical data for pre-sale lease tract selection and evaluation. This is needed in addition to present staff in FY 1972 to provide more complete detailed analysis of geologic structures to calculate reserves in producing oil and gas fields and for improved estimates of the value of lease tracts offered for sale. It will also permit acquisition of about 1000 miles of selected detailed supplementary geophysical data necessary for making such calculations.

Program of work: A general OCS lease sale and two drainage sales are tentatively scheduled in FY 1972 in the Gulf of Mexico. Geologic and engineering data obtained from industry drilling on about 590 leased tracts in the Gulf of Mexico will be used in supervision of operations and to develop knowledge of the geologic structure and oil and gas reserves in adjacent and nearby unleased lands. Geophysical data must be obtained and interpreted for about 30,000 square miles to determine the fair market value of leases to be offered in the general sale and to

supplement available geologic and engineering data in evaluating the drainage tracts offered for sale. Both geologic and geophysical data will be used in analyzing the adequacy of safety, pollution control devices and procedures in operators' drilling proposals, and to calculate reserves and productive capacity of OCS fields as a basis for controlling oil and gas production rates.

Status of program: This program, initiated in FY 1968, utilizes drilling data obtained from exploration and development of leased areas which lessees are required under Federal regulations to furnish the Government. The pattern of OCS leasing has been such that data from areas already leased provides valuable information on the mineral character and value of adjacent unleased areas. In undeveloped (wildcat) areas the evaluation program must depend primarily on geophysical data generated within the Government or purchased from service companies, since deep penetration pre-lease exploratory drilling is not permitted on the OCS.

The Survey has made substantial progress in developing the operational capability to interpret exploratory geophysical data for estimating the value of oil and gas resources in undeveloped areas and to evaluate the safety of exploratory and development drilling proposals.

The proposed increase will provide adequate funds and staff to meet the projected program demands in FY 1972.

(2) Federal and Indian lands: FY 1971, $1,053,000; FY 1972, $1,203,000; increase, $150,000.

Need for increase: The increase will permit geologic mapping and analysis, and classification of 250,000 additional acres of Federal coal land in FY 1972.

Federal lands are expected to produce about 24 million tons of coal in FY 1972 compared to about 12 million in FY 1970. With increased demand especially for low sulphur coal, and industry's rapid acquisition of huge blocks of reserves, the Government needs rapidly to evaluate its western coal lands, which contain about 40 percent of total U. S. coal reserves, if it is to receive fair value for development of this resource.

Program of work: About 750,000 acres of Federal lands, consisting primarily of those containing coal, will be mapped geologically, including structural analysis and interpretation, supplemented with sampling and trenching when necessary. As result of this geologic mapping and work in progress by Federal, State and other agencies, about a million and a half acres of land withdrawn pending mineral classification or identified as prospectively valuable will be formally classified and, if withdrawn, recommended for restoration. Where appropriate, valuable rights to the leasable minerals will be retained in Government ownership.

Eighteen river basins or parts thereof in nine western states and Alaska will be investigated. These involve approximately 250,000 acres of public lands withdrawn or classified as waterpower or reservoir sites. Withdrawals and classifications will be removed from those Federal lands found in the light of current technology, energy economics, and land status to have little potential for the development of water resources. Continued emphasis will be directed toward identifying and classifying potential reservoir sites on or involving Federal lands, including those planned for pumped storage development, in order to preserve such sites from incompatible uses that would forestall efficient future water resource development.

About 7,700 individual reports on mineral values or potential damage to future water resource development involved in retention, disposal, and multiple land use cases will be made at the request of agencies responsible for management of Federal lands.

Status of program: Approximately 300 million acres of public lands by geologic inference are prospectively valuable for development of leasable minerals. A systematic detailed program to determine the mineral value of these lands and to classify them in order to assure the lawful retention or disposal of the valuable minerals in them has been planned and maintained at a very low program level since 1960. Since the program has never attained an adequate level of implementation, most of these prospectively valuable mineral lands have yet to be systematically inventoried and classified. In the absence of a systematic inventory of the leasable mineral resources, and since leasing and disposal are continuous activities on Federal lands, classification determinations must be made case-by-case in response to leasing and disposal applications. Responses to these cases must be kept current regardless of other workload. The proposed increase will add to the effort expendable in this program toward the systematic accumulation and analysis of the basic data needed for classification decisions of optimum reliability. Improved data will prevent the issuance of noncompetitive leases where competitive leases might have been issued in the absence of knowledge of all the facts and will result in financial gain to the public from increased rentals and bonuses. Improved classification determinations for land disposal will reduce the chance of unintentional disposal of valuable Federal mineral rights.

Reservoir sites for regulation, storage, and conservation of surface water are physically limited in number, and practical sites are becoming increasingly scarce due to the rapid expansion of water resource planning and development and to the encroachment of non-storage uses. The Geological Survey conducts a continuing evaluation and classification program to assure the availability of such sites to meet future needs, to identify, evaluate, and preserve Federal lands in them from disposal, and to control incompatible land uses that would forestall efficient river basin development.

Withdrawals and classifications made with limited map and streamflow data are being systematically reviewed as accurate maps, reliable streamflow data, and other information become available. This powersite and reservoir site review program was begun in 1956 and by the end of FY 1972 studies will have been made in more than 100 separate areas covering about 2.7 million acres of land classified or withdrawn for water resource development, leaving a total of about 4.3 million acres to be reviewed. At the current rate 17 years will be required to complete this review. Of the area reviewed to date, about 40 percent has been recommended for removal from withdrawals or classifications.

8. Earth Resources Observation Systems (EROS) Program

FY 1971, $1,911,000; FY 1972, $5,179,000; increase, $3,268,000. The increase consists of:

	Increase (+) or Decrease (-) Amount	Positions	Total Program	Total Positions	Explanation
(1)	$+3,300,000	+7	$5,179,000	30 a/	To conduct aircraft remote sensing and space data-use studies for a national inventory of resources and land.
(2)	- 20,000	-	-	-	Program savings in public relations
(3)	- 12,000	-	-	-	Program savings in paper work management
	+3,268,000	+7			

a/ The base of 23 positions reflects an administrative reallocation of the 1971 employment ceiling for the Geological Survey. This number, which has been determined to be the minimum necessary to carry out the current year program, is an increase of 11 over the positions identified in the 1971 budget justification.

Cost Factors Involved in Increase

(1) Salaries and benefits for 14 man years of permanent employment and 1.5 man years of intermittent employment @ $16,258, $252,000; transportation, office rental, communications, utilities, and services, $36,000; printing, reproduction, supplies and materials, $188,000; data center equipment, $1,300,000; ground data relay equipment, $50,000; contract services for high-altitude photography, airborne geophysical surveys, information systems development, and data applications, $1,474,000.

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	FY 1970 Amount Available	FY 1971 Amount Available	FY 1972 Estimate	Increase (+) or Decrease (-) 1972 Compared with 1971
(a) Data Applications and Benefits (ERTS-A Experiment) ----------				
Semi-structured experiments	$ 104,852	$ -	$ 250,000	$ + 250,000
Sioux Falls Data Center Design	-	300,000	100,000	- 200,000
Data Center Equipment	-	-	1,300,000	+1,300,000
Ground Data Relay Equipment	-	100,000	150,000	+ 50,000
(b) Applications Research ----------	577,857	900,000	1,500,000	+ 600,000
(c) New Systems Research ----------	14,019	200,000	200,000	
(d) Resources Inventory Information System Design ----------	-	-	250,000	+ 250,000
(e) Airborne Geophysical Surveys ---------	-	-	640,000	+ 640,000
(f) High-altitude Photography ----------	14,166	-	150,000	+ 150,000
(g) Program Management ----------	390,125	411,000	639,000	+ 228,000
Total ----------	1,101,019	1,911,000	5,179,000	3,268,000

Need for increase:

The proposed increase will 1) enhance the capability of the EROS Program to create a system for a national inventory of resources and the land by performance of data-use experiments to demonstrate the feasibility of cost-effective surveys from space; 2) provide for initiation of an EROS Data Center to distribute remote-sensing and resources information and data to a broad community of users including Federal, state, and local agencies, industry, and the general public; 3) provide for collection of airborne geophysical and high-altitude photographic data as a portion of the national inventory; and 4) permit initial development of resources information systems.

ERTS-A is scheduled for launch in FY 1972 and Skylab in late FY 1972 or early FY 1973. The proposed program increase is essential to a successful test of the utility of space data and will ensure that potential users can participate to the maximum extent possible so as to assure the identification and development of beneficial applications.

Program of work:

The proposed program for FY 1972 will include the following components:

a) Data Applications and Benefits, $1,800,000

Objective: To ensure that significant experiments are conducted with ERTS-A and Skylab data and the potential operational benefits are determined.

Description of work to be done:

Resource experiments involving the use of ERTS-A and Skylab data will be evaluated and selected. Data will be provided to experimenters whose interests and responsibilities coincide closely with Interior's. Facilities will be established to assure that the supply of data for experimentation is adequate for needs of the user community. Data interpretation, information extraction, and automatic processing will be provided to achieve the objectives of flexibility and adaptability of the system to meet user needs, and to achieve the timeliness of data service required to test management applications where this is a vital factor.

Equipment for duplication of data, and for the routine extraction of information from space data will be specified and procured in order to meet the data needs of experimenters and to provide timely information extraction for predictive modeling. A number of ground data collection platforms will be purchased in order to conduct data-relay experiments with the ERTS-A data collection system. These platforms will be located in strategic locations across the country to collect streamflow, water quality, volcanic, and earthquake data.

Training of data users will be an integral part of the experimental process, to prepare prospective data users to get the most from the data which will be available to them during the experiment. During the period of experimentation, it will provide a means of keeping experimenters and users "up to date" on advances in the state-of-the-art and experience of other experimenters.

b) Applications Research, $1,500,000.

Objective: To test, in operational resource and environmental mapping situations, the applicability of repetitive high-altitude aircraft and space data.

Description of work to be done:

Applications research provides the means by which potential uses of satellite and other remote sensing data can be identified, the most practical methodologies for use defined and tested, and the potential significance of applications evaluated. It is by this method that specific experimentation in the practical use of the data will be stimulated and experimentation advanced from a general exploration of possible data use to a well planned test of data application based on a meaningful appraisal of application practicality. In 1972, major areas of applications research would be in use of resource and environmental data in regional and urban planning, urban management, and education.

NASA and contract aircraft will collect repetitive scheduled remote sensing data of various types over large areas, selected as representative of important resource and environment situations. Interdisciplinary resource teams will analyze this and existing space data for its significant information content, synthesize "situation reports" in map, graphic, and statistical form, and attempt to predict the changes in the situations. Tests of the resource and environmental predictions will be made from succeeding flight data and ground control and the process iteratively repeated until the predictive confidence level is high enough for operational use.

c) New Systems Research, $200,000.

Objective: Develop new and improved remote sensing systems to 1) apply to the information acquisition, interpretation, and application needs of resources research and management operations; 2) improve and expedite the extraction of resources and environmental information from remote sensor data.

Description of work to be done:

Continue research toward development of data collection systems involving remote sensors not included in ERTS spacecraft. These include new systems such as the Fraunhofer Line Discriminator for measurement of concentration of water pollutants, and modification of existing systems such as microwave radiometers for measurement of snow properties important to water runoff.

Conduct research in remote-sensor data processing to improve extraction of significant problem-oriented information. This research includes development of techniques by which resources and environmental information may be automatically extracted from space images (in either photographic or computer-compatible form) or the images may be manipulated to make them more interpretable by a user. Equipment and techniques upon which continued development would be concentrated would be designed to accomplish automatic extraction of areas of natural and agricultural vegetation, clear and turbid water, and snow cover, and to detect changes in features between successive images.

The image processing research will lead directly to more user-oriented systems of data analysis and to effective applications by the user community.

d) Resources Inventory Information--System Design, $250,000.

Objective: Define the overall characteristics and organization of a resource information system.

Description of work to be done:

Studies will be undertaken aimed at specifying the organization, form, and content of the resource inventory, and determining the requirements of users for this information. Particular attention will be directed to determining the optimum use and priority applications of data coverage resulting from the spacecraft and aircraft systems to permit its early incorporation into the national resource information system. Based on these studies, the overall characteristics of the information system will be defined and design initiated.

The ultimate system will be an integrated, standardized and computerized data system so organized that resource data can be assembled on a national, regional, or local basis and synthesized for rapid response to land use inquiries and the need for management decision data.

e) Airborne Geophysical Surveys, $640,000.

Objective: Provide a framework of interpreted geophysical data.

Description of work to be done:

Airborne geophysical surveys are essential for a satisfactory inventory of the natural resources of the public lands. In particular, the everexpanding use of aeromagnetic surveys by federal, state, and industrial organizations clearly demonstrates the need for a national aeromagnetic survey of the United States. Aeromagnetic surveys provide at very low cost per unit area data for interpreting subsurface geologic conditions, for synthesizing the geologic framework of large regions, for mineral resource appraisal, and for administration of public lands. They are particularly valuable in inaccessible areas or where surficial deposits conceal the underlying geology. Authorities unanimously agree that aeromagnetic surveys over large areas of economic interest have paid for themselves many times over.

About 90,000 square miles of aeromagnetic coverage would be obtained in FY 1972. The basic program is to obtain data at a flight line space averaging one mile, but varying from 1/2 mile to two miles depending upon the geologic terrain. Under the proposed program, aeromagnetic data will be obtained mostly through contracts with commercial firms. We have an ongoing cooperative program of aeromagnetic surveying with the State of Alaska where the State has allotted $500,000 in FY 1971, which will require some matching federal funds in FY 1972. In the course of the program, the USGS would develop and test other airborne geophysical techniques including methods using VLF electromagnetic systems, gravimeters, scintillometers, and radar.

f) High-Altitude Photography, $150,000.

Objective: To supplement data available from conventional sources; and provide a working base for field surveys, repetitive satellite coverage, and special mapping.

Description of work to be done:

Negotiations are in progress to obtain high-altitude photographic coverage from available government-owned aircraft (U-2, RB-57, and others). These aircraft are capable of flying at altitudes of 50,000 feet and higher, and are equipped with high resolution photographic systems.

The photography to be obtained from these systems will be used in the land inventory system for the following purposes:

-- Provide an image base for thematic mapping and resources inventories.

-- Provide a permanent photographic record of the country to supplement the 1970 census.

-- Provide synoptic coverage for aerotriangulation to extend the basic horizontal control network and to provide control for mapping.

-- Provide an image base for revision of topographic maps.

-- Provide a means for preparing orthophoto-type maps to be used for terrain information and as a base for locating remote sensor data obtained from satellites.

FY 1972 funds would be used for photographic processing, indexing, cataloguing, and the preparation of orthophoto maps. (It is assumed the aircraft costs will not be charged against the Survey.)

g) Program Management, $639,000.

Objective: To coordinate the experimental space and aircraft program elements and to provide consistent organizational, administrative, and management support to all program elements.

Description of work to be done:

Provide program organization and support, including personnel and facilities; provide liaison with NASA Headquarters and the involved NASA centers; plan program content and priorities; select proposals for projects; develop program by defining and authorizing projects and contracts; evaluate program results by reviewing products of projects and contracts.

Status of program:

The EROS Program is Departmental in scope. All major Bureaus are actively participating in the current program to define and test uses of aircraft and spacecraft data. Contracts with universities and state agencies are also in force that are defining the potential market for remote-sensing data.

Studies have indicated a potential demand in excess of 20 million copies of ERTS-A data per year. The FY 1972 program will be designed to produce one million copies during the experimental phase. Sales of these reproductions can provide a return to the Government that could eventually result in the program of data dissemination becoming self supporting.

A site of approximately 320 acres, near Sioux Falls, South Dakota, has been donated to the Government, together with an offer to build a facility thereon under a lease-purchase plan. A contract has been negotiated with an architectural and engineering firm to design the facility.

NASA and the Department of the Interior have agreed in the past that funds transferred from NASA for space applications studies will decrease as Interior appropriations rise. NASA funds have decreased, and during FY 1971, the transfer funds were cut from $1.940 million to $1.514 million, a 22% decrease. (The former figure is shown in the Federal Budget because of the timing of the decrease.)

PREPARED STATEMENT

Mrs. HANSEN. Dr. Pecora please insert your general statement in the record, and summarize it for us.

Dr. PECORA. Madam Chairman, I would prefer to place the prepared statement into the record so that it may be recorded in toto.

(The statement follows:)

Madam Chairman, in my comments before this committee over the past several years, I have emphasized two related aspects of our work. First, the continuing national programs of investigations, research and mapping in topography, geology, water and conservation—the foundation of Survey's capability; and second, those programs in which we draw upon the basic knowledge and expertise accumulated through our programs to make an integrated evaluation of special problems, such as the proposed trans-Alaska pipeline or the Miami Jetport, or special techniques, as in our EROS Program.

In my remarks last year, I noted the inevitable tension arising between our growing resource needs and our continuing desire to maintain a high-quality environment. In connection with this circumstance, I advised you of the Department's interest and commitment to a more complete assessment of the Nation's resources and environment to provide the vital platform of knowledge which would permit us to assess our competing needs more intelligently.

During the past year the way in which Survey's unique capability may be marshaled to contribute to the Department's resource inventory objective has been more thoroughly evaluated.

During this time, we have seen numerous examples in which a careful weighing of resource and environmental concerns and objectives was absolutely essential in reaching sound decisions and making wise choices. One circumstance, the emerging energy problem, has been particularly illuminating. As you know, the demand for energy materials of all kinds is a dominant factor in the resource equation and an essential ingredient in the maintenance and growth of our Nation's economy. At the same time, problems of environmental impact occur in connection with extraction, processing, transportation, and consumption of energy materials and affect the land, the water, the air, vegetation, fish, and animals, as well as man.

We find, therefore, that we can no longer think in terms of single commodities, single regions, or single environmental concerns. A broader frame of reference is needed. Clearly our energy problems must be viewed in a more comprehensive way. Emission standards prompted by air quality concerns abruptly change our supply picture for coal and residual fuel oil and strongly influence the geologic provinces which are appropriate for exploration and development of needed additional supplies of "clean energy" materials. A decision with respect to development of the vast petroleum reserves of the Arctic North Slope has to be made with clear knowledge of the risk of environmental damage in Alaska. But we must also have the knowledge which permits us to evaluate alternative sources upon which we would have to depend if North Slope development is deferred.

Inevitably, we must look at this problem as one of a total system and clearly define the options available to us and the environmental effects associated with them.

These needs are perhaps more obvious with respect to the energy problem than to that of other resources simply by reason of its sheer magnitude. However, I am convinced that many of our other resource values must ultimately be viewed in a similar manner. Witness the growing demands for a comprehensive perspective and program with respect to land use and the mounting concern for the dwindling wetland resource along our Nation's coastlines.

I believe we must consider the evolving character of these problems in designing and proposing to the Congress the programs of Geological Survey. To me they indicate that we must commence promptly the design of an integrated program of investigations designed to meet the information needs so vividly demonstrated by the energy problem, but by no means limited to energy as a sole objective.

What should the characteristics of such a program be? It must be national in scale and comprehensive with respect to the resource and environmental factors considered; it must achieve an early broad assessment within which further detailed studies may be targeted and carried out; it will need to include systems to make the information readily available, maintain it in current status as develop-

ment and change occur; and means must be provided to facilitate use of the information to analyze alternative modes of land and resource use.

In our proposals this year the EROS (earth resources observation systems) program has been broadened in concept to facilitate the development of such a program. We have long recognized that the full benefits of satellite-based remote sensing required complementary aircraft systems and ground systems and that all should be employed as components of an integrated investigational program. This year our EROS program makes explicit provision for aircraft data acquisition programs. It also includes funds to respond to the more fundamental need—the definition of an integrated program of remote sensing activities, ground surveys, and an information system to receive, store and assist in the analysis of a comprehensive body of resource and environmental data. Such a program is essential to achieving the resource and environmental assessment which we will need to meet the problems of the future. I believe this is a very constructive direction in which to move and I hope the committee will agree that this resolve is in the best public interest. It requires, however, new funding, as indicated in the proposals before you, over and above internal readjustments that we have made.

And now let me briefly describe the highlights of our proposed program increases for the coming year.

URBAN PILOT AREA STUDIES

We are proposing an increase of $1 million to strengthen and expand studies in those regions chosen from the six planning investigations now under way in the Pittsburgh, Connecticut Valley, Puget Sound, Denver, Phoenix-Tucson, and Baltimore-Washington areas; to augment the San Francisco Bay area study; and possibly to initiate one or more preliminary planning studies in additional areas.

TOPOGRAPHIC MAPPING PROGRAM

We are requesting an increase of about $2.5 million, of which $800,000 is to carry out mapping in the Missouri River Basin previously funded by transfer. The remaining $1.7 million is to be used to accelerate the program of standard quadrangle mapping and to continue the development and operation of the National Cartographic Information Center.

GEOLOGIC AND MINERAL RESOURCE SURVEYS

Increases are proposed in this program, amounting to $600,000 to accelerate geologic investigations of land and mineral resources, mainly on the Federal lands; intensify investigations of earthquake hazards; and extend geologic reconnaissance investigations of our continental margins.

WATER RESOURCES INVESTIGATIONS

A $1.9 million increase is proposed for this program of which $800,000 is for water investigations in the Missouri River Basin previously funded by transfer. The balance of about $1.1 million will be used to meet additional Federal and State water data needs and to accelerate investigation of nationwide practices in the area of subsurface waste disposal.

CONSERVATION OF LANDS AND MINERALS

Program increases are proposed in the amount of $600,000 to enhance our capability to analyze proposed development of and inspect and supervise operations on mineral leases—principally oil and gas and coal—on the Outer Continental Shelf and on Federal and Indian coal-bearing lands; and to accelerate our program of evaluation, classification, and inventorying of the mineral resources—principally energy—of the Federal lands and Outer Continental Shelf.

EARTH RESOURCES OBSERVATION SYSTEMS (EROS) PROGRAM

In the EROS program we are requesting an increase of approximately $3.3 million. This will provide for the development of an EROS data center to process and disseminate resource and environmental data and derived resource information acquired by satellite and aircraft; and begin the initial design and development of a resources information system and the national inventory of land and resources.

Dr. PECORA. And if you would permit me just a minute or two to summarize what I think is the thesis of what we are attempting to do——

Mrs. HANSEN. We are delighted to have your comments.

DUAL CONCEPT OF TIME

Dr. PECORA. The Geological Survey functions on a dual concept of time. One is attention to immediate relevant problems of the Nation within the area of resources and management, and the other is a long-term effect where work that is going on continually can in time become short-term when those problems arise, and it is within this context of a dual effort on relevancy now and continuing information and data gathering for future uses cumulative in time upon which I think we base the entire mission of the Survey.

This has proved to be an extremely valuable thesis of operation because we have the pipeline problem before us, and have had for the past 2 years, and our knowledge on the pipeline environment has been gained over 2 decades of research work in the field. There are many other areas of interest of this kind where cumulative work and knowledge is used profusely throughout the Nation. Therefore, what I am emphasizing here is that I would hope that in our program for the Geological Survey we could continue to have this dual concept of time, immediacy, relevancy of problems, and background accumulation of data, information for general use for all people of the United States.

Thank you.

CHALLENGING PROBLEMS

Mrs. HANSEN. Dr. Pecora, you have had some very challenging problems for the past 8 years since I have been on this committee. You have had the problems of offshore oil development and the adequacy of inspections. Then you also have had a problem which I think is becoming more and more immediate, and that is earthquake monitoring, earthquake planning, and construction of our cities in earthquake zones.

SANTA BARBARA OIL SPILL

The committee had a discussion earlier in our hearings with the Bureau of Land Management on the Santa Barbara oil spill. The question arose about the necessity to reprogram funds from other activities to meet the cost of this oil spill.

Mr. Wyatt asked a question: "I am concerned really about the methodology in the Department. It may be better with the Geological Survey to bring it up but I don't want to have this question slip between the cracks in the floor. Does the Department have flexibility enough, without coming in with a supplemental appropriations bill, and without coming in for reprograming authority, to find $322,000 for what emergency purpose it may be? If so, I would like to know what the extent of that flexibility is."

Then I said: "I think you have to ask the Geological Survey that question."

And Mr. Loesch replied: "Yes, you would have to ask them on that."

Several years ago this committee asked you at that time if the Federal Government had sufficient funding to provide the same

knowledge that was available to private industry, and I believe your reply at that time was that it did not.

Dr. PECORA. That is correct, Madam Chairman.

Mrs. HANSEN. The committee felt at that time this was a mistake on the part of the Federal Government not to provide adequate funding to the leasing agency, to acquire all the information that is necessary. You will well recall you got into the difficulty of not having adequate offshore inspections and inspectors not only for the California coast but also in the Gulf of Mexico. This committee added funds to provide for additional inspections and inspectors.

So the committee would like to hear a summation of where you are in this matter and whether it is going to be the advice of your agency for further leasing.

As you are well aware, the conservationists are deeply disturbed about the consequences of these oil spills in the Santa Barbara channel and in other areas of the Pacific coast.

Dr. PECORA. Yes, indeed, Madam Chairman. The problems as you have presented them in the offshore areas can be broken down into two parts. One is procedural and the other is responsiveness to situations that develop.

In our procedures we have in the Conservation Division of the Geological Survey two categories of operations. One is information gathering and the other is supervision of the actual leases.

ROLE OF BUREAU OF LAND MANAGEMENT

Now, the offering of an area for leasing is handled by a sister bureau in the Department, the Bureau of Land Management; 95 percent or at least 90 percent of the information that is needed by the Bureau of Land Management for decisionmaking in offering leases to the public is derived from this informational analysis of the Geological Survey.

Mrs. HANSEN. Where else do they secure information from?

Dr. PECORA. Basically, the Bureau of Land Management can only add on to this technical information an economic analysis that it may make within its own bureau.

Mrs. HANSEN. Will the Bureau of Land Management go to some other agency in your Department for additional information?

Dr. PECORA. On occasions where land problems arise, the Bureau of Land Management may go to the Bureau of Mines for some information on experimental recovery conditions, but we normally work in the Geological Survey with the Bureau of Mines to present a master informational document to the Bureau of Land Management. The Bureau of Land Management then will conduct a lease sale and establish leasing procedures. After the lease contracts are issued by the Bureau of Land Management these contracts are turned over to the Geological Survey for supervision and management.

So we have a full cycle of supplying basic information on mineral evaluation to the Bureau of Land Management for their action as a landlord and then subsequently as the agent for the landlord to supervise and manage the leases for mineral development on the public lands.

We do the same thing for the Bureau of Indian Affairs for Indian lands. We provide basic information and then after leases are issued we supervise the mineral development for the Department.

EXTENT OF OUTER CONTINENTAL SHELF

Mrs. HANSEN. What is the size of the offshore area that you are talking about?

Dr. PECORA. The area of the Outer Continental Shelf can vary by different definitions. By one definition, one which is normally in the public mind, the Continental Shelf extends to a depth of 200 meters, or a bit more than 100 fathoms or 600 feet. This area off the coast of the United States measures about 804,000 square miles. Multiplied by 640 acres per square mile, it is approximately 514 million acres.

Mrs. HANSEN. This is more than the total of the land area managed by the BLM.

Dr. PECORA. That is a good point. The OCS is about equivalent in area to the public lands on land. Comparison of these two blocks of ground to what is private land gives us a relationship that is very interesting.

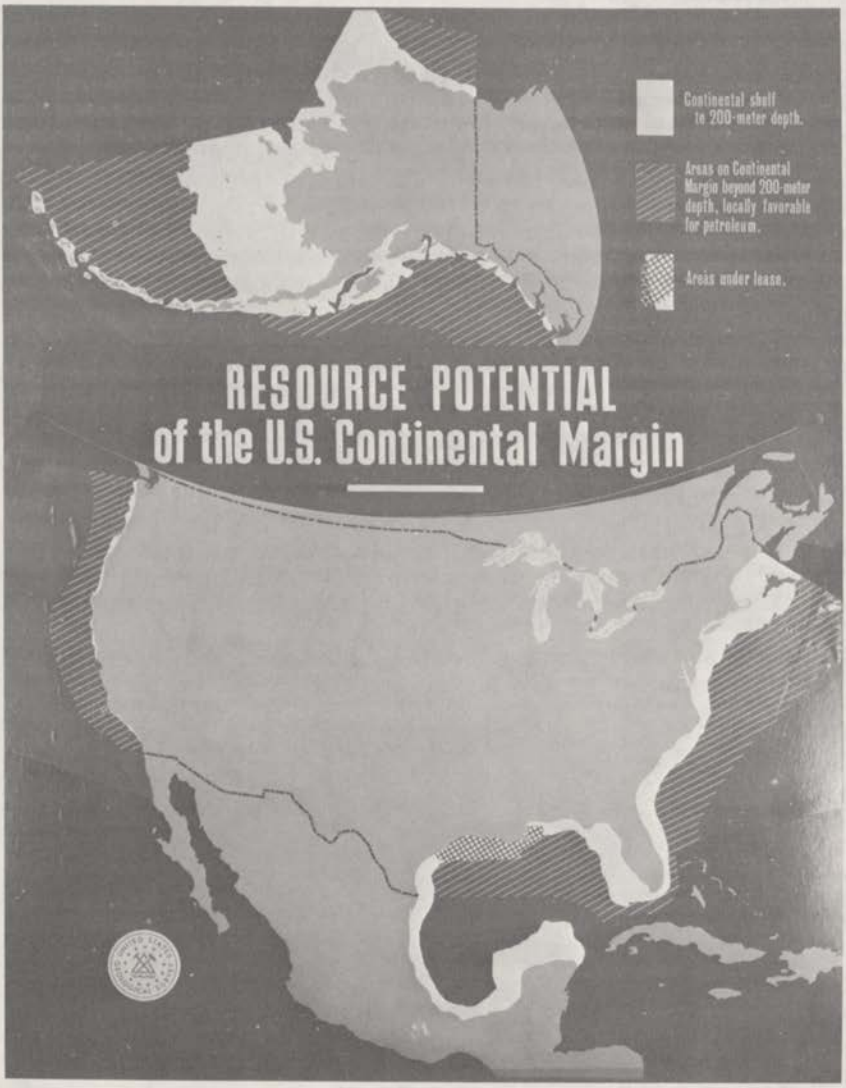
One-half of the total jurisdictional area of the United States available for mineral development is in the public domain. One-quarter is offshore, one-quarter is on land, and the other half is in State or private hands for the total mineral jurisdiction of the United States.

Mr. YATES. Madam Chairman, is there a chart that he has possibly which would show us the location of the Continental Shelf?

Dr. PECORA. The Senate has published a document just recently which has a chart to show the distribution of the Continental Shelf (report by the Special Subcommittee on Outer Continental Shelf, to the Committee on Interior and Insular Affairs, Committee print, 1971).

Mrs. HANSEN. Please insert that chart in the record.

(The chart follows:)


Continental shelf to 200-meter depth.
Areas on Continental Margin beyond 200-meter depth, locally favorable for petroleum.
Areas under lease.
RESOURCE POTENTIAL
of the U.S. Continental Margin

Dr. PECORA. This white area, which, on the map on the wall, borders the continental portion is essentially what we call the Continental Shelf. It is variable in width in different parts of the country. Off the west coast it is rather narrow. Off the east coast it is a little broader. Off eastern Canada it is very wide. The largest part of our Continental Shelf is off Alaska. About two-thirds of the U.S. Continental Shelf rests off the shore of Alaska.

EXPLORATION OF CONTINENTAL SHELF

Mrs. HANSEN. Dr. Pecora, how much of the Outer Continental Shelf has been explored by your Bureau, so that you know precisely what the resources are?

Dr. PECORA. That is a very good question because it will show how we go about getting our information. We rely first on the Geologic Division in our marine offshore studies program to make the broad reconnaissance studies of the offshore area to acquire geologic information in a third dimension and to make interpretive extrapolations from land to the offshore area, so that we can get some kind of a view as to what the Continental Shelf is composed of in three dimensions.

This information is made available to the Conservation Division which is a sister division within the Geological Survey. This Division will then make detailed studies of particular areas where there might be higher prospective value for exploration or greater potential for discovery. In other words, it is zeroing in on the hotter areas for mineral development.

This leads me to give you a rule of thumb which we normally have referred to, perhaps before this committee as well. In the broad area of the Continental Shelf, looked at systematically, it might be expected that 80 percent of the total oil and gas will eventually come out of about 20 percent of the area, and that within this 20 percent of the area containing major oil and gas fields perhaps 90 percent of production will come out of 10 or 20 percent of the area. We are looking for the big plums and the small plums and the raisins in the Continental Shelf.

This can only be done by a systematic study program, reconnaissance and detail, which we are really just beginning. We are far behind in this area.

Mrs. HANSEN. Can you indicate what proportion of the Outer Continental Shelf you have investigated to date?

LACK OF ADEQUATE INFORMATION

Dr. PECORA. Yes. Now, I would say that considering the primary investigation of the Geologic Division and the followup investigation of the Conservation Division, we have adequate information in about 1 percent of the total area of the Continental Shelf, just about 1 percent. This is mainly in the Gulf of Mexico.

Mrs. HANSEN. Why is that?

Dr. PECORA. Partly because our own research information gathering system has been rather slow and methodical because of the absence of funding, and partly because the companies themselves have sought to develop the first areas that were put up for leasing. In the development of these areas information acquired by the companies after

leasing is placed in the files of the Geological Survey. We have a standing regulation.

Mrs. HANSEN. But it is that time prior to leasing, Dr. Pecora, that this committee has been concerned about.

The committee has felt through the years that you were entitled to the same kind of information that private industry was entitled to.

Dr. PECORA. This committee has, rightly, supported the point of view that if we are to be guardians of our public lands to protect the public interest, and, second, if we are to encourage exploration and development for the national economy for economic security of the Nation, we should have a well-developed program to indicate which areas should be sought after first for maximum success in the program of exploration and discovery. We feel, of course, that in the area of pre-lease knowledge, that is, before the leases are issued by BLM, we had been in earlier years sadly deficient in information and had to rely on the competitive interests of the private companies for selection of the lease areas for exploration and development. Over the past few years through the strong action of this committee we have been given funds, and I must say through the support of the Bureau of the Budget at that time, now the Office of Management and Budget.

PRELEASING INFORMATION BEING ACQUIRED

Through this combined action the Department, through the Geological Survey, has been able to acquire more preleasing information so that we could then recommend to the Bureau of Land Management those lease areas which might be more productive because they had higher potential. The best proof of this, Madam Chairman, is in the last sale, December of last year, West Louisiana, where 116 leases brought into the Federal Treasury more than $845 million. In other words, industry felt that the leases we were offering had a great potential for success.

Now, in the past in the absence of this kind of information we had to put out leases where our information was lacking and some of these leases had no bids or just one bid.

Mrs. HANSEN. It is better for the economy, the U.S. Treasury, and for safety of the leasing procedures to have adequate information.

Dr. PECORA. Exactly.

In addition to a better use of funds on a national basis. To put it succinctly, if you are going to put your effort in dollars and time into any activity, you like to maximize the potential for success, and this is what having this additional information in the hands of the Geological Survey has made it possible for us to do. I believe that the funds—they are modest—allotted to us to acquire information before leasing have helped the position of the United States in identifying areas that have higher potential. That is the first part of the story.

INFORMATION FROM COMPANIES IS CONFIDENTIAL

The second part of the story is that after these leases are acquired by the companies they must by law provide all of their information to the Geological Survey. It is held in confidence. It is proprietary information. The Public Information Act forbids the Geological Survey to disclose this information elsewhere. It is a lessor-lessee relationship, and in this area this committee may recognize that we are being

clobbered by the public because we do not disclose this proprietary information which by law we must not do, and we have been criticized for not making this kind of information available to the public. It is not ours to do under the law. Nevertheless as lessor we have all of this downhole information that the company develops during the exploration and drilling of the leases it has acquired from the Government.

REASONS FOR SECRECY

Mrs. HANSEN. I think it would be well for you to give the committee the reasoning for this part of the law.

Dr. PECORA. The law specifically states in this area that geological and geophysical information acquired from these private companies must not be disclosed. There is a strong competitive position among the companies. Quite frankly, I find that the competition that exists among the oil companies is very intense. They would like to know, of course, what their neighbors are doing, and they have scouts attempting to find this out. It seems to me that the U.S. Government should not be the agent for distributing private and confidential information to the public at large which it has acquired under law for a specific relationship in management and supervision.

Mr. YATES. Madam Chairman, what is the nature of the information that is forbidden?

Mrs. HANSEN. Dr. Pecora.

Dr. PECORA. Yes; the downhole drilling information would indicate the depth and character of the producing horizon, the size of the reservoir, the character of the oil-gas ratios, etc., so that the position of the company on its lease then would be made public so that others may have information in which this company invested for its own competitive position. This is geophysical, engineering, and geological downhole information, the three dimensional information.

Mr. YATES. May I ask a question,Madam Chairman?

Mrs. HANSEN. Yes.

Mr. YATES. How is the public to know whether the lease is a good one for the Government unless it has information of this kind?

Dr. PECORA. The public does know this through the agency of the public, which is the Department of the Interior as an instrument for the people. We are, in our view, looking at this information in the best public interest.

Mr. YATES. This is confidential information known only to your agency?

Dr. PECORA. That is right, sir.

Mr. GALIFIANAKIS. May I ask a question?

Mrs. HANSEN. Yes.

Mr. GALIFIANAKIS. Where do you store the information?

Dr. PECORA. It is stored in locked security file rooms in our regional offices. The regional office, for example, in the Gulf of Mexico is in New Orleans. There are district offices at several points throughout the Gulf of Mexico and these are under tight security.

USES MADE OF CONFIDENTIAL DATA

Mr. GALIFIANAKIS. Is the information usable to you for scientific purposes?

Dr. PECORA. The information is available to us for analysis, for rendering judgments on requests from the lessee, on making decisions governing safety factors, and on making judgments concerning extrapolation of our knowledge to unleased areas, and this is the most valuable part of it from our point of view.

Mr. GALIFIANAKIS. That knowledge shouldn't be proprietary, however. The analysis that you make from the information that they have is not proprietary.

Dr. PECORA. The generalized knowledge we have of a broad province we publish because it is based on systematic use of information without disclosing individual sources.

Mr. GALIFIANAKIS. I think that is important. That is valuable to you.

Dr. PECORA. I think that type of disclosure would be, of course, in the public domain, but if one is to consider a block of ground, let's say, that has not yet been offered but it is adjoining a producing lease, by our analysis we can determine what we believe to be the minimum value that we think that adjoining lease should bring, considering its potential reserves.

When that lease is offered for public sale obviously the company that has the adjoining lease will have the advantage in estimating what the unleased area might be worth, but this is information it has acquired by purchasing the rights for its own lease, and drilling for its own information on its own lease. Under the law it is not our prerogative to publish this private information about the adjoining lease, but we know whether or not to recommend that the bids being offered for an adjoining lease are fair bids in the public eye.

Mr. WYATT. Madam Chairman?

Mrs. HANSEN. Yes.

Mr. WYATT. Dr. Pecora, just theorize for a minute with me. If this information were known generally to everybody, assuming you don't have the law which I certainly recognize we do have, if this information were open and available to everyone, would it be any additional protection against spills and leaks?

Dr. PECORA. I don't think so, Mr. Congressman. I think we will get into the spills and leaks and safety and drilling as a separate matter. It would seem to me that the primary value of this information is in trying to estimate the potential reserves in these reservoirs so that one could evaluate the production rate, the rate of economic return on investment, and the position the company would have in future reserves to supply its own refineries and its own public distribution system. This is where the strong competition is among the oil companies, the relative position of a company in its reserves.

ADVANTAGES OF SUCCESSFUL DRILLER

Mr. WYATT. Doesn't the law tend to give the ones who have successfully drilled an inside position or a better position in relation to the adjacent lands?

Dr. PECORA. Without question, I think this is true, and I would say this is a practical rather than a theoretical discussion here. If a lessee acquires a wildcat lease and finds through its drilling that it contains a producing reservoir which extends beyond one side or another of its lease, it obviously has preferential information which it

has acquired by its own investment to extrapolate to an adjoining lease. There is no question about this. This is a fact.

However, through seismic exploration in the general area, other companies would recognize that a seismic structure existed before it was drilled. After drilling shows it to be a producer, this information would lead competitors to understand that the structure is producing and that it is extensive.

Second, it would lead them to recognize that if they were going to bid on that structure they are going to have to outbid the lessee who has more downhole information. This is why I mentioned earlier that there is a very strong scouting movement among companies to try to get as much information as they can. I don't think that under the law it would be proper for the Geological Survey to divulge this information because it has acquired the information in a lessor-lessee relationship. The law must be changed in order to allow us to divulge the information.

Mrs. HANSEN. Do you believe the law should be changed?

Dr. PECORA. I do not personally believe so, as one who has worked with this problem for a number of years. I believe that, in the free enterprise system, one who has on a competitive basis won the right to drill in a given area has the right to keep that information rather than distributing that information to his competitors. If by law he must divulge that information to the representative of the public, in this case the Department of the Interior, it is done on a protective relationship.

Mrs. HANSEN. This is akin to the purchasing policy within the National Forests.

Dr. PECORA. With one exception. I don't know what the timber royalty is, but every sixth barrel of oil belongs to the people of the United States on the OCS.

CHECKS ON ACTIONS OF GEOLOGICAL SURVEY

Mr. YATES. Madam Chairman, may I just follow up? I am a little disturbed. Everything I hear about Dr. Pecora is he is a fine public servant.

Mrs. HANSEN. He is one of the most capable men in government.

Mr. YATES. Right. This is the reputation that he has. The question I want to know is, does the GAO, for example, oversee your operations to see whether or not the leases that you entered into are really in the best interests of the Government?

Dr. PECORA. Your question has two parts, if I may take it apart.

Mr. YATES. Surely.

Dr. PECORA. First, the General Accounting Office does in fact frequently have inspection teams to check into the production records, our accounting system, the recording system, and the deposits of receipts so that the entire action is then reviewed as a proper action with a proper accounting procedure.

The second part of your question on the nature of checking up on the leases themselves concerns the obligation that has been put on a Government bureau to manage these leases in the best public interest—how does one define public interest, maximum safety, maximum conservation, and maximum attention to all of the proprieties that should take place on a given lease.

Mr. YATES. Isn't this true of any public servant who enters into leases with private industry? He has that same obligation whether it is to make an aircraft, whether it is to build a tank, whether it is to do something else. GAO still has the function of determining whether he has made a mistake or exercised his judgment properly.

SUPERVISORY RELATIONSHIPS

Dr. PECORA. I, of course, must report to people above me just as the staff reports to me. The Regional Oil and Gas Supervisor, to whom we delegate a great deal of authority in the actual management of each lease and the operations on the lease, reports to his chief in headquarters, Washington, D.C., who reports to his chief, who is Chief of the Conservation Division, Dr. Wayland, who reports to the Director of the Geological Survey, who reports to the Assistant Secretary for Mineral Resources, who reports to the Secretary.

Mr. YATES. But all this is confidential, is it not?

Dr. PECORA. On proprietary information it is confidential. It is internal. But on matters of general public information it is not confidential. We have published a lot of information of a general nature which would assist the public in evaluating circumstances.

AUDITS BY GENERAL ACCOUNTING OFFICE

Mr. YATES. Is there any way the public might know whether there is favoritism between you and some oil company?

Dr. PECORA. I imagine the public could suspect this, as they might in any operation.

Mr. YATES. But they have no way of knowing?

Dr. PECORA. But the General Accounting Office can make its own inspections. The executive department also has its own procedures to determine this within the Department of the Interior.

Mr. YATES. It is solely within the Department of the Interior, then, that this takes place?

Dr. PECORA. I would say that both in the executive and legislative departments of the Government there are checks and balances—yes, on both sides.

Mr. YATES. We don't get the information relating to the proprietary aspects or information which would permit the legislative branch to know whether or not the oil leases which you have entered into are better or worse than oil leases which private companies make—with the Shah of Iran, for example, or with other owners of land which is being drilled.

Dr. PECORA. I would say, Mr. Congressman, that within the restrictions of the Outer Continental Shelf Lands Act this is a pretty open state of affairs, that the leases are offered on a competitive basis. There is no favoritism to one or another. It goes to the highest bidder; and if the bid is high enough and it is the highest of all of those received, who else should acquire the lease but the highest bidder? This of course, is defined by the Outer Continental Shelf Lands Act. The amount of royalty is likewise defined. The size of the lease is likewise defined by the act.

Mrs. HANSEN. Isn't it true, Dr. Pecora, that if changes are to be made in the procedure they must be made by the legislative committees?

Dr. PECORA. This would be my thought, Mr. Yates, in response to your question, that under the action of the law we are providing the kind of management which we consider to be under the terms of the law in the best public interest. If the law is changed, we will change our procedures. It is a very simple matter as far as I am concerned. I must be frank with you.

When I was in Santa Barbara in December and gave them a great deal of information, which they claim they had not had before, although I claim they had, I was accused of being in bed with the oil companies because we permitted leasing production, development, and drilling in the channel, which under the law was provided for; and I claim that I was in bed with the law and not in bed with anybody but the law.

Mr. YATES. Do you remember what Justice Holmes said? "The law is a jealous mistress."

Dr. PECORA. I should make the sequence complete because I have also been accused, quite frankly, by a number of oil company people of being in bed with the conservation movement because I have held up the TAPS pipeline. I can't be in bed with too many people at the same time.

SYSTEM OF CHECKS AND BALANCES

Mrs. HANSEN. Every time a Secretary of Interior is appointed by a President, the Secretary goes before the Senate for a review of all of his philosophy and his background. The Congress at the same time has the right of review and the right to change all laws, and the execution of the various laws is by the Constitution itself given to the executive branch. Is this not correct?

Dr. PECORA. That is the way I read it.

Mrs. HANSEN. This committee has the opportunity to question the wisdom of your funding, but the legislative committee has under its jurisdiction the ability to change laws.

Mr. DOLE. Madam Chairman, I wish to thank you very much for that remark because this is very true. The Department of the Interior through the Geological Survey carries out the laws that are passed by Congress. I think that the record speaks well for itself on the number of leases that have been bid on, the number of different companies that have obtained various leases, some leases abutting one another. The matter of proprietary information I think is what bothers the Congressman the most.

Mr. YATES. This Congressman, yes.

Mr. DOLE. And in that regard this proprietary information is information developed by the companies themselves at their own expenditure in order that they may be in a position in which to bid on a piece of land, and the bid is thrown open to anyone who wants to attend.

Mrs. HANSEN. Where are your bids advertised?

Mr. DOLE. In the Federal Register.

Mrs. HANSEN. How long are the bids advertised before the bidding?

Mr. DOLE. Do you wish to go through that, Bill?

Dr. PECORA. This is the procedure of the Bureau of Land Management in that an announcement is made of an area. A call for nominations is the first action, as to which lease areas or lease blocks in a predetermined map would be of interest. Ninety days are then permitted for the companies to develop their own information so

that they may be prepared to bid. Since the passage of the National Environmental Policy Act of 1969, the Department goes through the procedure of an environmental impact statement, draft, and final, with hearings on all of the major wildcat sales that are taking place, which were not done prior to the passage of that act.

There are, as usual, a number of days for comments and for final draft of the report before the public sale is made. At the public sale which is held under the auspices of the Regional Manager of the Bureau of Land Management these sealed bids are opened and evaluated jointly by the Bureau of Land Management and Geological Survey representatives. Decisions are then rendered by the Bureau of Land Management as to whether or not the lease will be consummated.

So the whole procedure is one of detail and well recognized by the public to be completely open in the competitive system. Excuse me, Mr. Secretary.

Mr. DOLE. And I would like to add that under the law that is set up by the Congress and the rules and regulations carried out by the Department of the Interior, that if there is ever at any time any indication of wrongdoing or for information purposes the Congress has the opportunity for oversight hearings, and we have those frequently and, in my opinion——

Mrs. HANSEN. This is the legislative committees?

Mr. DOLE. This is right. So in my opinion we have a series of checks and balances on the whole procedure that does give a fair return to the people and we also have an orderly development of the resource with due regard for the environment.

Mrs. HANSEN. Thank you. Mr. Obey?

EXPENDITURES FOR PRE-LEASE EXPLORATION

Mr. OBEY. Madam Chairman, I would like to get back to what was being discussed before we got onto this, the question of the adequacy of the information available to the Government before the leases are granted. Could you just give me some idea of how much you would be spending as opposed to how much any individual company would be spending to investigate a particular piece of land before it is put up for lease?

Dr. PECORA. The annual budget in the Geologic Division for offshore reconnaissance information is $1,510,000. The amount of money being expended by the Conservation Division for its mineral evaluation on the Outer Continental Shelf at the present time is $1,212,000. We are requesting in this budget a slight increase from last year when it was $1.1 million, so basically in this area about $2.7 million will have been expended this year by joint operations within the Geological Survey. A private company, one of the moderate to large companies, would expend in the same general area many millions of dollars not only for the acquisition of seismic information over a broad area of the shelf but for the computerization of this information. I would imagine that a major company would probably spend 10 to 20 times more money getting this pre-lease information than the Geological Survey can spend.

Mrs. HANSEN. This is where this committee has criticized the Office of Management and Budget, for not providing a comparable sum for the Geological Survey.

OPTIMUM BUDGET FOR PRELEASE INFORMATION

Mr. OBEY. May I ask what, budget limitations aside, would you need in order to be able to compete with these people on an even-stephen basis?

Dr. PECORA. I would have to speculate on this in a general way. We have done a lot of thinking as to what should be a proper budget for the geologic information of the Continental Shelf and prelease information that we would need. We have been thinking in terms of the geological program offshore of being in the order of $5 million to $10 million a year and of the prelease spearhead information of the conservation division to be in the order of $3 million to $5 million a year. The total program in its broadest aspects would require $10 million to $20 million a year in order to make us feel that we are actually acquiring the kinds of information that would make us comfortable in recognizing what we are dealing with before the fact of leasing.

As it is, in the last few years through the action of this committee, as I mentioned earlier, we had our budget upgraded from a miserably small amount to an amount now that at least gives us a toehold in the areas prior to leasing. This is a very important evolution in the development of our budget.

It seems to me that the whole ocean program of the U.S. Government needs to acquire a lot of information on the Outer Continental Shelf because the future resource development in the area of petroleum and natural gas is outward from the shore. After 100 years of exploration and production on land the rate of acceleration of new discoveries on land is flattening out. As a matter of fact, the amount of drilling and successes in drilling are falling down on land. We must move to the Outer Continental Shelf if it is a high policy decision of this Government that we need petroleum and gas in the near future for economic or national security, and that we want to develop it within our own controls. If those decisions are forthcoming, inevitably the direction has to be toward the Outer Continental Shelf

NEW SOURCES OF ENERGY MUST BE FOUND

Mrs. HANSEN. Dr. Pecora, this committee has tried to schedule the energy hearings together so that by reviewing the Bureau of Mines, the Office of Oil and Gas, and the Geological Survey, we would have a pretty complete picture of our needs. I think by this time we have a picture that shows if the United States is going to have an adequate supply of energy, and if it decides that it wants to maintain a reasonable standard of living in this hemisphere it has got to find additional sources of energy. Mr. Wyatt, what is the estimate that it will take to produce the power needed to replace the energy now produced by the Hanford reactor?

Mr. WYATT. The estimate is that it will take 8 million barrels of oil in southern California in addition to what they already burn to produce the power that we are going to need to replace the nuclear energy produced now by Hanford.

Mrs. HANSEN. Since this reactor has been phased out in the State of Washington, it seemed to us that each agency charged with the responsibility in this field has an obligation, and rather quickly, to find solutions to these problems.

The imports of oil are fine as long as international conditions are keyed to the free flow of oil, but I think you are well aware of the problems we have around the world at various times and certainly the price of that oil is going up and the consumer is going to pay an ever-increasing price for oil.

At the same time you are faced with the conservationist who says there must be no more offshore oil development, no development of the Arctic area, and no more shipment of oil by tanker. So you are faced with a series of dilemmas. This committee wants to provide the kind of funds that will enable you to do the best job possible. That is why we have been inquisitive over the years.

Dr. PECORA. I appreciate your comments, Madam Chairman, because I think you have your finger on the jugular vein of the situation. My predecessor, Dr. Nolan, advised this committee on a number of occasions, and I since 1965 have been advising this committee that we were approaching within the next decade a very serious situation with respect to the energy supply for the United States, and that if it were a high-level policy decision of the Government that energy should remain an important ingredient in the national economy and security, we had better get about the business of finding new sources of supply. These predictions are coming true because we now calculate that by 1973, if not 1972, the United States will have used up its surplus productive capacity so that it will no longer be able to fill the gap of increasing demand. It must seek this oil and gas from other sources.

If the earth itself, if the planet, were composed of one civilization, one planetary society, instead of 125 different national societies, which are nations, I don't think we would have the problem as we have it now because we could determine what parts of the world would produce certain minerals or oil and become the providers of minerals and energy and what parts of the world would provide the food.

But this is an idealized utopian view of what the earth should be instead of what it is. And in the concept of what we are dealing with in this country, the Geological Survey has been continually advising the executive and legislative parts of this Government that if energy is to remain a key ingredient in our economic and national security we had better get about the business of finding out where these energy resources shall be coming from in the future.

NUMBER OF COMPANIES OPERATING ON FEDERAL LANDS

Mr. OBEY. If I may just follow up my last question with another, I think that a logical conclusion to be drawn from your statement about the millions of dollars needed by these companies to get adequate information would be that it would be very difficult for small companies to bring in enough resources to compete with your large ones. In light of that fact I wonder if you could just give the committee an idea of how many different companies hold leases on Federal lands and if you could supply for the record a list of those companies?

Dr. PECORA. We would be happy to supply a detailed list for the record.

(The information follows:)

LESSEES OF RECORD OF OCS LANDS IN THE GULF OF MEXICO ON MARCH 25, 1971

1. Acasa Investment Co.
2. Ada Oil Co.
3. Allied Chemical Corp.
4. Amerada Hess Corp.
5. American Natural Gas Production Co.
6. American Petrofina Exlorlation Co.
7. Amoco Production Co.
8. Anadarko Production Co.
9. Apache Corp.
10. Apache Oil Corp.
11. Aquitaine Oil Corp.
12. Ashland Oil, Inc.
13. Atlantic Richfield Co.
14. Aztec Oil & Gas Co.
15. H. W. Bass & Sons, Inc.
16. Bass, Perry R. (individual).
17. Bell Oil and Gas Co.
18. Burmah Oil Development, Inc.
19. Burmah Oil Exploration, Inc.
20. Buttes Gas & Oil Co.
21. C & K Petroleum, Inc.
22. Cabot Corp.
23. Canadian Superior Oil (U.S.) Ltd.
24. Case-Pomeroy Oil Corp.
25. Chambers & Kennedy Prop., Ltd.
26. Champlin Petroleum Co.
27. Chevron Oil Co.
28. Cities Service Oil Co.
29. Clark Oil Producing Co.
30. Coastal Production Co.
31. Coastal States Gas Production Co.
32. Colorado Oil and Gas Corp.
33. Columbia Gas Development Corp.
34. Consolidated Gas Supply Corp.
35. Continental Oil Co.
36. Cox, John L. (individual)
37. Crown Central Petroleum Corp.
38. Diamond Shamrock Corp.
39. Dixilyn Corp.
40. Dorrance, Jr., John T. (individual)
41. The Dow Chemical Co.
42. Durecorp, Inc.
43. El Paso Natural Gas Co.
44. Essex Offshore Inc.
45. Exchange Oil & Gas Corp.
46. Felmont Oil Corp.
47. Fluor Corp.
48. Forest Oil Corp.
49. Freeport Sulphur Co.
50. General American Oil Co. of Texas
51. General Crude Oil Co.
52. Getty Oil Co.
53. Gulf Oil Corp.
54. Hamilton Brothers Oil Co.
55. Hamilton Brothers Petr. Corp.
56. Hanna Mining Co.
57. Harbert Construction Corp.
58. Highland Resources, Inc.
59. J. K. Huber Corp.
60. Humble Oil & Refining Co.
61. Hunt Industries
62. Hunt Oil Co.
63. Hunt Petroleum Corp.
64. Hassie Hunt Trust
65. Jenney Manufacturing Co.
66. Kerr-McGee Corp.
67. Kewanee Oil Co.
68. Kirby Petroleum Co.
69. Lone Star Producing Co.
70. The La. Land & Exploration Co.
71. Marathon Oil Co.
72. Mesa Petroleum Co.
73. Midwest Oil Corp.
74. Mitchell & Mitchell Gas & Oil Corp.
75. Mobil Oil Corp.
76. Moncrief, W. A. (individual)
77. Monsanto Co.
78. Murphy Oil Corp.
79. Natural Gas & Oil Corp.
80. Newmont Oil Co.
81. Occidental Petroleum Corp.
82. Ocean Drilling & Exploration Co.
83. ODECO One Thirteen, Inc.
84. The Offshore Co.
85. Oil & Gas Futures, Inc.
86. Oil & Gas Futures, Inc. of Texas
87. Peavy, Waymon G. (individual)
88. Pelto Oil Co.
89. Pennzoil Offshore Gas Operators, Inc.
90. Pennzoil Producing Co.
91. Pennzoil United, Inc.
92. Phillips Petroleum Co.
93. Placid Oil Co.
94. H. C. Price Co.
95. Prudential Funds, Inc.
96. Sid Richardson Carbon & Gasoline Co.
97. Samedan Offshore Corp.
98. Sea Drilling Corp.
99. Sharples, Philip T. (individual)
100. Shell Oil Co.
101. Signal Oil & Gas Co.
102. Skelly Oil Co.
103. The South Coast Corp.
104. Southern Natural Gas Co.
105. Southern Prod. & Refining Co., Inc.
106. Southland Royalty Co.
107. States Marine Lines Inc.
108. Sun Oil Co.
109. The Superior Oil Co.
110. Tenneco, Inc.
111. Tenneco Oil Co.
112. Tenneco West, Inc.
113. Tennessee Gas Supply Co.
114. Texaco, Inc.
115. Texas Eastern Transmission Corp.
116. Texas Eastern Exploration Co.
117. Texas Gas Exploration Corp.
118. Texas Gulf Sulphur Co.
119. Texas Production Co.
120. TransOcean Oil, Inc.
121. Union Carbide Petroleum Corp.
122. Union Oil Co. of California
123. White Shield Exploration Corp.
124. Woods Petroleum Corp.
125. Zapata Norness, Inc.

Dr. PECORA. But my recollection is these are something in the order of 50 companies who are participating in the Outer Continental Shelf development production program. These include the majors as well as a number of the minors.

Your point is well taken, Mr. Congressman. This is not a small-money game. It is a big-money game. The drilling of a well, for example, in the Santa Barbara Channel ranges in cost from $250,000 to $1.5 million at reasonable depths. In the Gulf of Mexico it is in the same order of magnitude. On the north slope of Alaska the cost of drilling an exploratory well would be in excess of $1 million. Some wells have cost as high as $5 million because of the circumstances of the permafrost. The mere drilling of a well is a costly venture, let alone the procedure of competing for the leases and the right to drill—for the right to see whether or not oil or gas may be beneath the lease. It is a very costly venture.

Mrs. HANSEN. Isn't the cost of the distribution becoming increasingly acute throughout the world.?

PARTICIPATION OF SMALL COMPANIES

Dr. PECORA. We have found, however, that a number of small companies get together to gather their resources and thereby are able to compete and this is why both in California and the Gulf of Mexico we have many small companies who are participating in the procedure.

JURISDICTIONAL PROBLEMS

Mr. GALIFIANAKIS. Do you have jurisdictional problems that you experience among the companies between themselves and/or the States and the Federal Government?

Dr. PECORA. In the first instance if a group of companies combine to make the bid and are awarded the bid, the companies select an operator. This operator is the company with which our regional supervisor shall deal in all decisions concerning that lease. The operator has the authority to take the actions on the lease in the name of the group although there are consultations, I am sure.

Mr. GALIFIANAKIS. You know the constituency of the group, don't you?

Dr. PECORA. Yes, we do. This is well known to us. Second, in the area of certain actions that need to be taken, for example, a court action that has been taken in the Gulf of Mexico against a number of companies, if the lessees are found culpable under the law, all of the constituents of the group are equally responsible, not just the operator, so the operator acts for the group in his operational development as well as in the legal implications.

Third, in the area of legal jurisdiction, inasmuch as the Supreme Court did define the State tidelands as separate from the Federal subsea bed, the complete jurisdiction beyond the 3-mile line, with the exception of Texas, which is 9 miles (3 leagues), the complete jurisdiction beyond that is within the Federal domain.

Mr. GALIFIANAKIS. What was the reason for the Texas exemption?

Dr. PECORA. Apparently there was an earlier 3-league relationship to the settling of the Texas lands and the Supreme Court accepted this grandfather relationship.

Mr. GALIFIANAKIS. May I ask one more question?
Mrs. HANSEN. Yes.

UNITIZATION AGREEMENTS

Mr. GALIFIANAKIS. When you have adjacent leases, when the lease is made, and the drilling is performed, and the reservoir is found and discovered, and the extraction is begun, and you give some other group a lease adjacent to it, how do you determine the distribution of the oil underneath?

Dr. PECORA. That is a good point, Mr. Congressman. For this reason we are authorized under the law to provide unitization agreements. These unit plans would require that all leases that have common reservoirs be assembled under one management for maximum conservation, because it is quite possible that one lessee will produce at a higher rate and injure the reservoir for the adjoining lessee, so that we do have a number of unit agreements. I will place in the record the number of unit agreements we have covering the several hundred reservoirs that we know exist in the Outer Continental Shelf in the Federal domain.

(The information follows:)

There are currently 95 unit agreements in effect on the Outer Continental Shelf. In the Gulf of Mexico, there are 93 such agreements for oil and gas operations and one for sulfur. There is one unit agreement for oil and gas operations in the Santa Barbara Channel off California.

Dr. PECORA. There are a great number of unit arrangements that have been permitted and are in fact under the supervision of our regional supervisor to make sure that that condition is taken care of that you mentioned.

Mr. GALIFIANAKIS. That is very good. It eliminates prospective disputes.

Dr. PECORA. As a matter of fact, many operators petition the U.S. Government for permission to form a unit arrangement in adjoining leases, and our engineers study the situation in great detail to be sure there are common reservoirs that need common pressure development in the program for maximum recovery of the resource.

In most cases we agree with the petitioners. In other cases we ourselves will institute inquiry as to whether or not unitization should take place.

This is likewise done between the Federal and State jurisdiction. With the State of Louisiana there are a number of common reservoirs right across the 3-mile line. They cross the line of dispute between the State of Louisiana and the Federal Government. These are jointly operated as unit plans. This is an excellent part of the conservation concept.

SHELF OPERATIONS OFF CALIFORNIA

Mr. GALIFIANAKIS. Are there any other States in which you cooperate in this manner?

Dr. PECORA. The State of California is the only non-gulf State where we have Federal production on the Outer Continental Shelf. We have in the Federal Government instituted operations there only since the first small lease sale in 1966. We have three producing leases in the Federal domain in the Santa Barbara Channel.

UNIT AGREEMENTS IN OTHER STATES

Mr. GALIFIANAKIS. Could you come in and do a survey at the behest of my State.

Dr. PECORA. The State has the authority, within the State to do this for the entire State. However, on the public lands the Federal Government makes these analyses.

For example, I am familiar with some situations in Wyoming and Dakota where private leases, State leases and Federal leases have been combined under a unit plan that has been developed.

Mr. GALIFIANAKIS. But you have to cooperate with the State if you are on that borderland.

Dr. PECORA. There is no question about it.

Mrs. HANSEN. Isn't there a very close cooperation in all the States with the Geological Survey?

Dr. PECORA. On land there is excellent coordination and cooperation. I don't think there is any problem in onshore relationships because of long existing conditions, plus the fact that any production that is forthcoming from public lands within a given State, the value of 37½ percent of that production reverts to the State in which that production occurs.

JURISDICTIONAL PROBLEMS OFFSHORE

So there has been very close coordination on this. But offshore because of the Supreme Court decision to segregate the State tidelands from Federal tidelands there is separate jurisdiction in the two zones.

Mr. YATES. Is that settled? Has Louisiana accepted that?

Dr. PECORA. The principle has been settled. It is a question of where the line of demarcation shall be marked. The Supreme Court has made the judgment as to how the line shall be marked and the Federal Government has submitted its information to the Court but the State of Louisiana hasn't yet finalized its position.

SOURCE OF FUNDS FOR EMERGENCIES

Mrs. HANSEN. Wasn't the $322,198 spent on the Santa Barbara oil spill reprogramed from some of your other ongoing programs?

Dr. PECORA. This was not a separate provision. Moneys which we expended in responding to the accident in Santa Barbara and the accidents in the Gulf of Mexico were provided from the same offshore, budget items, but deflected from other projects in the program because of the emergency nature.

In our case we find we can do a little bit of this on a flexible basis with funds and people who are currently working on their own project. We divert them because of the emergency, but we cannot do this on a permanent basis. On a temporary basis we can do a certain amount.

Mrs. HANSEN. That is the reason for the question.

NEED FOR DISASTER REVOLVING FUND

Dr. PECORA. We feel this committee might want to review a suggestion that was offered to it several years ago by my predecessor. That is, is it possible to develop within the Geological Survey, for example, or the Department—let me speak for my Bureau—would it be possible

to set up a disaster revolving fund within the Bureau of Geological Survey so that when a major flood occurs or an earthquake disaster or major landslide or offshore problem develops, we can have funds with the permission of the committee to meet these disasters and accidents and have those funds replenished at some subsequent appropriation hearing?

Mrs. HANSEN. This is the reason I bring this up, because it seems to me that each time you have to obligate your funds to meet disasters you are shortchanging other ongoing programs.

It would be far better if a contingency or disaster fund were established.

Dr. PECORA. I would recommend it very seriously, and our budget officer in the Department can have discussions, I am sure, with this committee as to how this disaster or contingency fund can be established.

I would think there is a very strong need for it. We have had this need for many, many years.

COSTS OF SANTA BARBARA CHANNEL SPILL

In the case of Santa Barbara Channel, of the total Federal funds expended in response to the accident, about half, $160,000, came from Geological Survey and the balance from other bureaus.

But these were moneys that were diverted from other programs.

Mr. OBEY. How much came from the companies?

Dr. PECORA. The Union Oil Co. representing the lessees as a group expended between $5 million and $10 million in the cleanup, for the liability to cleanup is with the lessee. The company is also burdened in meeting certain litigation by those who were injured by the spread of the oil, in meeting certain conditions that we imposed upon the company for cleanup, and in changeover under the regulations as applied to that particular structure.

An analysis was made by Professor Mead, University of California at Santa Barbara. In a recent paper he calculated the total social costs of the incident reached $16 million to the public at large, including the private costs to the company.

He included, of course, those costs that were accrued because of the accident alone.

I would expand this by many more millions of dollars, if I might make a comment, although I am not an economist. Because of the new regulations superimposed upon the old to make them more stringent, and particularly because of the redundancy of safety systems we put into the orders and regulations for future operation, there were additional costs which were taken up by the industry as a whole which range from $50 million to $150 million by one analysis or another that had not been imposed upon them by the older regulations.

So, the new regulations instituted as a direct result of the Santa Barbara incident have an added cost to society for putting on extra safety systems. They increase the redundancy of the system, and this is going to be borne by society because these costs will be reflected, of course, to the consumer.

In this exercise I think it is only fair to say we on the Federal side need to have as much redundancy in safety as we possibly can because it is the human error really that creates all of the accidents. It is a

human error of judgment. You can't legislate against this. All you can hope for is to have enough safety factors built in so that you reduce the possibility of error.

POLICY ON FURTHER LEASING IN SANTA BARBARA CHANNEL

Mrs. HANSEN. Do you anticipate any further leasing in the Santa Barbara area?

Dr. PECORA. Our present Secretary hasn't spoken on future leasing. He has spoken recently that he is very seriously considering rescinding a block of already leased tracts and permitting activity on the remaining part, and leaving it up to Congress in reviewing the legislation as to whether or not Congress would rescind 35 leases which would be then converted into a national energy reserve for some future use.

This is in response to a concept of a State sanctuary being extended seaward as a combination State and Federal sanctuary. This would be a congressional action.

Mrs. HANSEN. Can't this happen to every inch of coastline?

POTENTIAL AREAS FOR FUTURE DISCOVERIES

Dr. PECORA. Exactly. It seems to me that first the attention should be directed toward where are the probable areas of potential discovery. In other words, the Outer Continental Shelf is not uniformly rich in oil and gas.

Mrs. HANSEN. Where are the potential areas?

Dr. PECORA. We must say at this time that the Gulf of Mexico offers the most successful area for development because we have so much information on it.

NUMBER OF PRODUCING LEASES AND WELLS

Mr. MCDADE. Is my recollection correct there are about 1,000 producing wells offshore?

Dr. PECORA. No, sir; you are thinking of leases. There are about 1,000 active leases, but there are 8,700 producible zone completions.

Mr. MCDADE. How many in the gulf?

Dr. PECORA. All but 163 are in the Gulf.

Mr. MCDADE. Where are the others?

Dr. PECORA. In Santa Barbara Channel. These are the only two areas.

Mr. MCDADE. Did the Geological Survey recommend on every one of these tracts to the BLM that they be put up for lease?

SELECTION OF LANDS FOR LEASING

Dr. PECORA. The Geological Survey gave to the Bureau of Land Management an analysis of where the most immediately prospectively valuable lands are for oil and gas. Then with the pressures that came up from the industry side as to future locations for bidding, as expressed in nominations, the Bureau of Land Management put up a great number of leases in the Santa Barbara Channel for its lease sale in 1968.

Not all of the bids were accepted by the BLM. There were 120 or more leases put up for bids and only 71 in that sale were accepted.

Mrs. HANSEN. Why were some of the bids rejected?

Dr. PECORA. In the opinion of the land manager based on the technical and economic information available to him, some bids were too low, and some received no bids.

In addition to these two areas—to complete the discussion, Mr. Congressman, on the Santa Barbara Channel, the channel is merely the seaward extension of a well-known petroleum-producing area known as the Ventura Basin. The eastern half of the basin is on land and has been a producer for many decades, and this is a natural extension seaward of a geologically favorable basin.

Our job in the Geological Survey is to find basins of this kind in which a great thickness of sediment accumulated as the basin sank, and where organic action was rather high at the time of its formation.

We are dealing here with a record of 500 million years in geologic history.

OIL POTENTIAL IN GULF OF ALASKA

We have found there is an area in the Gulf of Alaska, off Southeast Alaska, where the conditions are such that there may be a potential for discovery.

Mrs. HANSEN. Where is the Gulf of Alaska?

Dr. PECORA. It is off Cordova and Valdez.

Mrs. HANSEN. Is this in an earthquake prone area?

Dr. PECORA. It is not as active seismicly as the on-land portion landward from Valdez.

PRUDHOE BAY

Mr. MCDADE. Did the Geological Survey make any recommendations in the Prudhoe Bay area?

Dr. PECORA. In the Prudhoe Bay area the Geological Survey did the original geologic and geophysical analyses before the State made its land selection. We pointed out that here was a broad sedimentary basin with great thickness, which if it had the right kind of conditions of organic accumulation could be a producer of oil and gas. Since then the State acquired those lands and permitted exploration drilling which led to discovery.

Similar basins are being discovered and published in the public record.

OIL BASINS WHERE STATE SELECTION NOT MADE

Mrs. HANSEN. How many basins in Alaska are there that have been explored where the State hasn't yet made selection of lands?

Dr. PECORA. The most attractive, of course, is the Naval Petroleum Reserve No. 4 which is a large tract of ground which we consider to have three or four different horizons which are prospectively valuable for oil and gas.

Mr. MCDADE. Did the Geological Survey recommend that area be set aside?

Dr. PECORA. Originally the Navy came to the Department and the Geological Survey assisted the Navy in setting aside this reserve.

Mr. MCDADE. Geological Survey picked the area?

Dr. PECORA. We recommended and advised the Navy. The Navy I think picked the area.

Mr. YATES. How are you going to get it out of there, though?

Dr. PECORA. This is a good question.

To pursue Mrs. Hansen's inquiry, offshore we have already defined certain basins of accumulation in the Bering Sea area.

Mrs. HANSEN. Is this State of Alaska land?

Dr. PECORA. This would be Federal land.

Mrs. HANSEN. But the State hasn't yet made a selection?

Dr. PECORA. The State hasn't made a selection.

Mrs. HANSEN. How many more acres do they have to select?

Dr. PECORA. I think the State has already selected about one-fourth of its potential and is making overtures about a second set for selection. Naturally the State of Alaska would select those areas that could be the most productive.

ATLANTIC COAST OIL POTENTIAL

We would also note that along the Atlantic coast, where there is no activity whatsoever in drilling, there has been some seismic exploration by the companies, and we have had some research activity with the Woods Hole Oceanographic Institute. We feel there are areas off the Atlantic coast where similar basins of accumulation can be identified which in broad perspective are likely to have some value for exploration with potential discovery.

This is also true with the eastern part of the Gulf of Mexico. But as I said, our job in the Geological Survey is to make these studies and make these recommendations as to where we believe the prospective value lies, and it is up to other groups to make the decisions what to do about them.

OTHER MINERALS ON SEABED

Mr. YATES. May we ask about other minerals?

Mrs. HANSEN. Yes.

Dr. PECORA. The seabed itself in many places on the Outer Continental Shelf has large accumulations of phosphate minerals and manganese nodules. Blake Plateau which is off Florida, is a rich area, for manganese nodules. Off Hatteras there are well-known phosphate deposits. So there are minerals as well as oil and gas on the OCS.

Mr. YATES. That is the extent of it?

Dr. PECORA. Of course, you know that near shore is where the heavy minerals tend to accumulate. Gold and platinum and heavy minerals are known, for example, off Alaska. We had a good project which indicated several layers of gold-bearing sands and gravels in the section, and the work also led to the recognition of deep basins of sedimentary accumulation and potential oil and gas reservoirs.

Off the cost of Washington and Oregon are likewise accumulations of heavy minerals which represent a mineral source.

SAND AND GRAVEL DEPOSITS

I suspect this committee doesn't recognize that one of the most valuable mineral resources is just ordinary sand and gravel. It is

amazing how important this is to the country. In many of our metropolitan areas, the sources of sand and gravel and crushed rock are becoming more and more distant and hence a problem of transportation and distribution.

Some of our offshore studies—for example, in the Atlantic coast—have shown areas of excellent sand and gravel that would supply the metropolitan areas such as New York and Boston. This can be not only within the 3-mile zone but also within the Federal domain.

DISPOSAL OF SPOILS

Mrs. HANSEN. As you know, the Army Corps of Engineers have the problem of what to do with the spoils in connection with one of their projects. You are well aware they usually dumped their spoils on public land. Are they reviewing with you what could be the most proper use of their spoils?

Dr. PECORA. No; we have not had any discussions in this area for disposal of waste or spoils. We have had discussions of certain sources such as of sand and gravel. In regard to waste dumping, Assistant Director Clarke might have a comment on this.

Mr. CLARKE. We are cooperating with them on a project in Tampa Bay to determine how spoil from opening of the channel there should be built into islands and other useful banks—spoil banks—instead of the troublesome spoil banks that have caused so much conflict.

Mrs. HANSEN. One example comes to mind where spoils were dumped on a recreation basin. Immediately this area had settlings below, which damaged some of the best fishing grounds. It seems to me somebody should be involved in the discussions to eliminate these difficulties.

Mr. CLARKE. We are doing that very thing in Tampa Bay.

FUTURE OF LEASING OFF SANTA BARBARA

Mrs. HANSEN. Please insert in the record a statement of policy relative to oil development of the Santa Barbara Channel.

Dr. PECORA. Yes.

(The information follows:)

[News release from Department of the Interior—Office of the Secretary, Mar. 9, 1971]

STATEMENT BY SECRETARY OF THE INTERIOR ROGERS C. B. MORTON ON OIL DEVELOPMENT IN THE SANTA BARBARA CHANNEL

Secretary of the Interior Rogers C. B. Morton today issued the following statement on oil development in the Santa Barbara Channel:

"The Department is seriously considering resubmission of legislation to terminate certain existing leases and to create a national energy reserve in the channel," Secretary Morton said.

"Quite frankly I am favorably impressed with the concept of a Federal sanctuary immediately seaward of the State sanctuary as set forth in the administration bill last year," he added.

"Although the 91st Congress did not act on that bill, I believe the 92nd Congress should have the opportunity to reassess this concept or some modification of it," he said.

"I would favor enlarging the proposed Federal sanctuary to include Federal leases off San Miguel and Anacapa Islands.

"The draft environmental impact statement on exploratory drilling in the Santa Barbara Channel is undergoing review by other Federal agencies and the public. I shall render a final decision upon review of the final statement, after comments on the draft are evaluated.

"In the meantime, however, with the concurrence of the Council of Environmental Quality, the Department shall honor lease clearances for exploratory drilling provided that (1) those safety clearances were obtained prior to January 1, 1970, the date of enactment of the National Environmental Policy Act; and (2) the cleared leases lie seaward of the State producing areas off Santa Ynez and Ventura County. All other exploratory drilling permits shall have to wait the decision reached after the final impact statement is thoroughly reviewed and assessed.

"No action will be taken at this time on applications to authorize two producing platforms because the draft environmental impact statement has yet to be issued for public comment. Public hearings on these platforms were conducted in Santa Barbara in January."

Mrs. HANSEN. Mr. McDade.

SYSTEM FOR SAFETY AND INSPECTION

Mr. MCDADE. Since the blowout at Santa Barbara you have revised substantially as I understand it the second aspect of your offshore responsibilities, that is to say the monitoring of the operations and the safety features have been substantially increased.

Is that a correct statement?

Dr. PECORA. That is correct. Not only has the Geological Survey revised its national regulations, but also revised its regional orders that are specific to that particular region. The operations in the Gulf of Mexico are dependent upon different environmental characteristics than are existing in the Santa Barbara Channel.

Therefore, the regional orders have to be responsive to each region. We have not only increased monitoring of the casings but also the drilling and blowout preventers and the character of the platforms themselves.

Mr. MCDADE. This committee has been very anxious to make sure you had enough people to perform the inspection task.

Dr. PECORA. Yes, Mr. Congressman, as a result of the action and interest of this committee and the favorable decision of the Secretary of Interior, we did double the actual inspectors on the job both in Santa Barbara and in the Gulf of Mexico.

We are now making a study with the concurrence of the Office of Management and Budget to analyze our system for safety inspection to determine whether or not we need many more inspectors or whether we can get along with the number we have.

We made an analysis, about 3 or 4 years ago, that we would need to triple our entire supervisory staff on the Outer Continental Shelf. Our present systems study being made on all of our procedures concerning the OCS will come up with an understanding as to what we actually need to achieve set objectives. We may differ as to what objectives ought to be.

There is no possibility, I should be very frank to tell you, of zero risk. You cannot give a 100-percent guarantee for safety. But how close to a 100-percent guarantee should we attempt in our efforts?

I think we should try to reach zero risk. I think we should attempt to achieve 100 percent if possible. I don't think we will ever reach it because human error and human judgment constantly come into the picture.

Nevertheless, the cost of such a safety system and the cost of the inspection system and the cost of supervisory and management systems must not be, shall I say, put at a low funding level just because we would like to have the industry take care of it themselves. However, it seems to me that industry is also very much interested in avoiding accidents because an accident costs them so much money.

COMPANY LIABILITY FOR RESULTS OF ACCIDENTS

Mr. McDade. And they are now liable?

Dr. Pecora. They are now completely liable for the cost and results of any accident or spills.

For example, in the last accident that is not yet completely overcome, the Shell Co. fire in the Gulf of Mexico, the present costs to the company are estimated to be about $35 million. This company has also lost the productive value of oil and gas in that period. So these are very serious matters.

Mrs. Hansen. How many oil fires have you had in the Gulf of Mexico in the last year?

Dr. Pecora. There were two in 1970 that were considered to be fires. One was in the early part of 1970 and the second in the latter part of 1970. These are both platform situations.

The first one was the Chevron incident and the second was the Shell incident.

In addition to fire incidents, there have been a number of accidents of one kind or another, which we have summarized for the record, since 1953. Only about six of these have produced oil upon the waters as a pollutant and a serious one, and the worst of the drilling incidents is the Santa Barbara incident, the first on the west coast.

A number of others have been gas blowouts which have been overcome without any serious injury or accident. Others have been serious explosions because of gas blowouts that have led to fatalities.

I must say that our concept of safety should, first, be around the concept of life and then property. But if one is careful in summarizing all of the possibilities where accidents can occur and highlighting them, then I think we can improve the record.

GOOD SPILL RECORD FOR OFFSHORE DRILLING

Also I need to say that the record in offshore drilling, as sensational as it has been in the communications media, is not a bad record. Over its productive period since 1953 the actual spill record is less than one hundredth of 1 percent of the amount of oil produced. This is still too much, but it is a small spill record.

Mrs. Hansen. What is the ratio between oil spills caused from drilling and spills caused by tankers?

Dr. Pecora. We have likewise summarized tanker spills from various records and would be happy to put it in the record.

Mrs. Hansen. Please do.

(The information follows:)

ESTIMATES OF DIRECT LOSSES INTO THE WORLD'S WATERS, 1969, OF INDUSTRIAL WASTES OF PETROLEUM ORIGIN[1]

[Metric tons per year]

	Loss	Percentage of total loss
Tankers (normal operations)[2]:		
Controlled	30,000	1.4
Uncontrolled	500,000	24.0
Other ships (bilges, etc.)[3]	500,000	24.0
Offshore production (normal operations)[4]	100,000	4.8
Accidental spills:[5]		
Ships	100,000	4.8
Nonships	100,000	4.8
Refineries[6]	300,000	14.4
In rivers carrying industrial automobile wastes[7]	450,000	21.6
Total[8]	2,080,000	100.0

[1] Source: Han's Impact on the Global Environment, the MIT Press, 1970.

[2] Sources: Intergovernmental Maritime Consultative Organization, 1965, and Esso Research and Engineering Co. (Standard Oil of New Jersey). It is estimated that 80 percent of the world's tanker fleet use Load-on-Top to reduce discharges from cleaning and 20 percent do not. These estimates are based on this distribution and some measured values for oil content of discharge using both methods.

[3] Source: Moss, 1963. Firm data in this area are not available anywhere. Records are not kept of bilge pumping nor are estimates of oil content. This area warrants further development; surveys need to be run to produce further data.

[4] Sources: Surveys by Esso Research and Engineering Co. (Standard Oil of New Jersey) and American Petroleum Institute, 1969.

[5] Sources: U.S. Coast Guard, 1969, and American Petroleum Institute, 1969. These data are not firm. Mechanisms are needed to accumulate data to improve the reliability of this estimate.

[6] Sources: American Petroleum Institute, 1968; Federal Water Pollution Control Administration, 1968; and Esso Research and Engineering Co. (Standard Oil of New Jersey). Petrochemical production wastes are included.

[7] Using U.S. Department of Health, Education, and Welfare, 1963 data, we have assumed that the average concentration of hydrocarbons in the U.S. rivers entering the sea is approximately 85 parts per billion. Multiplying this figure by the estimated river runoff of 1,750 billion tons/year yields a figure of approximately 150,000 tons of hydrocarbons, which are annually carried to the oceans from the United States (Revelle, 1963). If the river runoff for the world is 3 times that of the United States, and if the average concentration is the same as the estimated U.S. average, then about 450,000 tons of hydrocarbons are carried into the oceans. In addition hydrocarbons are introduced into the ocean through sewage outfalls. We estimate that this amount is less than that in the rivers perhaps by a factor of 3 or 4, but this is not included in the table.

[8] Oil from pleasure craft, whose use is increasing in the United States, is not included, nor are there any measurements of natural seeps, which would be valuable for comparative purposes.

SOURCES OF OCEAN POLLUTION BY OIL

Dr. PECORA. We have found that a study made by a group last summer indicated that of all of the spill of oil into the ocean, on the basis of an estimate of 2 million tons for the year 1968, less than 5 percent, 4 to 5 percent, was estimated to have come from drilling and production operations.

However, more than 50 percent came from tankers and other ships that were plying the seas, such as tanker accidents, bilges, tanker washouts of the tanks themselves for safety, refineries, spills along the shore, and that sort of thing.

A great deal of pollution came from land by way of the rivers. For example, what happens to our crankcase oil when we have an oil change for our car? In the old days this used to be collected and recycled. Now in most places it is merely being washed down the sewer with some kind of chemical so it moves to the river. This goes into the ocean in one form or another.

Mrs. HANSEN. How much gasoline pollutant is going into the rivers, lakes, and offshore lands from motor boats?

Dr. PECORA. The survey has no records of this, Madam Chairman. I am sure this would be great in cumulative total even though the participation of each item might be very small. I am sure there are many sources of pollution of this kind into the oceans, rivers and lakes.

One should never try to excuse or put aside the fact that the oil industry through drilling on a quantitative basis is polluting only a small portion of the total system. One has got to work on every portion of the system to reduce it to that minimum which is possible.

Mrs. HANSEN. That is the reason for my question. The other day it was discussed relative to operations within the Puget Sound, that motorboats at the present time were injecting more gasoline and oil than were the tanker operations or the refinery operations.

Dr. PECORA. In our table which I will submit for the record, which summarizes in order of abundance the amount of spills from various sources, tankers, pipelines, refineries, the tankers outweigh the rest by a great margin. The tankers contribute more spill of oil into the water than any other source.

(The information follows:)

RECORDED OIL SPILL INCIDENTS INVOLVING 2,600 OR MORE BARRELS SINCE 1957

NAME	DATE	CAUSE OF SPILL	MATERIAL	BARRELS	REMARKS
Torrey Canyon, tanker	03-18-67	Grounding	Crude	700,000	(1)
World Glory, tanker	06-13-68	Hull failure	Crude	322,000	(1)
Keo, tanker	11-05-69	Hull failure	#4 F.O.	210,000	(1)
Seewarren, storage tank	11- -69	Tank failure	Crude	200,000	(1)
West Delta Area, pipeline	10-15-67	Anchor dragging	Crude	160,000	(3)
R. C. Stoner, tanker	09-06-67	Grounding	Mixed	143,300	(1)
Anne Mildred Brovig, tanker	02-20-66	Collision	Crude	125,000	(1)
Andron, tanker	05-05-68	Sinking	Crude	117,000	(1)
Persian Gulf, pipeline	04-20-70	Break	Crude	95,000	(9)
Ocean Eagle, tanker	03-03-68	Grounding	Crude	83,400	(1)
Polycommander, tanker	05-05-70	Grounding	Crude	82,500	(9)
Tampico, tanker	03- -57	Grounding	Diesel	60,000	(1)
South Timbalier Area, Shell Platform	12-01-70	Fire damaged wells	Crude	44,570	(7) (3)
Arrow, tanker	02- -70	Grounding	Bunker	35,700	(9)
Main Pass Area, Chevron Platform	03-10-70	Fire damaged wells	Crude	30,000	(3)
General Colocotronis, tanker	03-07-68	Grounding	Crude	30,000	(1)
Esso Essen, tanker	04-29-68	Grounding	Crude	30,000	(1)
Argea Prima, tanker	07-17-62	Grounding	Crude	28,000	(1)
Ocean Grandeur, tanker	03-03-70	Grounding	Crude	22,000	(9)
Oregon Standard, tanker	01-18-71	Collision	Bunker	20,000	(6)
Esso Gettysburg, tanker	01-22-71	Grounding	Kerosene and #2 F. O.	18,583	(6)
Coal Oil Point, California	Annual	Natural seeps	Crude	18,250	(3) (5)
Buckeye, pipeline	01-14-69	Unknown	Crude	16,500	(2)
Moron, refinery	03-29-68	Pumping	Crude	16,000	(1)
Witwater, tanker	12-13-68	Hull failure	Mixed	15,000	(1)
Benedicte, tanker	05-31-69	Collision	Crude	14,000	(1)
U. S. Navy, Florida	11-30-70	Intent'l dumping	Bilge oil	11,900	(6)
Santa Barbara, Union Oil Platform	1-28-69	Blowout	Crude	10,000	(3) (4)
Evje, tanker	05-02-67	Grounding	Jet Fuel	6-10,000	(8)
Tim, tank barge	02-18-68	Sinking	#6 F. O.	7,000	(1)
Main Pass Area, pipeline	02-11-69	Unknown	Crude	7,000	(3)
Ship Shoal Area, platform stor.	10-03-64	Hurricane	Crude	5,100	(3)
Yukon, tanker	03-03-69	Collision	Crude	5,000	(8)
Hamilton Trader, tanker	04-30-69	Collision	Residual	5,000	(1)
Robert L. Polling, tank barge	05-10-69	Collision	#2 F.O.	4,700	(1)
Martita, tanker	09-20-62	Collision	Bunker C	4,300	(1)
Algol, tanker	02-09-69	Grounding	#6 F.O.	4,000	(1)
Chryssi P. Goulandris, tanker	01-13-67	Unknown	Crude	2,600	(1)

(1) Dillingham Corp., Analysis of Oil Spills and Control Materials
(2) Oil Spills Table, Senate Report 91-351
(3) U. S. Geological Survey
(4) Subsequent seepage 8,500 bbls.
(5) Estimated annual rate
(6) Company figure
(7) Thru 2-24-71. Fire not yet under control. Present spillage approximately 50 bbls/da
(8) Water Quality Office, Environmental Protection Agency
(9) Various published sources

TANKER SPILLS

Mr. WYATT. Is that getting better or worse?

Dr. PECORA. It is getting worse.

Mrs. HANSEN. Why?

Dr. PECORA. There are more tankers plying the seas. Some of them are old tankers, and I would say perhaps some of them need to have better navigational systems than they do have. They are getting larger.

The *Torrey Canyon* spill which we understand distributed 700,000 barrels into the water might be some day outclassed by a spill from a tanker that may carry a quarter of a million tons or even a million tons, maybe three to 10 times the size of the *Torrey Canyon*. This is a serious business moving oil. Fifty percent of the traffic on the high seas carried in tankers or ships is oil traffic and oil products.

If the need for energy is increasing throughout the world as we anticipate it will, this places a greater effort on supplying the liquid energy from the few source areas to the rest of the world.

Mrs. HANSEN. How much oil was spilled in the San Francisco collision?

Dr. PECORA. About 20,000 barrels were spilled, which is about equivalent to what we guess to have been the total spill and latest seepage at Santa Barbara Channel.

PROPOSED TRANS-ALASKA PIPELINE

Mrs. HANSEN. This committee is deeply concerned that you be provided with the funds to enable you to prepare the material to give the basic information to Congress, the administration and the public about the proposed trans-Alaska pipeline.

What have you done in this connection? What reports have been completed and what is your reaction to the comments of the Department of Defense?

Dr. PECORA. The role of the Geological Survey in the total problem of analyzing the trans-Alaska pipeline system has been largely one of evaluating the terrain, of evaluating the geologic accommodations any pipeline would have to make, of evaluating the characteristics of pipeline construction as a safety element in the entire system.

For this reason we have called upon the expertise developed over the past few decades by many of our scientists who have worked in Alaska. We put out a series of reports in the early part of the study which defined for the public the meaning of permafrost and which showed to the public the characteristics of the terrain that would have to be traversed by the pipeline route being offered by the applicants.

We naturally have to address ourselves to the route itself, from Prudhoe Bay to Valdez.

We have worked on the geologic characters of the rock, the soil, the crossing of rivers, the streambeds, and the nature of such environmental hazards as might be produced by earthquakes, by landslides, by snow and ice slide, and by floods.

EXPERTISE IN OTHER AGENCIES

In making these studies, which have taken about a year and a half, we have called upon counterpart experts from the Corps of Engineers,

both in their research laboratory in New Hampshire, as well as in their district office in Alaska. We have called upon similar expertise in other bureaus such as the Director of the Naval Research Laboratory at Point Barrow, Alaska, Dr. Brewer.

We have called upon others in the Federal Water Quality Administration and other bureaus of the Department of the Interior.

Our intent through this study program was to assemble all of the criteria that would have to be reviewed so that structural design of the pipeline could be evaluated.

TECHNICAL STIPULATION

We concluded one phase of our work with the publication of what is now known as the Technical Stipulations. You may recall that several months ago the Department of the Interior issued a set of guidelines which were referred to as environmental stipulations related to the Trans-Alaska Pipeline System.

This technical working group appointed by the Secretary of Interior, under my chairmanship, completed its work by assembling technical stipulations which would be parallel to the environmental stipulations.

These were included in the draft environmental impact statement, and what they intended to do was to show, for every one of these circumstances that we had reviewed, if structural design met the standards we had set forth, this pipeline could be built with maximum safety and minimum degradation of the environment.

This was the intent of the working group. It took a year and a half to reach this point.

MUCH OF PIPELINE TO BE ABOVE GROUND

We have felt that a substantial part of the line would have to be built above ground because to bury a hot oil-bearing pipeline in permafrosted sediments would create damaging consequences. To place the pipeline underground in permafrost would permit the heat to enter the frozen soils and thereby create a weak foundation that would be injurious to the integrity of the pipeline.

Originally the pipeline company wanted to place the pipeline entirely underground, if possible, because this is the conventional way of doing it and a pipeline in a trench underground, if the conditions are favorable, is by far the best way to do it.

But the pipeline builders had never attempted construction of a pipeline in permafrosted environment such as Alaska. Therefore, we felt that the study we were making was paramount to determine where the pipelines could be buried conventionally in a trench with safety and where for greater safety it would need to be elevated above the surface of the ground.

We concluded, therefore, in our report that just short of 50 percent of the entire pipeline would have to be above ground with certain standards that would apply to the crossing of rivers, earthquake zones and the like. We feel we have done the job that was assigned to us in this terrain.

In putting out the environmental impact statement as a draft preliminary statement, the intent of the Department was to put forth a number of items of information with these environmental and technical standards to get some comments, suggestions, corrections,

additions from other knowledgeable groups throughout the country—Government and public.

ROLE OF OTHER AGENCIES AND CONSULTANTS

We felt that the role of other Federal agencies, State agencies and the private individuals of the Nation would be to show how these conditions might be strengthened, or to indicate information that we did not have available.

In this connection the comments that have been coming in from other Federal agencies have been helpful. We are using the expertise, for example, of the Department of Transportation and its Pipeline Safety Division which we do not have in the Department of Interior.

Before any final assessment document is prepared, these suggestions will be brought together. New studies might be made so that the final environmental impact statement would represent the best overall assessment of the conditions related to the pipeline. Some higher level could then make a policy decision whether it be in favor of or against the pipeline right-of-way.

But there has been one grave misconception in the entire exercise, Mrs. Hansen. Most of the people in the country are expecting the Government to build the pipeline. We don't intend to build the pipeline. We intend to set the standards, the conditions. We intend to have the authorizing officer impose surveillance upon the construction, to look at the structural design before any construction authorization is given. I think this is the proper role of Government.

GOVERNMENT TO BE REPAID FOR PIPELINE RELATED COSTS

Mrs. HANSEN. You were also able through this committee to get clarification on the responsibility for the repayment of funds by the developers of the pipeline to protect the environment. Isn't that correct?

Dr. PECORA. Yes, I remember our discussions with this committee in the past and the committee insisted all of the work being done specifically through this permit application be carried by the pipeline company itself because this is far and beyond our regular work in Alaska. Our budget officer has been keeping a good accounting of the expenditures of these funds and the purposes for which they have been expended for the day of reckoning.

PROPOSAL FOR PIPELINE ACROSS CANADA

Mrs. HANSEN. You have now a proposal by Canada for the pipeline to cross Canada.

Would it be necessary to cross parts of our Federal lands that are permafrost areas?

Dr. PECORA. Yes.

Mrs. HANSEN. Does that require above-ground construction?

Dr. PECORA. That would for the most part require above-ground construction.

PERMAFROST PROBLEM IN CANADA

Mrs. HANSEN. What is the Canadian terrain like?

Dr. PECORA. If in fact a pipeline were to be constructed from Prudhoe Bay eastward along the Coastal Plain of the North Slope,

it would end up at the MacKenzie River Delta. This would be traversing permafrost terrain all the way.

Mrs. HANSEN. This would be the same kind of terrain?

Dr. PECORA. Exactly the same kind of terrain.

Mrs. HANSEN. So the problems are almost identical?

Dr. PECORA. That is exactly the point.

Mrs. HANSEN. The environmental problems are identical in Canada to those in Alaska?

Dr. PECORA. Indeed and more so by length of line, because going southward up the MacKenzie River one is going along the bias of the permafrost zone rather than across the bias as you would across the State of Alaska.

The permafrost boundary sweeps around Alaska and Canada and goes into Central Canada. So on the basis of the environment, one has essentially the same environment in Alaska as in Northern Canada.

However, there are some advantages that can be stated for a Canadian route and some disadvantages.

LEGAL PROBLEMS

It seems to me we are dealing first with a legal problem. The applicants came to the Department of Interior for action on the right-of-way permit from Prudhoe Bay to Valdez and this is what we are studying and acting upon.

If the applicant wanted a joint application part Alaska and part Canada, this is up to the applicants to make that application. A number of Canadians or others could make all the proposals or suggestions they desire, but we do not act on this unless the applicants themselves took an active part.

Mr. WYATT. The Secretary in his appearance here volunteered the information the Canadian route was under active consideration.

Dr. PECORA. I don't know what he would have meant by active consideration. I will continue in my review of it as indicated by the questions from Mrs. Hansen.

Mr. WYATT. I indicated interest. Perhaps "active consideration" wasn't too accurate a description of what he said.

APPLICATION FOR CANADIAN ROUTE

Mrs. HANSEN. Have applications been made to the Department of the Interior to cross into Canada? Has any discussion been held between Canada and the United States as to the kind of control Canada will exercise over the pipeline?

Dr. PECORA. The first part of your question can be answered negatively, that the applicants have made no application for a permit to leave Alaska. Their application is only through Alaska. Therefore, my bureau can't take any action on anything but that application.

If one is to consider seriously any potential route through Canada, whether it be a branch route or the primary route, this would have to be in a form of a formal application and it hasn't been received.

However, there is no doubt they are considering a lot of alternatives and if we should consider an alternative of overland route through Canada rather than through Alaska, we have to keep in mind, first that you have to traverse part of Alaska no matter what you do, and

second, the long pipeline for oil by way of Edmonton would have to have some sort of delivery to the West Coast as you yourself, Mrs. Hansen, indicated. If this be by pipeline it would cross many wilderness areas. The pipeline would have to reach a major port in Puget Sound or Portland and there would be tankers coming in for loading. So that one does not exclude tankers from the major ports.

Mrs. HANSEN. What would be the basis of that judgment?

Dr. PECORA. This would have to be some kind of a broad decision I am sure the companies themselves would come to, and from my reading of the press, the companies do not intend to exclude the West Coast because this is the big shortage area. California, in particular.

(Discussion off the record.)

PROBLEM OF SUPPLY OF ENERGY

Dr. PECORA. In our discussion we are really pointing at one of the most critical problems that faces humanity today—the source of energy. Many people think that food is the biggest problem of humanity.

Mrs. HANSEN. Our food supply depends on energy.

Dr. PECORA. That is exactly the point. The agricultural areas of the world are well known and can become productive for the masses if energy is available and distribution systems are worked out. I would consider that the supply of energy for humanity is the No. 1 critical problem for mankind.

We in the Geological Survey, as a result of our analysis of oil, gas, coal, and geothermal energy and other unconventional means, see a fairly good supply for a century ahead of us in this country if we are permitted as a Nation to pursue these sources of supply, to develop them for the use of the people.

OPTIONS FOR SOLUTION OF ENERGY PROBLEM

If there are going to be constrictions and restraints, then we need to have our options opened up to us so the decision can be made on the options.

One of the options is development of the Outer Continental Shelf. This has a very large potential as an energy producer in oil and gas. One option for the people in New England, for example, and the people in eastern Canada, who need gas for their homes and other needs, is to produce gas in the Gulf of Mexico and to pipe it up to New England and eastern Canada.

Another option is to urge exploration and development of the area in the Gulf of Maine. If gas deposits are found there, this would be a shorter haul and obviously an option which can be considered.

Another option is to bring gas in from Prudhoe Bay where there is a major gas reserve as well as an oil reserve. This supply could come down via pipeline and spread over the country and be used in many places.

The problem I see in all of these controversies is that the options are not fully expressed, and the conditions of each option are not fully realized. This is really the situation.

You mentioned the west coast, Mrs. Hansen. This is a shortage area. There is a shortfall, for example, in California of one third of its oil needs. This has to come in part from Cook Inlet near Anchorage,

in part from Indonesia, in part overland from the Four Corners area by pipeline, in part from Venezuela.

What is the future of California, the most prolific producer in the West, as its own domestic production declines? As production declines, California must rely on more tanker imports from abroad as one option, or, a second option, more development within California.

Mrs. HANSEN. You have many people today seriously saying that you should allow no more oil tankers.

REDUCE ENERGY EXPENDITURE

Dr. PECORA. Another option is that we reduce forcibly or by law the amount of energy that can be expended so that we have to ration the use of energy to the most essential requirement.

If this be done, this is an option. It is one way to reduce your energy requirement, to reduce the demand and the need by some other form. But if mankind is to succeed on this planet on a continuing basis, he has to have his options open to him; and he has to look for all of the evidence he can find so he can choose the right option at that time.

Mrs. HANSEN. If we reduce our energy sources by our own options, we may get to the point where this Nation would be unable to survive.

Dr. PECORA. This is the primary issue in what we classify in our common terminology as economic security—how can we continue to provide the social and physical needs of a culture, of a civilization, if we reduce the energy that that civilization needs? If you reduce the energy, you will unquestionably reduce the economic security of that group of people.

Another way of saying this is, even to maintain our present standards of living, let alone have any new benefits, we have to have a continually increasing supply of energy available.

Considering all of the options available to us, we in the Geological Survey assess our energy resources on the land and offshore as adequate for another century at least. Other people would not agree with us. But looking at it from all——

Mrs. HANSEN. Is this by utilization of all sources of energy?

Dr. PECORA. This is by completely opening all of the options and utilization and discovery. If any constraints or restrictions are put into the system, then we would find ourselves in a bind and that is what I want to emphasize to the committee—if the direction of the Nation is to put those restraints and constraints on, and that is a policy decision, we must face the consequences and they are pretty clear.

COMPARISON WITH SOVIET UNION

Mr. GALIFIANAKIS. Does Russia have an activity similar to the one you perform?

Dr. PECORA. The Soviets have a Geological Survey which is Federal and the Soviets have something in the order of 300,000 geologists working throughout their domain—estimates range from 100,000 to 400,000.

Mr. GALIFIANAKIS. How many?

Dr. PECORA. 300,000 geologists working throughout their domain and the whole United States has about 20,000.

Mr. GALIFIANAKIS. Quality versus quantity?

Dr. PECORA. We are hoping, of course, that is the explanation of the problem.

Mr. GALIFIANAKIS. Do you have an impression of how our energy resources compare with their energy resources?

Dr. PECORA. Yes. There is a lot of information that can be acquired by just reading the scientific literature and applying the same analysis to large sedimentary basins behind the Iron Curtain that we do with sedimentary basins within our own domain.

We feel the Soviets have a large supply of petroleum and gas, but much of it is in inaccessible portions of their country. In other words, they have the same problem we have in Prudhoe Bay—how do you get gas and oil which occurs in the northeastern part in the Siberian region onto the Western market. This is a real problem of pipelines. The Soviets have about five large gas pipelines. These are all above ground. None of them are buried and they are having problems with their pipeline system. This is why their scientists and engineers are following very closely some of the standards and conditions we are setting forth in our Federal Government that must be met by private industry.

Mr. GALIFIANAKIS. Thank you.

Mrs. HANSEN. The committee will adjourn until 1 p.m.

AFTERNOON SESSION

Mrs. HANSEN. The committee will come to order.

SAN FRANCISCO BAY AREA STUDY

Justify your requested increase of $1 million and 28 positions to initiate interdisciplinary programs in selected pilot areas, and augment the San Francisco Bay Area Study.

Dr. PECORA. Yes, Madam Chairman. In the San Francisco Bay project the Geological Survey joined with HUD in an attempt to use this area for a pilot study to determine what factors that exist in the natural environment need to be appraised for better planning as the stress of growth for the urban area developed. We are dealing in the San Francisco Bay project area with nine counties in close affiliation. Our discussions with the planning groups within those local government areas are aimed toward the utilization of topographic mapping, water resource quantity and quality data, geological terrain and resource analyses, in an attempt to help the local planners and regional planners foresee the kind of problems they would be faced with and how to arrange the development plans of the future. The information we have gathered in the San Francisco Bay area has led to inquiries from many other cities. More than 50 other cities have asked us——

Mrs. HANSEN. Please insert a list of those cities in the record.

Dr. PECORA. We would be happy to place the list into the record.

(The cities follow:)

LIST OF CITIES EVALUATED FOR URBAN PILOT AREA STUDIES

Phoenix, Ariz.
Tucson, Ariz.
Los Angeles, Calif,
San Bernardino, Calif.
San Francisco, Calif.
Denver, Colo.
Hartford, Conn.
New Haven, Conn.
Dover, Del.
Wilmington, Del.
Bartow-Orlando, Fla.
Miami, Fla.
Tampa, Fla.
West Palm Beach, Fla.
Aurora, Ill.
Chicago, Ill.
Peoria, Ill.
Cedar Rapids, Iowa
Iowa City, Iowa
Waterloo, Iowa
Lawrence, Kans.
Louisville, Ky.
New Orleans, La.
Baltimore, Md.
Boston, Mass.
Springfield, Mass.
Detroit, Mich.
Pontiac, Mich.
Minneapolis, Minn.
St. Paul, Minn.
Jackson, Miss.
Tupelo-Corinth, Miss.
Concord, N.H.
Exeter, N.H.
Manchester, N.H.
Albuquerque, N. Mex.
Sante Fe, N. Mex.
Asheville, N.C.
Durham, N.C.
Raleigh, N.C.
Fargo, N. Dak.
Moorehead, N. Dak.
Cincinnati, Ohio
Cleveland, Ohio
Dayton, Ohio
Toledo, Ohio
Pittsburgh, Pa.
Scranton, Pa.
San Juan, Puerto Rico
Dallas, Tex.
El Paso, Tex.
Galveston, Tex.
Houston, Tex.
Midland, Tex.
Wichita Falls, Tex.
Salt Lake City, Utah
Brattleboro, Vt.
Washington, D.C.
Seattle, Wash.

Dr. PECORA. Under the budget provided to the Geological Survey last year we selected six of this group. These include the Greater Puget Sound area; Pittsburgh, Pa.; Denver, Colo.; Washington-Baltimore area; Phoenix, Ariz.; and the Connecticut Valley, as six growing urban areas where we could apply some of the lessons being learned in the San Francisco Bay project.

In these six areas the Geological Survey is joining with the State Geological Survey and with that partnership dealing with the regional planners and other State institutions on one side with HUD dealing with its regular affiliates.

SAN FRANCISCO BAY PROJECT

Mrs. HANSEN. How much is HUD allocating for this project?

Dr. PECORA. Insofar as the San Francisco Bay project is concerned over a 4-year period HUD has promised $1.2 million to match our $4.8 million.

Mrs. HANSEN. What is the participation of the State of California?

Dr. PECORA. The State of California through its cooperative programs in water has been contributing funds, the State Geological Survey likewise. Local counties are for the most part participating in discussions without any actual participation in funds.

Mrs. HANSEN. Who is funding this effort?

Dr. PECORA. The San Francisco pilot area is mostly a Federal effort. In the six other cities where we have begun to do our work the state surveys are participating.

Mrs. HANSEN. The San Francisco area poses specific problems of earthquakes. If future development of the area isn't well planned you will face increasing environmental hazards.

Dr. PECORA. This is the biggest problem we face as far as environmental hazards are concerned, that is, how can we plan future development of homes, facilities, public buildings, and other facilities such as to take advantage of the natural terrain to avoid natural hazards and at the same time to provide the area that is necessary for growth.

Mrs. HANSEN. What special emphasis are you giving to bridge, tunnel, and transit system construction in view of the problem of earthquakes?

HAYWARD FAULT

Dr. PECORA. Those construction facilities that have already been made are being located within our growing information system on the earthquake hazards. For example, we have shown on one map along the Hayward Fault, which is an offshoot of the San Andreas, that something like 45 schools are located in the fault zone or within a thousand feet of the fault, and something in the order of five hospitals are located along this fault zone. We can't do anything about that except to indicate that this is a situation. Our detailed studies, however, are attempting to show whether any fault movement is taking place by monitoring this fault.

Mrs. HANSEN. Is there any movement?

Dr. PECORA. Yes; the Hayward Fault is in a stage of creep.

Second, we are attempting to show whether certain kinds of earth materials, dry and wet, will respond differently under earthquake shock, so that if new construction is taking place advantage will be taken of the information we are providing so that will minimize damage should the inevitable earthquakes take place. I think this is our greatest contribution, to minimize the damage that is inevitable because the earthquakes themselves are inevitable.

Mrs. HANSEN. Which parts of their transportation system can an earthquake easily disrupt?

Dr. PECORA. If the bridge, tunnel, or pipeline traverses an active earthquake zone and if the earthquake produced does create dislocation along the fault zone, then there will be stress and strain upon that facility. It could offset a tunnel. It could break a pipeline or bend it; it could do damage of this kind. The problem of response to earthquake damage is one of trying to determine what the possible energy dissemination would be, first, and then what the response of different terrain materials might be, so that you could structurally design against it.

Mrs. HANSEN. Has the present mass transportation system in California been designed against earthquakes?

Dr. PECORA. I have been advised that the State of California has specific earthquake design standards for different areas. However, I must be frank to say that our work is showing that these design standards are based on generalized information of broad zonal responses. We have found tremendous variations of response in one earth material compared to adjacent earth material. We feel that the biggest contribution that can be made is to provide geological engineering analysis so that these response characteristics can be fed into a structural design criteria. This has yet to be done for a large part of California. The State, universities, and Federal institu-

tions are interested in this kind of work, and a large part of our effort is directed to this particular analysis.

LOS ANGELES EARTHQUAKE

Mrs. HANSEN. Isn't the Los Angeles earthquake just a small example of what could possibly happen throughout that State?

Dr. PECORA. It is indeed, Madam Chairman. As a matter of fact, if you recall an earlier question, when this disaster took place the Geological Survey reassigned some 24 scientists and engineers to the accident area for a special study to make as much information available to us as quickly as possible. We entered the area with portable seismometers and other equipment, we made geologic analyses based on land observations as well as aircraft observations, and we came up with a very interesting conclusion. Here is one photograph which shows an overall view of the San Andreas Fault and the San Gabriel Fault, which is an offshoot of the San Andreas.

(The chart follows:)

HA 031L 7-8-69
141
MOJAVE DESERT
SAN ANDREAS FAULT
SAN GABRIEL MTS
SAN GABRIEL FAULT
N
EPICENTER
San Fernando

Dr. PECORA. In this view, in which north is askew, we show the San Andreas Fault, which is the main blocking fault separating the San Gabriel Mountains from the Mohave Desert. An analysis made in the field some years ago shows that the San Gabriel Mountains themselves are a block which is bounded by a fault, offshoot from the San Andreas Fault, and this is called the San Gabriel Fault. This fault system includes planes which are inclined from the surface downward at an angle, and the San Fernando earthquake took place at a location in that San Gabriel block. The symbol shows the epicenter, which is the surface position of the energy dissipation, at a depth of perhaps some 10 miles. A number of aftershocks are not located on this diagram.

However, what happened really is that this San Gabriel Fault block moved just like a grape squeezed between your fingers and outsqueezed another block along breaks shown by the red lines north of San Fernando. Along this new fault zone were many of the buildings which got a terrific shaking. Because of the nature of the terrain the damage was far greater than might normally be expected from a 6.6 Richter magnitude earthquake, which this was.

Mr. WYATT. Where is the veterans hospital? Is that shown on the map?

Mr. RADLINSKI. That is shown right here.

Dr. PECORA. A most important conclusion is that had this earthquake taken place sometime later in the day, instead of at 6:01 a.m., there would have been many more hundreds of people in populated areas who would have been exposed to danger. And had the earthquake continued without withdrawal of water from the Van Norman Reservoir, that reservoir would have broken, and the lives of thousands of people downstream would have been in jeopardy.

What we are learning out of this is that we may anticipate the magnitude of energy that comes out of any particular earthquake area. We predicted this to the Atomic Energy Commission a few years back in our general report to them on seismicity in California for structural design criteria—we predicted that in this area a 6.5 earthquake was to be expected in the near future, and it came out just that way.

SAN FRANCISCO BAY EARTHQUAKE HAZARD

Mrs. HANSEN. Urban planning in a city like San Francisco is almost mandatory if you are going to avoid tremendous casualty lists in the future. Isn't that correct?

Dr. PECORA. This is exactly it. The San Francisco Bay area happens to have earthquakes as its dominant environmental hazard. This hazard is aggravated during the rainy season, when loose, high angle slopes are apt to be subject to landslide. Each area—here we mention the San Francisco Bay area and the six other cities that we are starting in—each area has its own characteristics which have to be factored into the overall study plan.

OTHER URBAN PILOT AREAS

In the case of the Puget Sound area, for example, where there are earthquakes——

Mr. HANSEN. Yes.

Dr. PECORA (continuing). There are, however, vast deposits of sand and gravel related to the old glacial advance. This has an important relationship to construction as well as to preservation of structural materials which are needed in the development of the city. In the case of Phoenix, Ariz., the big problem is the water supply: how does one plan for the future of the region without taking into account the future water supply and many other factors related to that.

The Connecticut Valley is a highly industrialized area. Here the primary water supply is really factored into how to accommodate for industrial development. In Pittsburgh we have old underground coal mines which present a subsidence hazard, among other factors. Each area has been selected because it represents a different set of environmental characteristics. We feel that over the next few years, applying our effort in conjunction with the State and local agencies, we can come up with a realistic analysis as to how that area should grow in the future to the best advantage of that area. Since 80 percent of the people of the United States within the next couple of decades will be living on 10 percent of the land we have to think about urban development as a national problem in addition to that of the resources which feed the Nation and its economy.

ARCTIC ALASKA RESOURCE INVESTIGATIONS

Mrs. HANSEN. Justify your request of $300,000 for "Arctic Alaska resource investigations."

Dr. PECORA. Madam Chairman, what we did here, as first presented to this committee a few years ago, was to consider all of the activities that are going on in Alaska through our normal program and then the added impact of activity required by the study for the Trans-Alaska Pipeline System. We have segregated out from our accelerated program that which is our normal type of work, and that is what is represented by the $300,000 budget item. The other segment, which is $1.3 million, is that work which is specifically related to the pipeline route. We are separating the regular Alaskan work from the specific high-impact Alaskan work brought about by the pipeline permit request.

Mrs. HANSEN. How far along are you in your regular resource investigations on Alaska lands?

Dr. PECORA. In Alaska, I would say we are farther behind than in any other State insofar as basic resources are concerned for a number of reasons. Alaska is relatively inaccessible. It is a high-cost operating area, being distant, and transportation costs are high. With the pressures for resource studies in the lower 48 there was a tendency in previous years to keep Alaska activities relatively low. However, with the accession of Alaska into the family of States, and the realization that the resource potential of Alaska is truly very large, we have stepped up our resource investigations in Alaska. The resources of Alaska must be considered not only for development of the State but for contribution to the national development.

UNDEVELOPED MINERAL RESOURCE BANK

Mrs. HANSEN. Would you say that Alaska is probably the greatest resource bank in the United States today?

Dr. PECORA. As yet undeveloped, yes. What we have done, and this might interest the committee, is to make an analysis of large chunks of area in the western part of the United States which traverses different mountain region and geologic provinces. As a large sample it would be comparable to a similar sample in western Canada and comparable to the State of Alaska which likewise encompasses several geologic provinces. In the western part of the United States the resource development has been a major element in the economy and development of the West. Canada is beginning this stage of development and production and Alaska has yet to begin really, but the potential for discovery in Alaska is as great as it is in Canada or Western United States.

Mrs. HANSEN. I would guess, this entire problem in Alaska is one that is going to be under conversation and in controversy for many years to come. One Member of Congress envisioned that the State of Alaska should remain a permanent wilderness area of the United States.

Dr. PECORA. Well, one can look at our land in many ways. There are many parts of our own Western States which are prime wilderness areas and efforts are being made to retain them as wilderness areas. A large part of Alaska has a varied type of topography and terrain and can be indeed also looked at in the same fashion.

But if one looks upon resources that man needs one has to recognize that in the mineral resource area the minerals are where nature put them, not where we want them to be, and if in fact we intend to explore and develop and produce minerals for man's needs we have to know where they are before we make a decision as to whether we do or do not want to develop them.

ALTERNATIVES TO RESOURCE DEVELOPMENT

Mrs. HANSEN. Do you think there are any alternatives to not using at some point in time the resources in Alaska?

Dr. PECORA. They will have to come from somewhere. The alternative or option which the United States faces if it takes a course of antidevelopment is that it must rely completely on imports from foreign sources.

Mrs. HANSEN. What happens to the economy, if we rely completely on imports? You can't pay for your resources, materials, and your labor and then still expect to be competitive with another manufacturer.

Dr. PECORA. I think you are quite right. The economic climate and configuration of the country will have to change and this must be understood if this option is taken. If we in fact as a Nation adopt an antimineral development image and import all of our needs or most of our needs from foreign sources, then the entire economic configuration of the United States shall change, as you brought out, Madam Chairman.

There would be an outward flow of cash from the United States. There would be less internal development of cash and the developing nations who have these resources being supplied to the United States would then develop a cash flow of their own because of the sale of raw materials or even finished materials. These developing nations of course would be in a better position not only to benefit their physical well-being but they would in effect be taking a major role in inter-

national affairs as being suppliers to the world of not only raw materials but finished materials.

As I said earlier in my testimony, if this planet were composed of one planetary society we could do this with great advantage, by selecting those portions of the world which will be the suppliers of minerals or oil or food; but there are 125 different nations and it is a competitive situation insofar as the world is concerned. So your question directly brings out the question of the competitive role facing the United States if it in fact takes an antidevelopment attitude, and of the consequences that would have to be faced. It would be unfavorable to the present economic and social strength of the United States.

Mrs. HANSEN. Can you think of a comparable country in the world where this has happened?

IMPORT ECONOMY

Dr. PECORA. In the history of Great Britain there were resources in the British Isles which provided some of their necessities such as coal and iron and other materials, As the country grew, Great Britain depended more and more on imports from colonies and other countries, so that today Great Britain is almost entirely dependent on an import economy, and the difficulties of the British I think have been exemplified by a number of studies that have been made in recent years.

I would say that every nation that has command of its own resources for its own economic security will remain a strong nation in health, in physical well being, in economics, and it will remain strong; but if it depends more and more upon imports from abroad it will have to depend on an international arrangement for permanent peace in order to make that system work for everyone.

Mrs. HANSEN. The United States would not be a major constructor of that peace if our economic strength declined.

Dr. PECORA. It would seem to me that we would have a smaller and smaller voice in trying to achieve world peace.

ALASKA PIPELINE RELATED INVESTIGATIONS

Mrs. HANSEN. You are requesting $1,320,000 for Alaska pipeline investigations. Do you want to add any comments to the discussion we had earlier, particularly relevant to the Canadian proposal.

Dr. PECORA. It would seem to me that any pipeline which originated in Alaska and traversed Canada to markets would have to have strong bilateral agreements between the two nations. There are pipeline extensions that can be made in Canada itself, as for example to Norman Wells, which is near the Mackenzie Delta, which would add to the main system. One would have to be sure that the equity is properly sorted out in the oil and gas in their respective pipelines.

Secondly, one must be sure that the proportion of the product being transported, oil and gas, is agreed upon to go to whichever markets. It is quite possible that one can make a proportionate agreement as to what is to go to the west coast, what is to stay in the Chicago area, and what is to go to eastern Canada or New England. These would be extensive agreements and probably would take a lot longer to reach than all the work we have been doing on feasibility of the pipeline itself.

Mrs. HANSEN. These agreements must be reached prior to the actual construction of the pipeline.

Dr. PECORA. It would seem to be the most reasonable way to go. It would be a difficult situation in the future, although Canada and the United States are extremely close in their relationship and have been for many years. One would have to assume, of course, that they will remain as close as they have been, in the future. Otherwise there might be some reasons to have a change of agreement at some time in the future.

But I would say from the technical point of view the amount of work that has been done on the Alaskan portion of the pipeline proposal would have to be done in any Canadian proposal. This would take 1 to 2 years to accomplish because the line is longer and the problems are somewhat like our problems. If one is thinking seriously of pursuing an Alaskan-Canadian pipeline route for the oil, one has to realize that the whole problem is going to be deferred for a couple of years before any construction can begin. The same geologic and engineering information would be required for creating technical standards in the Canadian portion that we have already developed for the Alaskan portion.

TRANSPORTATION AT PIPELINE TERMINUS

Mrs. HANSEN. The next ingredient of these pipelines is the availability of transportation at the terminus of the pipeline.

Dr. PECORA. Yes.

Mrs. HANSEN. I would imagine some place along the line there is going to be water transportation involved?

Dr. PECORA. For the most part, there will be river and lake crossings that naturally will be subject to hazards of leakage or spills. If the purpose of the oil and gas pipeline is to serve only the Midwest and the eastern part of the country, then one is not faced with the problem of how to get that pipeline over the Rocky Mountains and Cascades to the west coast where there is a shortage. I mentioned earlier that the west coast has a shortfall of production of one-third of its needs, something like 500,000 barrels a day. Where is this coming from in the future?

OIL SHORTAGE IN THE MIDWEST

Mrs. HANSEN. Does the Midwest have a great oil shortage?

Dr. PECORA. The Midwest does have a shortage of oil and gas, yes, as we predicted. So does the northeastern part of the United States and the eastern part of Canada.

Mrs. HANSEN. How useful has the St. Lawrence Seaway been?

Dr. PECORA. Fuel oil is transported up the St. Lawrence to Montreal, for example, to provide heating fuel for eastern Canada.

Mrs. HANSEN. Is there a pipeline from the Gulf of Mexico to Chicago?

Dr. PECORA. A gas pipeline but not an oil pipeline.

Mrs. HANSEN. Why not?

Dr. PECORA. Well, I don't know why the oil pipeline has not been constructed from the Gulf to Chicago. Tanker transportation has been the principal means of transporting surplus petroleum.

Mrs. HANSEN. Is that automotive or rail transportation?

Dr. PECORA. I am not familiar with the statistics on the economics here, but it is more a matter of transport of fuel and residual oil for heating, and gasoline as a finished product, rather than of raw petroleum for refinement into these products. Mostly the transport system of tankers is to bring raw material to major refineries where it is broken down into gasoline and residual fuels which are then transported either by tanker or rail or truck to subsequent depots.

The gas line that would come down from the Arctic would connect up with a Canadian interprovincial gas line which passes through Edmonton. This would be a common gas carrier system then which would provide gas to the Midwest and eastern Canada as well as western Canada and western United States, but I think the problem of an oil pipeline is different from that of the gas pipeline. Gas is cooler. It doesn't create the problem of a hot pipeline.

HOT OIL TRANSPORT

Mr. WYATT. What temperature is it?

Dr. PECORA. The oil would be transmitted at a temperature of about 150 degrees Fahrenheit and it would be maintained at that temperature through pumping stations and heat exchangers all the way through the pipeline. This is essentially the temperature of the oil as derived from the ground 6,000 or 8,000 feet below the surface in the Prudhoe Bay area.

Mr. WYATT. Why is it maintained at that temperature?

Dr. PECORA. For chemical reasons. Studies in rheomorphism indicate that temperature changes make the refining system more difficult. It is wiser and more prudent for the chemical behavior of the petroleum to keep it at a uniform temperature until it reaches a destination point for treatment.

Mr. WYATT. How about the temperatures of gases in transit pipelines?

Dr. PECORA. Many of them under pressure, of course, would reduce in temperature and they can become freezing for that matter. We have had some suggestions from private people—why not have the two pipelines, with the gas line enclosing the oil line, so that the cooling gas would keep the oil from getting too hot? But the point is the pipeline people don't want the oil to get too cold. They need to retain it in a warm state because the transmission fluidity is then maintained. The high viscosity at lower temperatures creates more pumping problems and they can't get the quantity transmitted that they think will be needed. They are contemplating, as I understand it, that 500,000 barrels a day would be supplied to the west coast area for needs immediately on the west coast. The surplus beyond this could be for other uses in the Pacific or in other parts of the continent.

PIPELINE TO MEET WEST COAST NEEDS

The first cut is a direct supply to the west coast because as diminishing production occurs in the California fields there is likewise an increase in demand so the two divergent curves create some problems 5 or 10 years from now unless another source is available.

Mrs. HANSEN. If the proposed Canadian route is accepted where would the refineries be located?

Dr. PECORA. The refineries could be anywhere along the route for treatment of whatever oil can be taken from the line and transferred and transformed into chemical products. One could still pipe raw petroleum to the west coast—to Puget Sound or Portland—where the oil would either be refined and the product transported by tanker, or raw material transported by tanker. It is a roundabout way to get oil to the west coast. There is no question about that.

Mrs. HANSEN. Would this add to the cost?

Dr. PECORA. It would add to the cost of transporting it as well as construction of the pipeline itself, and a significant portion of it still would have to end up in west coast ports like Los Angeles, San Francisco, the Puget Sound area, and Portland.

Mrs. HANSEN. Unless the demand in the Midwest and Northeast were great enough to use the entire output.

Dr. PECORA. There is, of course, the possibility that the demand for petroleum and gas is so strong in the Midwest and northeastern part of the United States and eastern Canada that this demand might be for the entire output. That is possible.

Mrs. HANSEN. What would happen to the west coast if this occurred?

Dr. PECORA. It would be in worse shape than I predict it is right now, relying on tankers from abroad to bring oil to the west coast.

(Discussion off the record.)

JOBS INVOLVED IN ALASKAN AND CANADIAN ROUTES

Mrs. HANSEN. I don't think you can review this entire problem without considering how many jobs would be involved by the Alaskan route and by the Canadian route.

Dr. PECORA. If one thinks of the economics of employment related to pipeline construction and operation, then obviously it becomes a very important consideration whether the pipeline is in Alaska or in Canada. Without any question of doubt many millions of dollars each year will be expended for maintenance and repairs, and for surveillance and monitoring, creating positions for a great number of people. The number of tankers necessary to carry 500,000 barrels of oil per day from Valdez down the west coast would be just a few more than the tanker fleet currently being used to transport 200,000 barrels a day from the Cook Inlet field near Anchorage. This would not really make a large impact on the tanker traffic on the west coast.

TRANSPORT FROM COOK INLET

Mrs. HANSEN. Has there been any uproar to date by the people on the western side of Canada about the Cook Inlet tankers?

Dr. PECORA. I have heard none so far. I am sure that most people who have discussed this don't realize that oil is being transported by tanker from Cook Inlet at the present time. These keep to the outside waters because of necessity to get to San Francisco or Los Angeles. Now, the tankers of smaller or medium size have no problem getting into Puget Sound or San Francisco Bay. The large tankers that might develop in the future probably would have difficulty and would not be permitted in San Francisco Bay. They could transport, however, to the Los Angeles area where the principal refineries are. The Puget Sound area has a depth of water which is sufficient to handle large

tankers, but there may be some opposition to large tankers entering Puget Sound because the turnaround radius is not as favorable. But whatever the situation is, the amount of tanker traffic that would be needed to carry an increased amount of oil from Valdez added on to what is going down from Cook Inlet would not make a major impact on the traffic moving down the west coast.

(Discussion off the record.)

IMPORTS FROM INDONESIA

In considering other aspects of the tanker transportation to the west coast we recognize that approximately 100,000 barrels or 200,000 barrels per day are transported from Indonesia. This is a rather important source because it is low-sulfur oil and can be used mixed with our own domestic oils to give a favorable product. The future of Indonesia, looks very promising, and a lot of exploration and development is going on there. One of the options we have on the west coast, of course, is to not receive any oil from Prudhoe Bay and get all of the oil from across the far Pacific if the production is big enough to take care of it.

Now, we are not sure of the reserves in Indonesia. We have made analyses in the Geological Survey of the situation in Prudhoe Bay. We are confident the reserves there are sufficient to assure a supply to the west coast to make up for its shortfall for many decades. These are the options that the Nation has to face, that is, given these situations what is the best course of action. This is the issue before the Nation.

EXPLORATION OFF COAST OF VIETNAM

Mrs. HANSEN. It has been reported in the papers that there is oil exploration work going on off the coast of Vietnam. Dr. Pecora may we have your comments on this?

Dr. PECORA. Our Geological Survey analyses have indicated for many years that the Continental Shelf throughout the world should be looked at for its potential of oil and gas. The Geological Survey has submitted technical reports for the review of the United Nations concerning these potentials. I represented the technical group for the Department of State a few years ago in New York. Dr. V. E. McKelvey of the Geological Survey now is our principal technical representative and is at the present time in Zurich, Switzerland attending the United Nations meetings at which the potential of the Outer Continental Shelf is being considered. The United Nations has strongly endorsed exploration on the Outer Continental Shelf so that a better handle could be gotten on distribution of oil through the world.

Exploration including seismic surveys is going on all the way from the Soviet border down the Sea of Japan, off Taiwan, down the coast of Indochina, into Indonesia. It is showing that there are areas that warrant exploration drilling. However, to state that the United States is extending the Vietnam war to create a position in oil development off Vietnam, I think is utterly absurd. It is an international search for oil which is sponsored by the United Nations and reports have been issued by the United Nations, and I would say that Vietnam is in no separate position from any other offshore areas off Asia or Africa or South America. There is a worldwide search that needs to be made with greater and greater perception to determine where our future

oil supplies are coming from, and much of this will be in the offshore area.

Mrs. HANSEN. Thank you very much.

Mr. WYATT. A very good statement.

Mrs. HANSEN. An excellent statement. I am probably not too incorrect when I say that a great deal of the problems today in the world are related to economics.

Dr. PECORA. It seems to end up that way because basically poverty throughout the world, which is certainly widespread, is really the absence of economics.

Mrs. HANSEN. This committee is increasingly aware of what depths of poverty our own Nation may well face within the next 50 years.

Dr. PECORA. Yes. The United States has been extremely fortunate, first, for having the natural environment which will make our science and technology and economics become productive and, second, in utilizing them in such a fashion that the distribution system of its effort has been extremely effective. Now, perhaps in doing this we have moved too fast, and in our cost economics we have only figured in the actual minimum that was needed to make the lowest cost.

Mrs. HANSEN. The environmental costs have never received enough input.

Dr. PECORA. These side effects have never been costed into the economic system and now we are suddenly faced with 100 years of this lack of planning and to factor all of that in at one time will be $100 billion at a mimimum. I think what the Nation is facing is that henceforth we should factor in the economics of those side effects which economists call externalities, factor them into the cost of the product and the cost of the system, while at the same time we figure out ways to ameliorate what we have done already.

Mr. WYATT. Madam Chairman, will you yield for a question?

Mrs. HANSEN. Yes.

LINK OF DEVELOPED ENERGY TO POVERTY

Mr. WYATT. Doctor, would you agree that there seems to be a rather direct link between developed energy supplies and poverty in geographical areas?

Dr. PECORA. I would say yes. In my own personal view there is a direct link, because the science and technology which is controlled by good economic practice will provide for location of raw materials, development of raw materials into a product, whether it be food or substance of the mineral kingdom, and then distribution of that product to the system so that the system can respond and participate. There is no need for poverty in India today when one considers the great amount of food-producing areas that the world can bring into production. It is a problem of distribution to the system.

Now, this is a harsh thing to say because in reality India and many other countries are suffering tremendous nutrient deficiency, in protein and others, and yet when one considers the parts of the world that are arable, where with modern science and technology food production can take place, it is a broad economic failure of the international scheme. I keep coming back to my old theme—as a geologist I look at the earth as a single unit, and I think eventually, probably a thousand years from now, the people on this earth are going to look upon themselves as a single system on the planet. When that

happens, then I think these conditions can be avoided but until that happens we have to work some international scheme of search, find, develop, and distribute. This is what we need to do in the international arena.

NATIVE CLAIMS IN ALASKA PIPELINE AREA

Mrs. HANSEN. At the present time do the Native claims extend into any areas which will be traversed by the pipeline?

Dr. PECORA. I am sure that under whichever bill you refer to the pipeline does traverse one of the areas that is a part of the bill. In particular, the only village closely traversed by the pipeline is Stevens Village.

Mrs. HANSEN. If the Native claims prevail, will these Natives receive any remuneration if the pipeline traverses their land?

Dr. PECORA. I don't know whether or not part of the conditions of the Native claims bills would be a payment for the right of traverse to the villages or whether that would be included in the outright payment to the Native villages. I think that this is up in the air and is not mentioned specifically in any of the bills. I am unable to answer that question.

Mrs. HANSEN. I think this is an important ingredient and the committee would be interested in answers because our Alaskan Natives are among the most inpoverished people in the world and just giving them raw land isn't going to be the answer to their impoverishment.

Dr. PECORA. I would agree. I would say that each of these bills does contemplate, in addition to land, making a payment of funds which would be held for the utilization of the Native groups. Whether they will have direct participation equity in the pipeline is not a matter of these bills, I believe.

Mrs. HANSEN. No.

Dr. PECORA. But I think that the pipeline people have stated that they will train and employ Natives in the construction, maintenance, and operation of the pipeline. I feel sure that this has to be done because you will need people to keep the pipeline going, if it is ever constructed, and the Native people have to be trained for that particular kind of work.

ANALOGY TO INDIAN FEE LANDS

Mrs. HANSEN. I can quickly think of an analogy on the settlement of the Native claims to some Indian fee lands in the United States which rapidly disappeared from the Indians. The Indians needed immediate cash and had to dispose of the land at a much lower figure than they would if they had had the ability to develop their own land. This is particularly true in those areas where the Indians own timberland and the related mineral rights.

Dr. PECORA. I think that in the Northwest there are many examples of this and in other parts of the country too. As I read these Native claim bills for Alaska, I see an attempt by the people sponsoring these bills to do something beneficial for the Native Indians, Aleuts and Eskimos; something that will not be dispensed with in time but something done on a permanent basis. I think this is a very enlightened way to go at it, to be sure that some trust is formed so that the funds can be used in the future for future generations.

Mrs. HANSEN. Yes. You are only sentencing them to starvation if they only have land.

Dr. PECORA. I think there is an old saying "land poor".

Mrs. HANSEN. Exactly.

STANDARD QUADRANGLE TOPOGRAPHIC MAPPING

Justify your requested increase of $2,479,000 for standard quadrangle mapping.

Dr. PECORA. Madam Chairman, we have increases indicated in two areas. One is the standard quadrangle mapping program itself. You will note that we do not intend to put any of these increases into revision mapping. We still believe that first attention should be given to the primary mapping itself. A small part of the increase will be toward the development of our National Cartographic Information Center. The Map Information Office in the Geological Survey is the source of information on maps throughout the Nation. There is now general agreement as to the need for a broader effort to systematize the cataloging of data from our own Federal, State, and local agencies in keeping with the circular from the Bureau of the Budget that a central information center in the Geological Survey would be an excellent way to provide basic answers to inquiries on maps and map data throughout the Nation. A very small portion of our funds would be going into that.

The increase of $786,000 is being asked for as a substitute for what had been a transfer from the Bureau of Reclamation in the Missouri River Basin. It is the intent of the administration to now have these funds appear directly in the budgets of those agencies using the funds in the Missouri River Basin, and this is the first year of that change of budgetary procedure.

So, of the net increase of $2.479 million, we are asking for $786,000 for mapping in the Missouri Basin which had been accommodated previously by transfer of funds, and essentially $1.5 million for new mapping throughout the country, and $150,000 for a National Cartographic Information Center.

ENDORSEMENT BY ASSOCIATION OF AMERICAN GEOGRAPHERS

Mrs. HANSEN. The Association of American Geographers has written endorsing the principle that the rate of mapping in the United States at the scale of 1:24,000 should be greatly accelerated and that the continuing revision program be adopted to maintain the quality of the mapping. The letter goes on to say:

> Estimates have indicated that the cost of our not having adequate maps is well over $1 billion annually. That sum is far greater than the cost of the proposed program.

BENEFITS FROM TOPOGRAPHIC MAPPING

Dr. PECORA. I am very happy you brought this up, Madam Chairman, because a few years ago the Geological Survey sought an analysis of the benefits from topographic mapping from an outside institution by contract. One of the rather important conclusions reached by that organization was that the amount of the annual benefits derived from all the mapping that has been done is in the order of magnitude of $900 million, whereas the total cost of all the mapping that has been done by the Geological Survey from the beginning is in the order of

magnitude of $430 million. On that basis we considered that if we got into our mapping program at a faster pace, then the benefits would accrue at a faster pace and earlier. In other words, we would realize at an earlier time the benefits from the mapping. For this reason we have attempted on a number of occasions to expedite this mapping.

This has also been very strongly endorsed by the Association of State Geologists who are direct users of our maps, by other Federal agencies, and institutions throughout the country, but in this budget which you see before you it had to be curtailed to meet the situation of limited funds which were to be shared by so many other programs.

Mrs. HANSEN. We limit our own production of wealth continually by our budgets.

Dr. PECORA. Yes. Now that we have some pretty good statistics from the System Development Corporation as to the benefits that are measurable in mapping, we feel all the more comfortable in attempting to increase the pace of mapping, particularly since only 20 States are covered with maps at either of our standard scales; and at the scale supported in the letter you read, Madam Chairman, only nine States are covered.

STATUS OF MAP COVERAGE

Mrs. HANSEN. Do you want to insert the names of those States in the record?

Dr. PECORA. I would be very happy to place them because I think this is a very important piece of information.

(The information and chart follow:)

STATES WITH COMPLETE MAP COVERAGE AT SCALE OF 1:24,000

Connecticut
Delaware
Indiana
Kentucky
Maryland
Massachusetts
New Jersey
Ohio
Rhode Island

Status of Topographic Mapping
7½-minute
15-minute
July 1970

MAP REVISION AND MAINTENANCE

Mrs. HANSEN. Justify your request of $4,330,000 for map revision and maintenance.

Dr. PECORA. There is no increase being asked for in our revision program even though we are falling farther and farther behind in this work. We are attempting, of course, constantly to find that balance of mapping funds used to complete the mapping system of the United States and at the same time update old maps that are out of date. It is a very difficult decision to determine relative priorities in each one of those categories. This year, at the urging of many States we decided to put all of the increase for the mapping program into new maps and just hold level on our revision, hoping that next year we might be able to catch up somewhat.

SMALL-SCALE AND SPECIAL MAPPING

Mrs. HANSEN. Justify your request of $1,955,000 for small-scale and special mapping.

Dr. PECORA. We have a number of projects in the small-scale and special mapping program. The principal one, of course, is the standard 1:250,000 scale series of the United States. We expect to complete 60 of the maps that are now in progress, and we will begin revision work on 60 other maps of this series.

NATIONAL ATLAS

A part of these funds has been used to complete the National Atlas, which is probably well known to you, Madam Chairman, and members of your committee.

Mrs. HANSEN. It is a very good atlas.

Dr. PECORA. It has been an excellent job, really.

Mrs. HANSEN. How many copies have been printed?

Dr. PECORA. In our first printing, 15,000 copies, and if I may——

Mrs. HANSEN. Have they all been sold?

Dr. PECORA (continuing). Quote some statistics, something in the order of 2,000 copies have been sold but the peak has not been reached because there are groups that buy in large quantities who have not yet come in. By law we were to distribute copies of this map, this atlas, to the GPO, the Library of Congress, Members of the Senate and the House, and some of the libraries. I would say that in the 2 months that the atlas has been on the market the sale to the public of 2,000 copies is about as expected, and we expect this to continue.

THEMATIC MAPPING

Mrs. HANSEN. I am intrigued by a sentence in your justifications.

The thematic mapping program includes the preparation of maps to portray distributional patterns of man-environment interactions.

Would you discuss that for us please?

Dr. PECORA. Yes. I will introduce the subject and ask Dr. Gerlach to take over. Dr. Gerlach, you know, is the chief geographer on my staff. For many years in the Geological Survey we have considered the land-water interactions as the primary domain in which we did most of our work. Now that man is becoming actively concerned about the

environment we must give attention to how man fits into the environment and what he needs from the environment. So in our office of geography we are attempting to enter this field of considering the man-environment interaction because the land-water interaction is already part of our background.

Dr. Gerlach, will you tell them some of the things we have been working on?

Dr. GERLACH. I think you have covered the essentials of it very well, Doctor. In thematic mapping, however, perhaps 80 percent of the time is involved in gathering and classifying the data and about 20 percent in graphic presentation in map form. The big chore in thematic mapping is the integration of statistics from many disciplines, and the resultant product probably helps more than anything else to bridge the gap between the physical and social sciences and to make more readily interpretable the scientific work that has gone on to user groups, scholars, social scientists, and so on.

We are particularly interested in land-use mapping, urban mapping, a wide range of complex special subject maps, many of which appear in the national atlas but have to be updated very frequently because as soon as you get into the social-cultural field things change very rapidly and so probably the biggest part of the program should be oriented eventually toward better understanding of the land uses in the United States as a whole, in its urban communities, from a national viewpoint.

We have been getting only point data lately or in the past from the cities, and I think now that we can make some selections of cities widely scattered over the United States it will give us an overview of what is going on in urbanization for the whole country instead of a lot of spot checks.

Mrs. HANSEN. Thank you very much.

Dr. PECORA. Permit me to point out that most of the maps in the National Atlas of the United States were in the thematic map series under the editorship of Dr. Gerlach.

GEOLOGIC SURVEYS

Mrs. HANSEN. Justify your requested increase of $300,000 and four positions for an additional 8,000 square miles of geologic surveys, primarily of public lands.

Dr. PECORA. The geologic mapping program of the Geological Survey hasn't advanced its budgetary position for some time, and the $300,000 is being sought for this purpose. The work will be directed toward our public lands for the most part in our regional mapping program, for use largely in the Rocky Mountain area; $195,000 is being assigned to the Rocky Mountain area because of the additional emphasis needed on oil shale and clean energy, coal and gas and resources of this kind.

A smaller portion, $45,000, would be in the Eastern States and $45,000 in the Pacific States. This is a very small increase for a major program of this kind, but it is our feeling that there are certain adjustments that need to be made in our geologic mapping program and this will permit it.

Mrs. HANSEN. How much of the oil shale area has been thoroughly mapped by the Geological Survey?

Dr. PECORA. A very small portion of the area. The principal oil shale areas are in three States—Wyoming, Colorado and Utah. The first work of the Geological Survey in these areas was essentially a stratigraphic effort, that is to find out what the three dimensional picture was in different parts of this three-State area for projection, for analysis in depth and that sort of thing.

In detail a mapping program was begun a few years back—

Mrs. HANSEN. When?

Mr. JAMES. Some work on the oil shale has been carried on to some degree since World War I. It has been carried on at a modest level ever since that time. I would think perhaps 25 percent of the oil shale lands have been mapped reasonably adequately.

Mrs. HANSEN. Must they be mapped prior to your final conclusion?

Dr. PECORA. It is our opinion that the mapping and the analysis should be done and then that information transmitted to the Bureau of Land Management and the Secretary for any major judgments about the disposal of these lands.

Mrs. HANSEN. This would enable the Bureau of Land Management to have the kind of knowledge that previously wasn't available on your offshore and oil shale lands.

Dr. PECORA. This is the primary purpose, Madam Chairman—to direct the information so that it can be used to the maximum benefit of the Nation in designating which areas can be leased to the greatest advantage for immediate exploration and discovery.

It is really a question of where can you put the efforts to the greatest advantage in the quickest time, with the least detriment to the environment and presumably the least cost. This can only be done with the kinds of work we do first. Our information is made available to the many others who use the information in their operations.

Mrs. HANSEN. Please insert in the record the total potential oil shale reserves, technology, and environmental obstacles to development.

Dr. PECORA. We will be happy to do so.

(The information follows:)

POTENTIAL OIL SHALE RESERVES, TECHNOLOGY, AND ENVIRONMENTAL OBSTACLES TO DEVELOPMENT

Although enormous low-grade sources of energy are potentially available from oil shale, the only deposits that contain enough organic matter to yield oil in amounts that are of commercial interest are situated in western Colorado, northeastern Utah, and southwestern Wyoming.

These deposits contain enough organic matter to yield about 2 trillion barrels of oil if the entire deposits could be processed. Only a small part of these deposits, including the richest, most accessible shale in thick mining units, appears to be of current interest for development. Such shale units 30 feet or more thick, yielding about 35 gallons of oil per ton, accessible from the outcrop or by shallow underground mines, contain about 80 billion barrels of recoverable oil by demonstrated mining and plant extraction methods. There is apparently not sufficient incentive for industry to develop such deposits at present.

The total resources of rich oil shale (yielding 25 gallons or more oil per ton) in the Colorado, Utah, and Wyoming region contain about 600 billion barrels of oil in place. Leaner shale of the deposits (yielding 10 to 25 gallons per ton) contain about 1.4 trillion barrels, but most of these deposits are too deeply buried or too low-grade to be of present commercial interest for development. The oil potential of other low-grade shale deposits in the United States has been estimated to be

about 26 trillion barrels in place. None of these deposits, however, appear to be of present interest as a source of oil.

Status of technology.—Government and industrial research in mining and processing oil shale has demonstrated that substantial quantities of oil can be produced from the richer oil shale by underground mining and mine-mouth processing at costs approaching costs of comparable petroleum from wells. Research by industry and Government on extraction of oil from shale in place has been conducted during the past 10 years on the deposits in Colorado, Utah, and Wyoming but results to date have not been reported to be promising as an economic process for extracting oil from shale. In some areas of Colorado and Utah schemes for open pit development of oil shale have been promoted but the costs of such development seem prohibitive in light of environmental obstacles.

Environmental obstacles.—Recent studies of environmental problems relating to future oil shale development indicate that most environmental obstacles can be met with partly undetermined additions to cost of producing oil and byproducts of shale. The likely regulations on restoring land surface may preclude open pit mining for consideration. The control of saline water effluents may become a future problem.

Mrs. HANSEN. Have any oil lands been leased?

Dr. PECORA. As yet none.

EARTHQUAKE RESEARCH

Mrs. HANSEN. Justify your requested increase of $200,000 and two positions for seismological and geological studies to reduce potential losses from earthquakes. This is a subject in which the committee is deeply interested.

Dr. PECORA. I think, Madam Chairman, the Nation was awakened to the sudden importance of earthquakes in this generation as a result of the Good Friday earthquake in 1964 in Alaska.

As a result of that earthquake disaster, a Presidentially appointed committee made a study of the event and from it a special committee reporting to the Office of Science and Technology prepared an earthquake prediction report dated, I think, in 1966.

In 1968 a second report was prepared by an interagency group of the Federal Government which I chaired reporting to the Office of Science and Technology.

This report addresses itself more specifically to the kind of damage that would come out of such earthquakes and how the kind of information that might be obtained might be useful in minimizing that damage by setting up construction criteria ahead of time before an earthquake took place.

This 1968 report was transmitted to the Office of Science and Technology and to the Bureau of the Budget and it called for a 10-year program and essentially a doubling of the existing Federal effort in the first year.

I estimated at that time that the total funding from the Federal Government, with all of its agencies and bureaus, was in the order of $7 million. This included money in the Department of Defense, funds in the National Science Foundation which were directed to universities, it included funds in the Department of Commerce, Department of Interior and other agencies.

PROPOSED 10-YEAR PROGRAM

We suggested that in the first year of a 10-year program almost doubling of the effort, and then having this increase over the next 10 years. The program would provide information that could be

extremely useful in identifying not only the earthquake active areas but the nature of the response of the ground materials and the kind of engineering design that would be needed to minimize potential damage.

MAJOR EARTHQUAKE PREDICTED

It was our conclusion that if a major earthquake such as that which hit San Francisco in 1906 should occur, the damage would run into many billions of dollars, and the fatality loss would be extremely large. We have always hesitated to put a number on the fatalities because of the inevitable panic that will come among the people if they recognize what the situation is.

Since then we calculated on a statistical basis that an earthquake of the intensity of the San Francisco earthquake in 1906 should occurr any time within the next 30 years.

In other words, the best analysis indicates a return cycle of 50–100 years for major earthquake movement on the San Andreas fault in the San Francisco area.

The information we are acquiring with our modest funds is extremely important in helping to designate where construction should go and what construction design should apply.

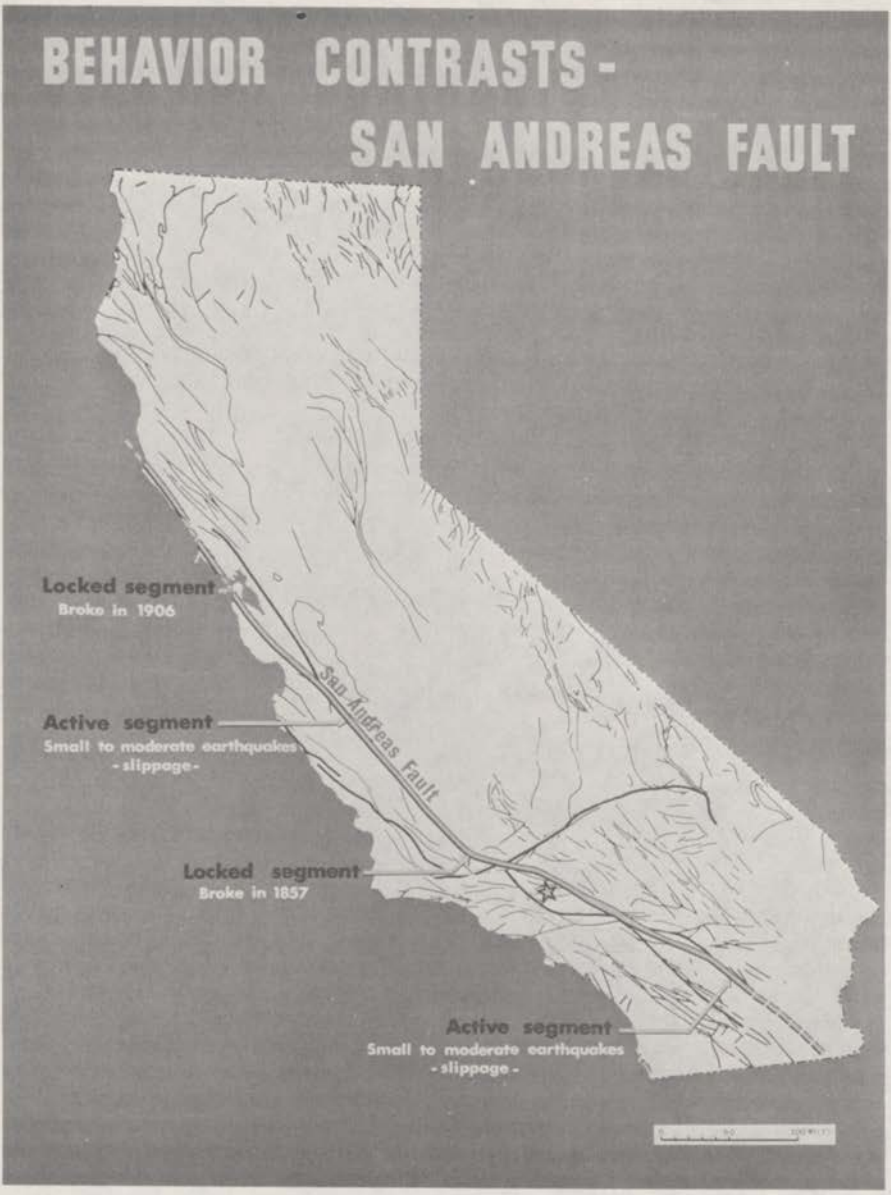
We feel, however, because time is catching up with us, that the effort should be at a much larger scale.

CALIFORNIA EARTHQUAKE SYSTEM

I would like to show the committee, if I may, a chart of the California earthquake system on which we have shown the locked portion of the fault and the unlocked or active, portion of the fault.

(Chart follows:)

58-935 O—71—pt. 3——37


BEHAVIOR CONTRASTS -
SAN ANDREAS FAULT
Locked segment
Broke in 1906
Active segment
Small to moderate earthquakes
- slippage -
San Andreas Fault
Locked segment
Broke in 1857
Active segment
Small to moderate earthquakes
- slippage -

Dr. PECORA. Our field seismometers indicate strain release taking place in those active segments of the fault—some of the strain is being relieved on a continuing basis. For these areas we would not expect to have a major earthquake.

For the locked portions such as in the San Francisco Bay and Los Angeles areas, we would expect that when the strain is released it would in fact be as a major magnitude earthquake. California, Nevada, the Pacific Northwest and other areas are subject to major catastrophic-type earthquakes. The purpose of our program——

EARTHQUAKE-PRONE AREAS

Mrs. HANSEN. Where are the earthquake-prone areas in the Northwest?

Dr. PECORA. In the Puget Sound area and north into Canada in the Vancouver area are well defined areas along the western portions of Washington and British Columbia. It is rather important, however, to recognize that earthquakes are not solely restricted to the Pacific borderland all the way up to Alaska and down to South America. There are earthquake zones in other parts of the United States and the lessons we learn from this program can be applied to other parts of the world.

It seems to me that we are going to feed our program, of course, on catastrophe. When the Peru earthquake took place last year, our people who had studied that area recommended after the quake that the town not be relocated in the same place because of the susceptibility to earthquake induced landslides.

There are all varieties of recommendations that can come out of an earthquake study program; these are based primarily on research in depth.

The funds we are asking for are extremely modest in view of what the two major reports recommended. I should say also that there is a third report that has been prepared recently under the auspices of the Office of Science and Technology and which is being reviewed by the Office of Management and Budget. The results of that report, I feel sure, will endorse everything that has been proposed in the two earlier reports.

If the kind of information that can be secured before the fact can be put into operation and design, it will reduce by a large measure the damage from a future earthquake.

Mrs. HANSEN. I would recommend that every Member of Congress, particularly those in the earthquake-prone areas, read your Alaska report "Lessons and Conclusions."

If you will recall, a few years ago, this committee asked you if the governmental agencies were soliciting from the Geological Survey information prior to locating facilities in possible earthquake-prone areas. I think your answer was they were not.

Dr. PECORA. That is right.

JAPANESE PROGRAM FOR EARTHQUAKE PREDICTION

Mrs. HANSEN. Last year we discussed very briefly the Japanese earthquake detection program. Have you had any recent reports from them on this program?

Dr. PECORA. The Japanese are far ahead of us in their prediction program. This includes more than just seismometers to measure shaking; it includes tiltmeters, magnetometers, and strain gages to measure other aspects of rock behavior and response.

We feel the Japanese have been very effective in doing the kind of research that should be going on in earthquake countries and in the application of that information to their own problems.

BUDGET FOR EARTHQUAKE STUDIES

The State of California has always been forward looking in this area, but it has come to my attention that even within the State of California the funds have been curtailed or diminished somewhat.

I recognize, of course, there is bound to be some periodic readjustment in budgetary programs. But here is an area where I think the funds put into acquisition of information, which can be factored immediately into a system to minimize future damage, has an obvious cause-and-effect relationship. I would speak very strongly, Madam Chairman, and ask that if next year we come to you with a bigger budget proposal in this area, it be looked upon favorably, because I have a great deal of confidence——

PACIFIC NORTHWEST

Mrs. HANSEN. You have no problem with me. Remember I live in earthquake country. In fact, my own town was stricken by an earthquake.

We had several deaths, as you know, in the Northwest. In fact, if the legislature had remained in session, those of us who sat right under the chandelier would have been dead because we adjourned the week prior to the earthquake and that was all that saved us.

(Discussion off the record.)

EARTHQUAKE PREDICTION

Mrs. HANSEN. The Associated Press had an article that said:

> The earthquake that struck the Los Angeles area last week focused new interest on an old question, Can earthquakes be predicted? Even the experts don't know. Some say it is possible; others say it is impossible. Still others say it is possible, but only with more money, equipment, and research."

The article goes on, and quotes one expert:

> The mathematical calculations involved in checking earthquake series and field data magnetic fluctuations, plus factors and the like, are so immense no computer can adjust them.

Do you want to comment?

Dr. PECORA. I would say earthquakes can be predicted within general areas of discussion. We have a leg up already. We know where many of the principal faults are, and we would like to know if there are other earthquake faults that exist that haven't been identified.

Second, knowing where the faults exist, and by studying the geologic characters on both sides of the faults with our field instruments, we can come up with an estimate as to what might be the magnitude of the earthquake when it occurs.

As I mentioned earlier in my testimony, our people predicted that an earthquake should it occur in the San Gabriel area would be of 6.5

magnitude. That is exactly what happened. It was a lucky prediction perhaps, but the fact is that it is the order of magnitude of that kind of an earthquake in that general environment.

So that prediction requires, (1) location of the area, (2) the general magnitude of the event, and (3) and this is what we are reaching for now, when will it happen. We have no experience in predicting when it will happen, and all we can do at the present time is to give you what we call a return cycle, that this will happen probably once every 100 years or once every 50 years, depending upon the history of the region and the nature of the creep and reaction along the fault zone.

But the Japanese are having some success in being able to predict movement on some of the faults for which behavior has been instrumentally observed for some time. They have been able to predict within a period of days or weeks that something is happening on certain faults that subsequently have had earthquake movement.

RELIEF OF SEISMIC STRAIN

Another area of prediction, of course, lies in the concept that if energy is building up, can you in fact help relieve that strain?

Experiments are going on in the Rangely oil field of Northwestern Colorado where water is being injected into the oil-bearing formations as a secondary recovery system. The area is under geologic stress, and injections of water ease the strain on those rocks and earthquakes occur. In concert with private companies we have had a program over the past year or two of inducing secondary water pressure and then stopping it, inducing it and stopping it. The instrumental record is unequivocally clear that earthquakes can be induced and that they can be stopped, by controlling water pressure drive in an area of strain.

With this in mind it would be interesting to have an experiment in some active earthquake fault, to see if water injection will permit gradual release of stored energy, rather than abrupt release through natural earthquakes. This is an area we are looking into.

PREDICTING EFFECTS OF EARTHQUAKES

The final area is predicting the kind of effects and the cost of those effects. We can, I think, make good estimates of the effects of an earthquake of given magnitudes in a certain region, considering the type of construction and facilities that exist there.

It is really shocking to calculate the costs that might be involved in recovering from a major earthquake in the San Andreas country if the big bang should happen in the next 30 years. It is a shocking realization.

Mrs. HANSEN. The fact is that some of these communities that stand right in the path of the earthquakes, do not take the opportunity to move their facilities such as schools and hospitals.

Dr. PECORA. Mrs. Hansen, this is a very important point. I had a visit recently from the mayor of Valdez who came to thank me personally for the work that the members of the Geological Survey did in advising them to move their town from the existing site on a glacial outwash plain on the Alaskan coast to a site about 4 miles away where the terrain was firmer bedrock—not only in locating the new site, but also in indicating the best portion of the site and the area for future development of the town.

In the followup it is interesting to note that the tank farm which will receive the oil on the projected pipeline might have been put on hazardous terrain. Now, of course, with the knowledge and information we have developed, it will be located on hard rock terrain, which will involve more costly construction because our standards require that the tank farm shall have dikes around it which will contain 110 percent of the total volume of oil that would be contained in those tanks.

WARNING SYSTEM

Mr. YATES. How much would it cost for this country to have the same kind of warning device you say the Japanese have?

Dr. PECORA. We have a very good analysis on this, Mr. Congressman. We calculate that over a 10-year period, the present rate of expenditure by all Federal agencies would amount to about $75 million. The proposed program would cost about $200 million over a 10-year period.

Mr. YATES. What does this mean? Why do you need so much money? What would have to be done?

Dr. PECORA. One has to drill into the fault zone and emplace strain meters and other instruments down the hole where the action is taking place and record these on a continuing basis. One needs to have measuring devices of ultrahigh accuracy which would indicate whether there is any creep going on along a fault, as measured from points on opposite sides of the fault.

Mr. YATES. Would this program take care not only of the California area but as well the Northwest?

Dr. PECORA. It would be a national program. It also would include the engineering aspects that apply to design criteria.. We recognize, of course, there are options as to where you put your money in national programs. Here is one area we think is of great benefit because of the hazards.

SCHOOLS AND HOSPITALS

Mrs. HANSEN. These points were made in the Associated Press article:

> Why did the brand new $19 million Olive View Hospital give way in the Los Angeles quake?
> Why did 10 State highway bridges and overpasses collapse and another 10 suffer severe damages and cut off a freeway? Why was the 45-year old VA hospital building in which more than 40 persons were killed allowed to be modified and renovated only recently? How could the Van Norman Dam presumably built to resist major stress nearly give away?

These are a few of the questions that resulted from the California earthquake.

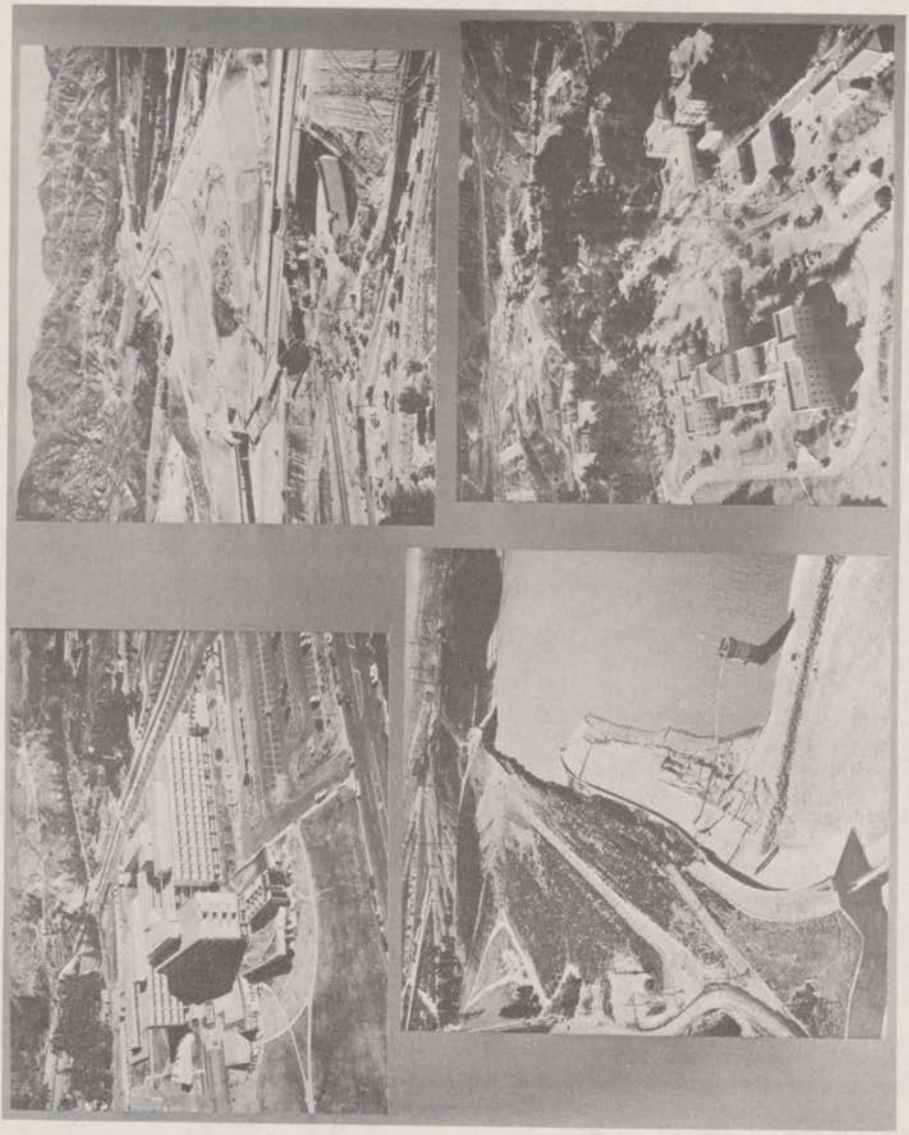
Mr. YATES. Would the information that would be achieved through this program be able to prevent happening what Mrs. Hansen just said?

Dr. PECORA. That is the direct aim of the program, yes. It would in the future. One of the things that might be done is to make a study of existing schools and hospitals. You have got to think first of schools and hospitals, I think, in a situation like this. And some of them might be in bad terrain and we might have to recommend that they be reinforced or that they be displaced and moved somewhere else.

I am sure that some of the recommendations that would come out of this program, Mr. Congressman, would not be received too well, because it would involve pretty tough decisions.

But this is the option. You have got to know what you have got to decide upon. It is so easy to operate in ignorance, so that when something happens, you dont know the reasons. I would rather operate with the knowledge when I had a decision to make, no matter how tough it was. I will insert a chart in the record showing some of the damage that was done.

(The chart follows:)



Mrs. HANSEN. It would seem to me something was wrong about the input of knowledge available to them. I can't see any reason in the world why the Veterans' Administration would be updating and modernizing a 45-year-old hospital that is right in the middle of an earthquake-prone area.

The economics are such that you have to make an investment to save some money.

Dr. PECORA. I think this is a good summation. You make your investment to save money in the future. It is a question of how big an investment and when do you start making it.

PROJECT VELA UNIFORM

Mrs. HANSEN. An article recently appeared in the Wall Street Journal with regard to the efficient detection of earthquakes now being performed by the Defense Department with Project Vela. Please describe for the committee how your earthquake detection system is coordinated with Project Vela.

Dr. PECORA. The Geological Survey was one of the Federal bureaus who assisted the Department of Defense in setting up Project Vela Uniform. The purpose of Vela Uniform was to determine what the source of certain seismic phenomena might be. Frankly, the intent was to be able to distinguish between earthquakes and underground nuclear explosions.

Through the expenditure of many, many millions of dollars, a system has been successfully devised for distinguishing between earthquakes and underground nuclear explosions.

Mrs. HANSEN. If we can invest that kind of funds for that project why can't you invest funds to save lives?

Dr. PECORA. Do I have to answer the question?

Mrs. HANSEN. Yes.

Dr. PECORA. My feeling has been that we should be investing funds in this kind of a program in the broad civilian area without deterring from the investment of funds in national security.

Mrs. HANSEN. I am not at all against protecting our national security, but I still think you have an obligation to the people in an earthquake-prone area. From the standpoint of saving lives, I think you have an investment to make.

Dr. PECORA. It would be a prudent area of inquiry to find out how you should construct your buildings and facilities in a hazardous area. Good work has been done here and there in the past. But the problem is so widespread that a lot of work needs to be done.

RELATIONSHIP TO ATOMIC UNDERGROUND TESTING

Mrs. HANSEN. Have you ever found any relationship between atomic underground testing and earthquakes?

Dr. PECORA. In the Nevada test area it is a fact that in one of the experiments an induced man-made earthquake represented by an atomic explosion has resulted in subsequent after shocks induced by the original atomic blast.

In most earthquakes we are dealing with multiple shocks, but in an atomic explosion we are dealing with one single event.

Mrs. HANSEN. Supposing it happened at the same time?

Dr. PECORA. This is what I was leading up to: If we had an atomic blast at, or nearly at, the same time as a natural earthquake nearby, could the earthquake have been induced by the atomic event? We have shown by our studies at the Nevada test site, in fact, there are minor shocks that have been induced by the atomic event.

So that, yes, an atomic blast can induce earthquakes. We have measured them, we have plotted them, we have shown where they exist.

The question really is, can an atomic blast in Nevada set off a major earthquake on the San Andreas. We believe that the energy differential here is so large that this is unlikely. We doubt there is enough energy in one of these underground blasts to tilt the scales.

Mrs. HANSEN. How about Amchitka?

Dr. PECORA. In Amchitka our studies of the Geological Survey on behalf of the Atomic Energy Commission did in fact show that the device explosion would not only lift the ground a measurable amount, but could result in a break in the ground.

However, some miles away in the Aleutian trench, which has been the site of many earthquakes over geologic time, the amount of energy expended to make these earthquakes is so much greater than the experiment on Amchitka that we thought it highly unlikely that the Amchitka nuclear event would set off a major earthquake.

Mrs. HANSEN. You better hope the earthquakes don't occur at the same time as the explosions.

Dr. PECORA. The explosion would get blamed for it no matter what. But we don't know how big the next experiment would be, and we would have to make a calculation on the experiment presented to us.

Heretofore we felt there would be no danger.

VOLCANIC DANGERS

Mrs. HANSEN. I notice you are continuing investigations on the volcanic dangers at Mount Saint Helens.

Dr. PECORA. In earlier testimony before this committee we indicated that one of the programs involved a study of the Sierra-Cascade volcanic chain which extends through Washington, Oregon, and northern California.

We had reported to this committee that although the volcanoes of the chain are now dormant, there had been a major explosion in which the head of one volcano blew off about 6,000 years ago and the result of it is now, of course, Crater Lake, Oreg. Crater Lake was once one of these high-coned volcanoes, but the crest blew off in a major event about 6,000 years ago.

For this reason we instituted a study program and found some of these volcanoes were getting warmer. We decided to have an experiment with Mount Rainier. In conjunction with the National Park Service we installed instruments and have had them recorded via the Nimbus satellite to see if we could obtain a continuous recording of temperature at this spot in Mount Rainier. This has been in operation 1 month, but the system is working excellently.

What we intended to do here is what we have done in Hawaii. In addition to temperature measurements, we plan to ring the volcano area with seismometers to see if there is any motion that can be picked up that reflects the movement of lava at depth.

We won't know until we have tested the system whether any hazard is coming up in the immediate future.

We have had volcanic events in this volcanic chain, which includes Mounts Saint Helens and Rainier, within historic time. If in fact one of these volcanoes is heating up, this can be a forerunner to a volcanic eruption. We need to know whether this temperature change is on a positive slope or a neutral and hence nonhazardous slope.

This is part of the broad volcanic hazards program which was started in Kilauea where after 10 years we were able to predict volcanic eruptions. We feel with this program we will be able to conclude whether any of these volcanoes in the Sierra-Cascade chain are in fact heating up, in which case we will give it very special attention.

GEOGRAPHIC DISTRIBUTION OF CERTAIN DISEASES

Mr. OBEY. Could I go back to page 27 for a second. I noticed an interesting statement that you had done some research investigating what you said was the odd geographic distribution of heart diseases and congenital malformation.

Dr. PECORA. Let me introduce it and then ask the chief geologist to give you detail. This is an exceedingly interesting area.

Several years ago the Geological Survey worked a program out with the National Institutes of Health to study environmental distribution of certain diseases. We found there was in fact a geographic relationship between certain diseases and the character of the terrain.

Our program decreased in this area largely because of lack of funding support from National Institutes of Health, but there has been a recent recurrent interest in this problem. I think it is an extremely interesting relationship. I have several examples, but I would rather have the chief geologist give you some he has been personally interested in.

RELATION TO MINERAL DEFICIENCIES IN SOIL

Dr. JAMES. What you refer to is the incidence of cardiovascular disease in the Southeastern United States. What we undertook to do there was to examine the incidence of disease in relationship to the content of mineral elements in the soil, in the water, and in vegetation. We did in fact find there was a rather strong correlation between deficiencies of certain of the elements and the high incidence of heart disease.

We have become involved with——

Mrs. HANSEN. What deficiencies were there?

Dr. JAMES. Curiously enough, iron was one; others are manganese, chromium, vanadium, cobalt, and zinc.

Mr. YATES. Are there not so many old people down there who are going to get more heart disease anyway?

Dr. JAMES. That is what makes this a difficult problem and why we work with medical doctors and statisticians. It is difficult to isolate the causes of high death rate. For example, Arizona has a high death rate of tuberculosis. That is because people with tuberculosis go to Arizona, not because Arizona is a tuberculosis-prone area. It is a very difficult problem to work out and there are many factors involved.

Nevertheless our work with the medical researchers and statisticians is indicating some quite significant relationships between not only disease and geochemistry of soils and water but between health and geochemistry, too. So you can work both sides of the fence.

Mr. YATES. If that is true, do you have a corollary to that as to what is the healthiest part of the United States as far as heart disease is concerned?

Dr. JAMES. We are far from the point where these areas could be defined. We are attempting now to take adjacent counties where the maximum differences in death rates occur, to study these patterns to see what the geologic difference is between adjacent areas and see if we can run it down through geochemistry.

(Discussion off the record.)

Dr. JAMES. If the question had been asked 20 or 30 or 40 years ago as to the distribution of goiter in the country, I think we could have provided a geological answer. Since then it has been found it is lack of iodine in waters that produce goiter and other thyroid conditions.

There are areas of the country in which the rocks containing ground waters are continental, or nonmarine, in origin, and they don't contain any significant amount of iodine. This could have been predicted from knowledge of the geologic environment. The Pacific Northwest is one that would have been a high goiter incidence area.

Dr. PECORA. The same problem has been faced in behavior of soils under geochemical conditions of climate. In the Southeast, for example, high rainfall, but particularly in areas of soils unresponsive to iron chelation or the organic transfer of iron. We find that many of the indigenous diseases there have a relationship in the lack of uptake of iron in the system because the iron itself is not in organic form.

Metal mercury in certain areas can easily be transformed into the organic state of methyl mercury and hence organically transmitted and retained by the system, as contrasted to mercury in the form of the sulfide.

ENGINEERING GEOLOGY PROGRAM

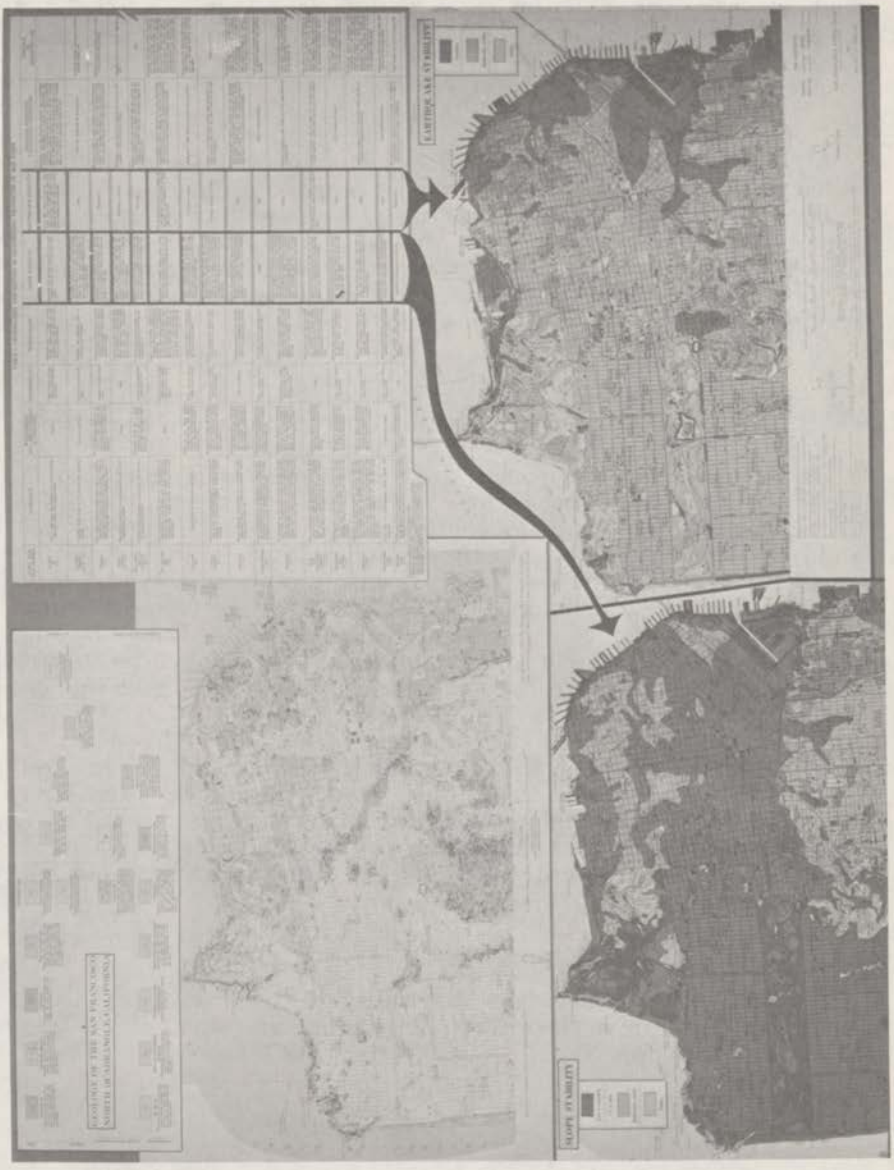
Mrs. HANSEN. Would you briefly summarize for us your engineering geology program? Will this be coordinated with your special resource and environmental project we discussed earlier?

Dr. PECORA. Yes; the engineering geology program is essentially to provide in the urban areas, and elsewhere, the kind of terrain analysis needed for construction and design of facilities. What kind of terrain would be the best support, for example, for oridinary dwellings as opposed to major facilities? What angle of slope, what is the nature of the movement and soil conditions on that slope?

This is a program which has arisen or grown out of our background program in our geologic division.

Basically the making of a geologic map is a sum total of all the research effort. It places on a single map a great many observations and measurements of the terrain, the physical character of the terrain that we walk upon. From this are made derivative, or environmental, maps. An example of that is in the chart before you. From the original geologic map analysis of that area, certain criteria are derived such as those related to earthquake stability or to slope stability.

(The chart follows:)


GEOLOGIC MAP OF THE SAN FRANCISCO
NORTH QUADRANGLE, CALIFORNIA
SAN FRANCISCO
LATITUDE 37°45'
LATITUDE 37°30'

Dr. PECORA. Engineering geology is an attempt to apply geologic research to engineering problems such as highway and dam construction and site selection. Our engineering geologic maps with tabulated measurements and observations are then used by highway construction engineers, by developers, in an applied fashion by a great variety of people.

MINERAL RESOURCE SURVEYS

Mrs. HANSEN. $13,503,000 is requested for mineral resource surveys. What will be the principal thrust of your program in 1972?

Dr. PECORA. This is one of our base programs. It is a core program that covers our studies of various minerals in different categories. For example, one category is that of energy resource investigations, which include the organic fuels, uranium, and thorium, as well as geothermal energy which is a newly developing field.

GEOTHERMAL ENERGY

Mrs. HANSEN. Why has geothermal energy not been more fully utilized?

Dr. PECORA. It has been one of the great surprises of my professional life that it hasn't been because geothermal energy has been known for a long time and put to great use in places like Iceland, New Zealand, and Italy. In many places not only steam but hot water itself has been converted to useful purposes.

Our Bureau has been making studies over a 25-year period because we look upon these hot springs and thermal areas as being the end product of a funnel system in which minerals were being deposited at depth. Geysers and hot springs are the end products of that funnel-through system.

We have studied in detail the character and mineral content of these hot spring waters to see if we could determine what the mineral resource potential was in deeper rocks should those rocks have been up-tilted elsewhere through some geological event.

In our study of the geothermal areas of the United States we have proposed certain standard conditions in response to the new bill passed by the Congress.

GEOTHERMAL AREAS IN WESTERN STATES

You will notice in the chart that with few exceptions most of the geothermal areas are in the western part of the country.

(The chart follows:)

KNOWN HOT SPRINGS and GEOTHERMAL AREAS
YELLOWSTONE
GEYSERS
SALTON SEA
CERRO PRIETO

Dr. PECORA. The reason for this is quite clear. The western part of the country geologically is younger, there are more volcanoes, more volcanic——

Mrs. HANSEN. More explosive.

Dr. PECORA. More explosive. I was going to say more active. And there are some areas where the temperature of the thermal source is so high that water is superheated and it will flash into steam when brought to the surface. And because of that flash energy transfer one can develop geothermal energy and make electricity.

This is being done now at the Geysers in California. This is an area of hot springs but they are not true geysers. A private company has drilled here and the steam produced is being used for power generation.

The creation of Yellowstone National Park was so successful because here was a beautiful example of a natural phenomena in hot springs, geysers, and that sort which should be preserved.

I have to also apologize when I say this in the presence of my friend, George Hartzog, Director of the Park Service, but this is the most beautiful example of where one could get future energy not only from geothermal but also from all the water over the waterfalls. He pales every time I talk to him.

Mrs. HANSEN. You might talk to him about Ohanapecosh Hot Springs. He has done nothing about the problem at that area.

Dr. PECORA. I would say in the case of Yellowstone, the Nation has made its decision to put this aside and we should not be concerned about it.

But there are places in the West where the temperature and conditions are such one could utilize this type of energy. It would not be as extensive as energy from conventional sources, but in these particular areas one would not have to import oil or coal to make energy. At the least one would use the hot water to heat homes in the winter under controlled conditions.

Mr. YATES. How would the cost compare with other sources?

Dr. PECORA. They are competitive. The costs at Geyser per kilowatt-hour are competitive with conventional plants.

The new Geothermal Steam Act of 1970 requires us to identify geothermal areas for competitive leasing on the public lands. I would say here is an area of interest that should receive a lot of attention.

Mr. YATES. What happens if the geyser stops flowing?

PERMANENT HEAT CELLS

Dr. PECORA. The rocks are still hot; you can push water down. It virtually is a permanent heat cell. The heat source in hot rocks below the geyser or hot spring is diminished so slowly that we can expect the only problem would be what fluid do you put down to heat up. You could put air down.

Mr. YATES. Can you put salt water down?

Dr. PECORA. You can. You might have a problem in that the salt water would be more corrosive on any of the metallic conduits than fresh water. Hot air would be a good way to go. Get hot air back and use it as a heating system. There is a great potential of this in the West and in some places in the East.

Probably next year when we come before you we will have an addition to our budget for additional work in the geothermal area because we have nothing so identified in our budget at this time.

Mrs. HANSEN. Nothing at all?

Dr. PECORA. Only a nominal amount. Mostly we are scrounging funds in the general area of geologic research to support this.

NATIONAL WATER DATA PROGRAM

Mrs. HANSEN. Justify your requested increase of $399,469 and 10 positions to provide needed water data in which Federal interest is paramount.

Dr. PECORA. We are attempting to make national standards on quality of reporting. If we did not do this on a national scale, then we would have a potpourri of informational items that are going into analysis of our national water system.

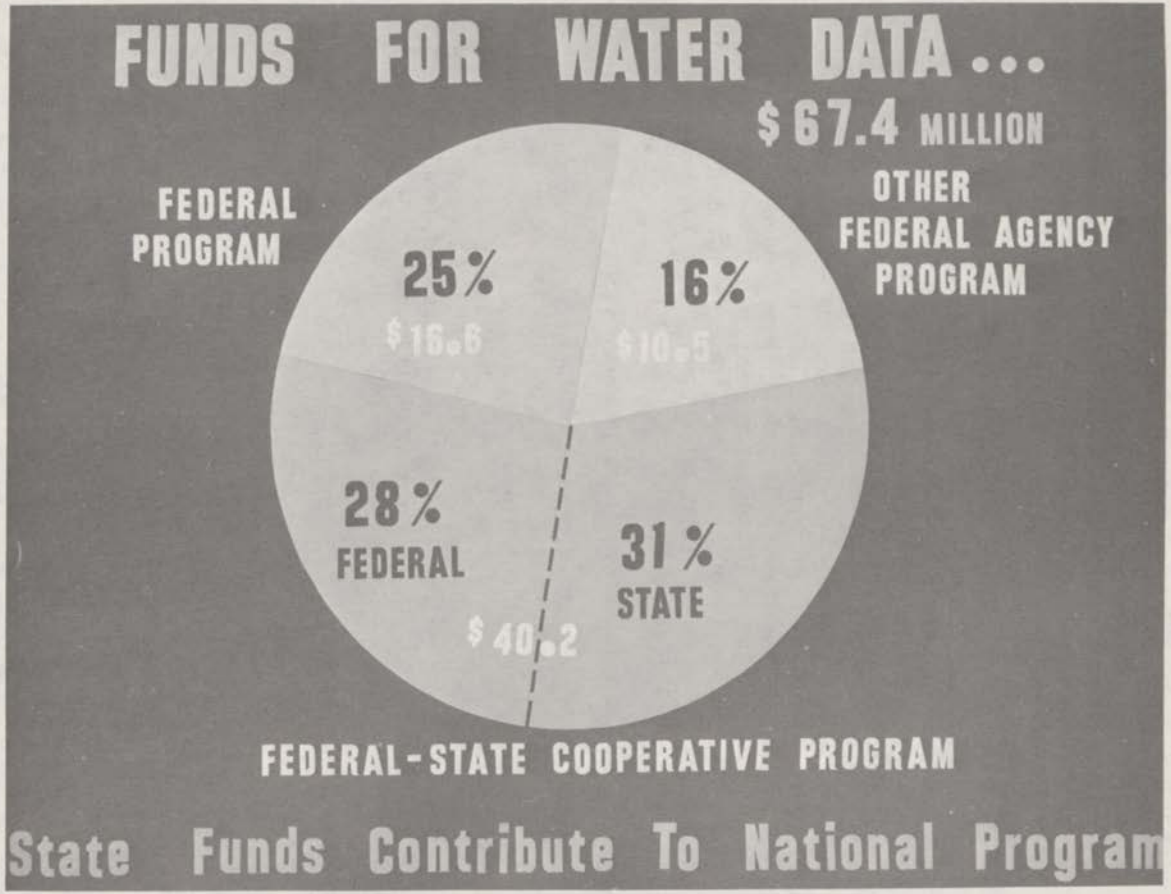
The Geological Survey's Water Resources Division has had this obligation for a number of years and has had an excellent coordinating relationship with other Federal bureaus and the States. In the overall program we have one segment which is completely Federal, and another segment which is a joint State-Federal cooperative program, where the States and Federals are matching funds to do the work under the management of the Federal Government. And in a third portion of the program is our reimbursable work we do for other agencies at their request.

SOURCES OF WATER PROGRAM FUNDING

Mrs. HANSEN. What is the source of the water program funding?

Dr. PECORA. As this chart shows, the funds for water data in this budget total $67.4 million and the portion of the program I have identified as the independent Federal program on a national scale makes up 25 percent of the total budget. The work we do for other agencies and are reimbursed for that work, which would include Bureau of Reclamation, Federal Water Quality Administration, Corps of Engineers, et cetera, makes up 16 percent of our total effort or $10.5 million.

(The chart follows:)


FUNDS FOR WATER DATA...
$67.4 MILLION
FEDERAL PROGRAM
OTHER FEDERAL AGENCY PROGRAM
25%
$16.6
16%
$10.5
28%
FEDERAL
31%
STATE
$40.2
FEDERAL-STATE COOPERATIVE PROGRAM
State Funds Contribute To National Program

Dr. PECORA. These data are given to the other agencies but also are put into the national system where we are controlling the water data program.

The other part of the program is this joint match, Federal-State program, which makes up $40.2 million where the Federal appropriation directly identified as being available to match that which is available from the States is 28 percent of the total program. Inevitably the States offer more funds to do this work which we cannot match. This is a problem we find ourselves in year after year.

Mrs. HANSEN. Yet we are talking about revenue sharing.

Dr. PECORA. Yes; this is kind of revenue sharing in reverse where the State groups, some 400 different agencies, put up funds which are matched on this basis—where the States and local municipalities are transmitting funds into the Federal Government, through a contract, for us to manage a water data program for them in their area to meet their problems, their needs, and to put that information into the Federal system.

MANY AGENCIES CONCERNED WITH NEW SOURCES OF WATER

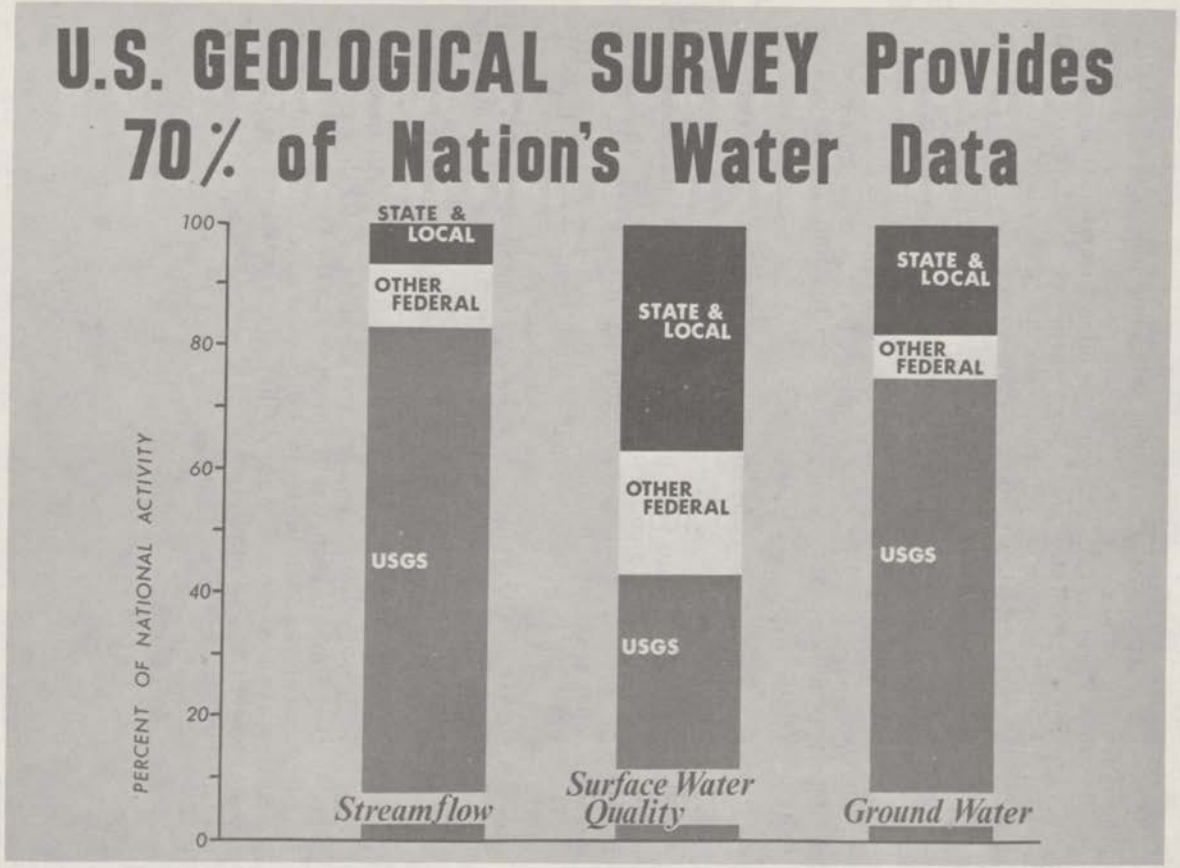
Mrs. HANSEN. Isn't it true, Dr. Pecora, that many river basins find themselves at certain peak use times short of water? Many communities are not able to compute their total needs for water in the future. The governmental agencies dealing with water are continuously searching for new sources of water?

Dr. PECORA. It is quite true that a local group does not have the total picture of what options and alternatives for water might be called upon. In a study of a river basin, for example, the Federal survey is in a better position to analyze what the effects of the water use and water supply of the whole basin could be through this program.

In order to have a common central source of this information, the Water Resources Division of the Geological Survey has been selected and designated by the Bureau of the Budget as the principal water coordinating agency. Seventy percent of all of the water data gathered in the United States is gathered by this group in the Geological Survey.

The chart before you indicates in the areas of streamflow and surface water quality and ground water, what the breakdown is in these areas of water data accumulation.

(The chart follows:)


U.S. GEOLOGICAL SURVEY Provides 70% of Nation's Water Data
PERCENT OF NATIONAL ACTIVITY
100
80
60
40
20
0
STATE & LOCAL
OTHER FEDERAL
USGS
Streamflow
STATE & LOCAL
OTHER FEDERAL
USGS
Surface Water Quality
STATE & LOCAL
OTHER FEDERAL
USGS
Ground Water

GROUND WATER ENVIRONMENT

Dr. PECORA. We have found in the ground water area that in the past it is not sufficient, it is no longer adequate, to look upon ground water merely as a source of fresh water. We must also look upon the ground water environment as a source for storage of water for peak needs and look upon the third dimension finally as a source of waste disposal, where it would not affect the ground water.

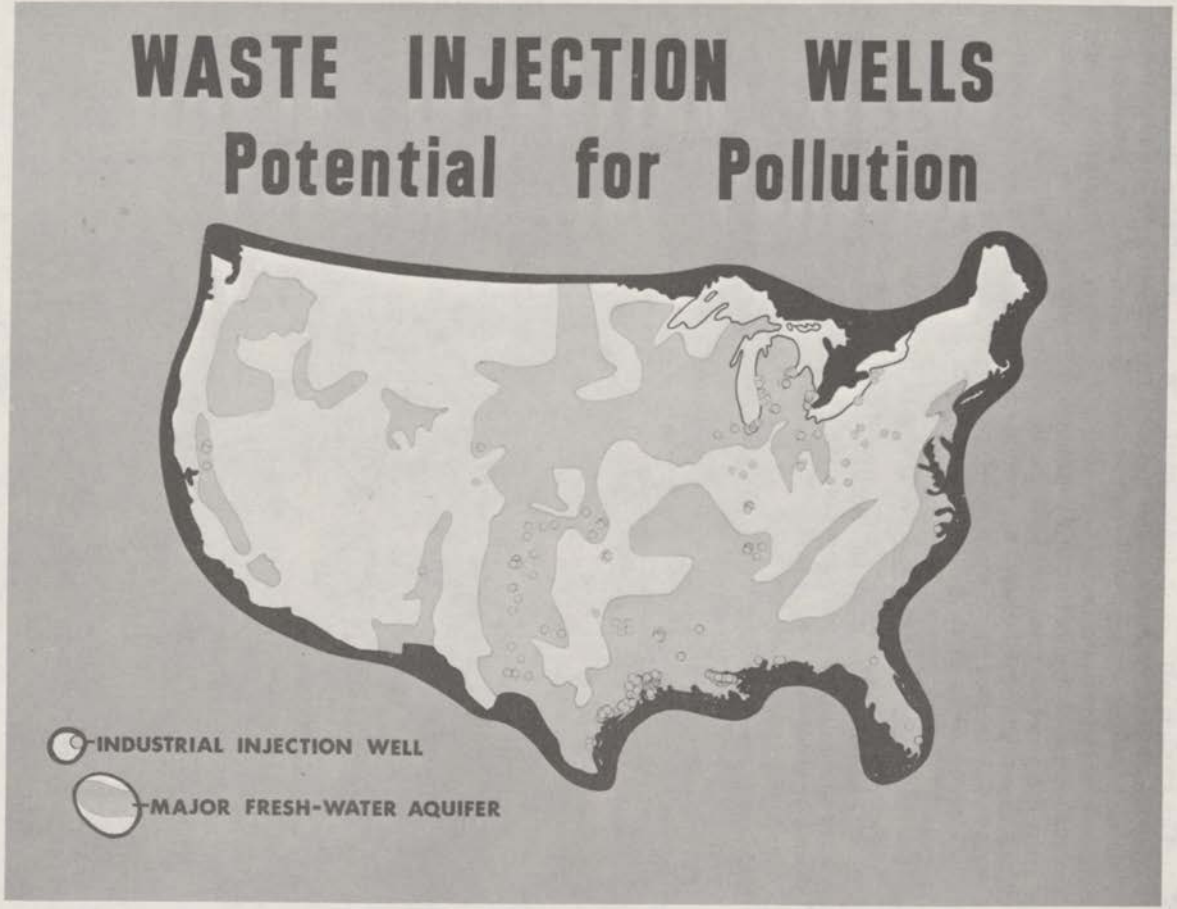
I don't know whether you would like to get into this concept of waste disposal at this time.

Mrs. HANSEN. Yes, we would.

UNDERGROUND WASTE DISPOSAL

Dr. PECORA. We have an excellent chart to show you what we consider to be our waste disposal analysis.

(The chart follows:)


WASTE INJECTION WELLS
Potential for Pollution
INDUSTRIAL INJECTION WELL
MAJOR FRESH-WATER AQUIFER

Dr. PECORA. This chart shows the distribution of waste injection wells in red and also in blue the major water-bearing aquifers of the Nation. That is the underground source of fresh water supply.

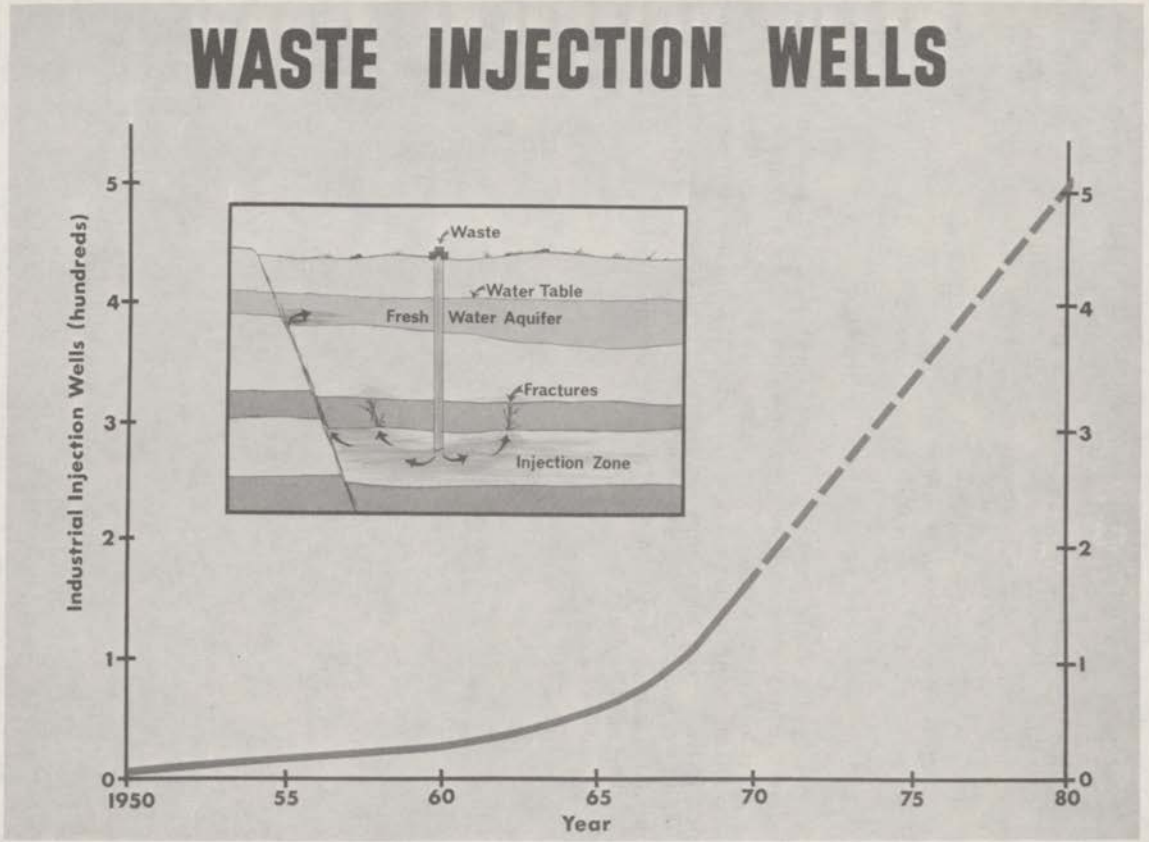
One can see immediately how the biggest industrial activity has been in the area where along the coast there have been great water supplies in depth as well as from stream flow. But in the interior where waste disposal is a necessity, the area where waste disposal is at a maximum is also the area in which ground water aquifer potential is at a maximum.

How do we permit this without disturbing or destroying the fresh ground water supply for future generations or even for this generation? I would guess in your State you are facing this quite severely, Mr. Yates.

INJECTION INTO SALINE AQUIFERS

We have a chart showing the cross section. It is possible in certain areas to put waste injection wells down through the fresh water aquifer zone into some deep aquifer that is saline or nonfresh and let it disperse itself in that nonfresh aquifer. We must watch out, however, for faults where there may be seepage, or fractures in the overlying sealing formation; that there will be no migration of this waste injected fluid upward into the fresh water zone.

(The chart follows:)


WASTE INJECTION WELLS
Industrial Injection Wells (hundreds)
0
1
2
3
4
5
1950
55
60
65
70
75
80
Year
Waste
Water Table
Fresh Water Aquifer
Fractures
Injection Zone

Mr. YATES. How far down is that?

Dr. PECORA. This is a matter of a couple thousand feet. We have a specific area in western Oklahoma, the panhandle, where the Ogallala sandstone formation is a broadly distributed fresh water aquifer practically at the surface and is the base of the water supply for many farms.

Down deeper about 2,000 feet is the saline, salt-bearing aquifer which makes a good waste disposal zone. So the petroleum producers producing from a greater depth are disposing of their waste brines back through the fresh water zone into the underlying material.

DISPOSAL IN SALT MINES

Mr. YATES. Was your agency consulted with respect to the disposition of the atomic waste in the salt mine?

Dr. PECORA. Yes, the Geological Survey had a continuing advisory-consulting relationship.

Mr. YATES. Did you approve that disposition?

Dr. PECORA. Which salt mine?

Mr. YATES. The one in Kansas.

Mr. CLARKE. What we did, sir, was to examine the preliminary environmental impact statement and make our comments upon that. We pointed out a number of things that should be taken into more account and gave constructive criticisms as to how they should improve their analysis of the situation.

In general we think, as they do, that disposal in salt mines of this sort is the best means of disposal, but the impact statement left many things improperly discussed. So now they are going about it again.

Mr. OBEY. What kind of substances are being injected?

PETROLEUM AND CHEMICAL WASTES

Dr. PECORA. One, in petroleum-producing areas, brines which are mixed with the oil on the way up and have to be disposed of. Rather than disposing of them on the surface, they are reinjected.

Second, chemical wastes are being reinjected to greater depth. Mr. Clarke will probably list a lot of these.

Mr. CLARKE. One of the most troublesome things cropping up now in many of these locations is industrial waste of all sorts, plating fluids, petrochemical wastes, all sorts of things that are difficult to dispose of in surface streams because the standards are improving all the time or becoming more stringent all the time.

You name the waste, whether it is municipal sewage or an industrial chemical, you can find all sorts of things going into the ground into hundreds of wells that are now operating over the country.

MUNICIPAL WASTE DISPOSAL

Mr. YATES. May I ask about Chicago which worries about disposing of its waste.

Is this the type of waste disposal operation that a metropolitan community of millions of people could use?

Mr. CLARKE. I should say that is a rather broad question to answer. Presuming you could get into an aquifer of this sort (points to diagram) a saline aquifer no good for anything in the future—and aren't

pre-empting it from some other use, and can be certain the well has proper integrity—never will leak—and the formation likewise has no fractures or faults that will allow leakage into some useful aquifer—one might conceed it is a proper way to dispose of things that can't be disposed of easily in another manner.

Mr. YATES. Can you dispose of the wastes of a community having millions of people in this kind of way?

Mr. CLARKE. You can dispose of it for a considerable period of time.

Mrs. HANSEN. What period of time?

Mr. CLARKE. Maybe for decades, maybe for centuries in some of the big aquifers. For example, in Florida the saline aquifer might take a tremendous amount of discharge of the kind you are talking about without causing any trouble. But this must be investigated. No one can say so categorically.

We are in the process now of investigating this very thing. Real trouble comes from the fact that there are all sorts of holes, abandoned wells, rusted casings, wells closed with fence posts, and that sort of thing that are, in places, unidentified.

COST OF INJECTION

Mrs. HANSEN. What would the cost be in something like that?

Mr. CLARKE. The cost of injection?

Mrs. HANSEN. Yes.

Mr. CLARKE. Obviously the cost of injection is cheaper than the cost of disposal by product reclamation—not cheaper than disposal in surface stream. But since surface disposal is prohibited and it is cheaper than disposal by salt reclamation—by product reclamation—people are going underground.

MISSOURI RIVER BASIN PROGRAM

Mrs. HANSEN. Justify your requested increase of $786,000 and 49 positions for water data for the Missouri River Basin development program.

Dr. PECORA. Madam Chairman, this request for an increase in funds is in the same category as that mentioned earlier, that normally in past budget cycles money for work in the Missouri River Basin had been transferred to the Survey account from the Bureau of Reclamation and the budget is being reformed in having the money directly appropriated to the Geological Survey. This is the work that has been going on on a continuing basis in the Missouri River Basin.

Mrs. HANSEN. Isn't this going to have a direct impact on Montana and all the States downstream?

Dr. PECORA. There are a number of States that are involved.

Mrs. HANSEN. How many States are involved?

Dr. PECORA. Mr. Hendricks.

Mr. HENDRICKS. Seven, Madam Chairman.

Mrs. HANSEN. Please insert a list of those States in the record.

Mr. HENDRICKS. Be happy to.

(The list follows:)

The States involved in the Missouri River Basin program are Colorado, Kansas, Montana, Nebraska, North Dakota, South Dakota, and Wyoming.

FEDERAL-STATE WATER PROGRAM

Mrs. HANSEN. You are requesting a $500,000 increase for the Federal-State water program. Please insert a list in the record of the States participating in this program.

Dr. PECORA. Yes, we would like to put that in the record, if we may.

(The list follows:)

Cooperative water-resources investigations are carried out in all 50 States, the District of Columbia, Puerto Rico, the Virgin Islands, Guam, American Samoa, and the Trust Territories of the Pacific. The table on page GS–41 indicates fiscal year 1971 matching funds and estimated fiscal year 1972 offerings for matching for each State.

Mrs. HANSEN. What is the requested $500,000 increase for?

Dr. PECORA. The $500,000 is what we are presenting in our budget to match their offerings over and above what it has been thus far, the existing program of $18,785,000.

GROUND WATER RECHARGE

Mrs. HANSEN. You say in your justifications, "Investigations in progress include one at Lubbock, Tex., begun in fiscal year 1968, representing conditions in the High Plains of Texas and New Mexico; one on Long Island, begun in fiscal year 1970, for studies of injection of storm runoff; and one in the Minneapolis-St. Paul area . . ."

Do you want to give the committee the results of these investigations?

Dr. PECORA. Mr. Hendricks, would you want to do it now or put it in the record?

Mr. HENDRICKS. Madam Chairman, it is a little too early to give you the results because the type of program that we are doing is aimed more directly at understanding principles and problems and exactly what happens in the subsurface when you inject water. We do not approve at the moment of the empirical method of going in and putting down wells and just shoving the water down to see what happens. We would rather understand what happens and therefore in the initial phases of our work we have not been doing extensive injection practices, but rather have been emphasizing the more theoretical and more fundamental aspects of the problem. Perhaps next year at this time we can give you some definitive answer.

Mrs. HANSEN. Please insert a summary of the results in the record.

Mr. HENDRICKS. Thank you, Madam Chairman. We will do that.

(The information follows:)

Results so far include:

High Plains: (a) a survey and analysis of current and past recharge operations that identifies conditions favorable to recharge has been completed; (b) new methods to define the controls or recharge, such as the permeability of the unsaturated zone, have been developed and applied to the field; (c) research has shown that the type of clay suspended in the injection water has a drastic effect on injection potential; (d) chemical additives that show promise in improving injection rates have been identified and field tested; and (e) effects of injected water on the aquifer that reduce injection rates have been identified.

Long Island: (a) a theoretical model to predict maximum infiltration rates for a recharge basin has been developed and is being field tested; and (b) the feasibility of injecting tertiary-treated sewage effluent to recharge aquifers has been demonstrated.

St. Paul: Pilot installation needed for the recharge studies has been completed; injection of water will begin next winter.

MINERAL LEASE MANAGEMENT

Mrs. HANSEN. You are requesting an increase of $292,000 and 11 positions to inspect the oil and gas operations on the Outer Continental Shelf. We discussed that at some length this morning. If you want to add anything at this point, please do.

Dr. PECORA. I believe, Madam Chairman, it is important for the committee to recognize that we are trying to pick ourselves up and to catch up on an entire procedure of information gathering on the OCS, on the actual inspection procedures in force on the OCS, and on the supervisory capability to manage the entire operation.

This involves more than just inspectors and engineers. It involves accountants and clerks, and the helicopters with communications systems that are making their flights. It involves a complex arrangement of a program which we would rather do systematically in stepwise fashion rather than in one fell swoop.

The program we are internally reviewing at the present time will, by our next year before you, have some very firm recommendations as to how we think this program ought to be going over the longer term. Right now I would say that we are attempting to do our best with the people we have to evaluate all of the phases of this program as well as to get the job done at the same time.

Mrs. HANSEN. This gives you a total funding then of, $3,313,000?

Dr. PECORA. $3,313,000 for the 1972 budget, which would be inclusive of the field inspection activity and other supervisory activities, plus the royalty accounting system.

Mrs. HANSEN. Would this include field inspection activity in both Santa Barbara Channel and the Gulf of Mexico?

ANALYSIS OF COSTS AND REVENUE

Dr. PECORA. Yes. I would like to insert in the record at this time, Madam Chairman, if you will permit me, an analysis that we have made of the total income into the U.S. Treasury and the total cost for the expenditure of this program.

(The information follows:)

OCS LEASING 1953 - 1971

Fiscal Year	Program Costs 1/	PROGRAM REVENUES (thousands of dollars) Lease Sale Bonuses	Minimum Royalties	Lease Rentals	Shut-in gas Payments	Production Royalties	Total Revenues	Prog. Cost as a percent of revenue	
1953-1967 (mgt. only)	3,173	1,973,144	6,827	72,702	974	708,376	2,762,023	(.0011)	.11%
1968 (mgt.)	654								
1968 (eval.)	200								
Total FY 1968	854	1,196,649	2,139	8,292	57	177,316	1,384,453	(.0006)	.06%
1969 (mgt.)	887								
1969 (eval.)	360								
Total FY 1969	1,247	194,621	1,879	8,261	42	211,993	416,796	(.0030)	.30%
1970 (mgt.)	1,598								
1970 (eval.)	1,045								
Total FY 1970	2,643	66,908	1,617	7,225	46	257,848	333,644	(.0079)	.79%
1971 (mgt.)	3,104*								
1971 (eval.)	1,180*								
Total FY 1971	4,284*	943,602	2,000*	8,400*	41*	310,000*	1,264,043*	(.0034)	.34%
Total 53 - 71	12,201	4,374,924	14,462	104,880	1,160	1,665,533	6,160,959	(.0020)	.20%

1/ Reflects Geological Survey costs only

* Estimated

Dr. PECORA. Over the period of several years, since 1953, the income into the U.S. Treasury has totaled $6 billion. This includes lease sale bonuses, minimum royalties, lease rentals, gas payments for shut-in, and production royalties. The total of all of this, $6 billion, has gone directly into the U.S. Treasury with no participation with the bordering States.

Mrs. HANSEN. Are there any strings attached to these funds?

Dr. PECORA. No strings attached. Since 1953 this has cost the Geological Survey, to acquire the basic information, make recommendations, and then manage, supervise, inspect, collect, and deposit, about $12 million, which is less than two-tenths of 1 percent of the total revenues taken in. Now, I would ask this committee, which I am sure is well informed of business practice, whether any private group would handle a major estate, evaluating revenues, supervising, collecting, inspecting, for two-tenths of 1 percent of the total.

Mrs. HANSEN. When you look at differences like that, it would seem to me that over the years, there has been almost a deliberate attempt not to have the kind of servicing that is required as an overseer in this kind of an operation.

Dr. PECORA. I think it is related to perhaps a general philosophy, do we want the companies to do this work and to rely on the companies to take care of themselves and all we do is sit back and collect money, or do we want to exercise what I would consider to be the primary concern of the public interest.

MAXIMUM EFFICIENT RATE OF PRODUCTION

I feel that the committee should appreciate this point because we are getting into other kinds of activities over and above what I have described. For example, we will be getting into what we call the MER, which is Maximum Efficient Rate of production. The President has issued a statement and we have issued orders to our regional supervisors that henceforth on the undisputed zone of Federal production our engineers will investigate what is a maximum production rate that will not damage the reservoir from the point of view of geologic conservation. This is to insure maximum ultimate recovery of the resource from those reservoirs by not high grading or depressurizing those reservoirs at too fast a rate. This will require a lot of reservoir analysis. We don't have the people on hand to do this although we are in the process or hoping to work out something with——

Mrs. HANSEN. What would be required fundwise in this year's budget to give you the beginning of an adequate input?

Dr. PECORA. Toward this one particular MER study?

Mrs. HANSEN. Yes.

Dr. PECORA. We have presented to the Office of Management and Budget a figure of $1.3 million, which is our estimate of carrying out the program of determining the maximum efficient rate of production from our Federal reservoirs. This would involve some 87 people of various categories and disciplines, but we are in the negotiation stage and discussion stage on this issue. It means, however, that we are currently unable to dig in and calculate what should be the proper rate of production up to a certain limit, and until that time the companies will be using their own estimates.

Now, what is involved here, and this is why it is such an important point for your committee, is a dual concept of what, on the one hand,

would be called the optimum economic rate of return on dollar investment, a return on funds, and even though you lose some oil down there in the reservoir, even though you don't recover all of it, the amount that you lose isn't worth going after because you have money back at an early date. That is an economic rate of return. As opposed to that, we have a geologic conservation concept which claims that, in future generations, oil must be withdrawn from the reservoir because it is a finite resource. You don't want to damage the reservoir and leave oil and gas there because future generations will need it. Therefore there is a constant conflict between this economic rate of return versus the geologic and conservation concept of rate of return.

Mrs. HANSEN. We had testimony the day before yesterday from the Bureau of Mines on the work that they are doing to get a larger percentage of oil out of the ground so that we are more able to meet our energy requirements.

Dr. PECORA. Their work is in the area of secondary recovery—how can we repressurize reservoirs through the injection of water or steam or gas to get out those trickles of oil that are caught in the spaces that may otherwise never come out? An overall increase in this recovery from the reservoir of 1 percent is equivalent to making a major oil discovery and this is why it is important off of the entire Gulf of Mexico.

Mrs. HANSEN. The committee feels that this is one of the high priority items and there shouldn't be any equivocation about providing funds.

Dr. PECORA. Well, we hope that we can get ourselves straightened out once and for all in this entire OCS work because it does become an important contribution to the Federal Treasury. It does become an important item in the national economy. It requires constant vigilance to protect the public interest and you can only do this with funds and people.

Mrs. HANSEN. I think it is mandatory at this point in time. That is why I can't imagine why the OMB doesn't realize what the implications are.

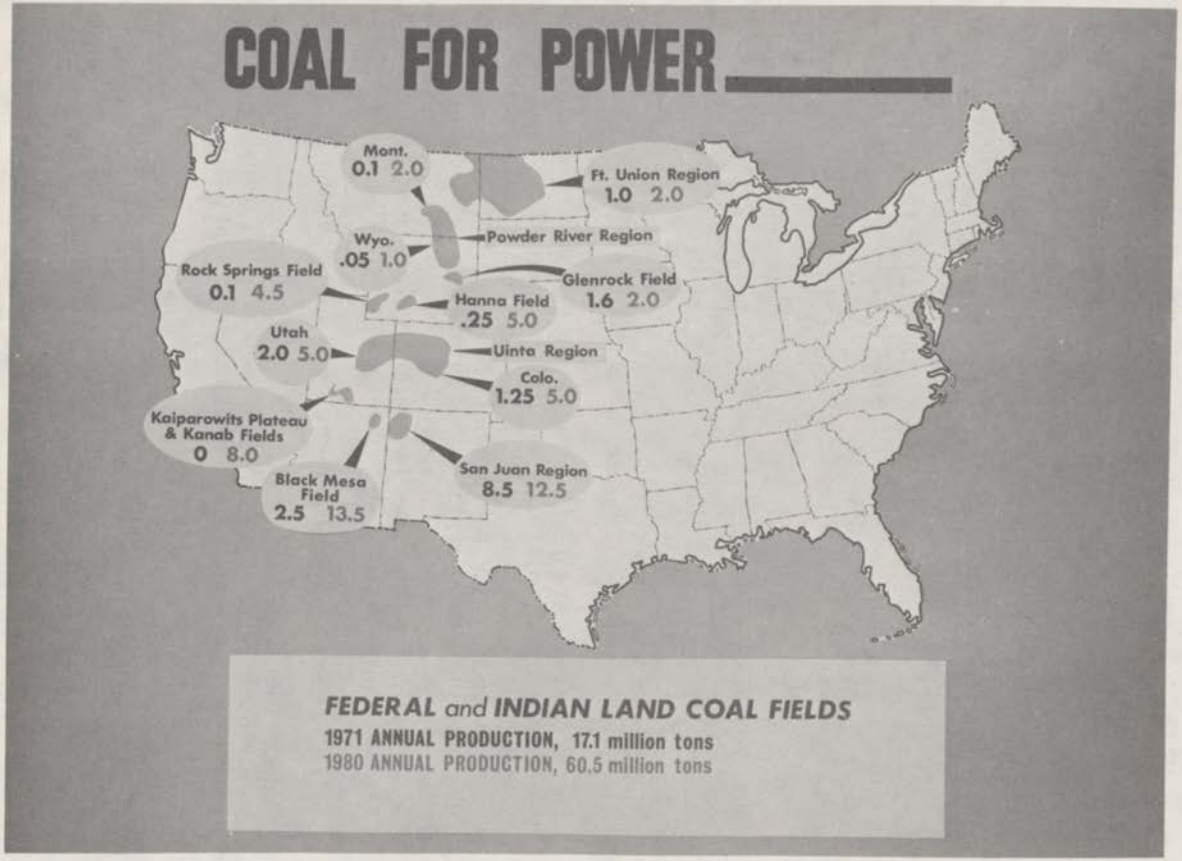
INSPECTION OF FEDERAL AND INDIAN LANDS

Justify your requested increase of $50,000 to analyze proposed surface mine developments and inspect operations for coal to improve environmental protection on Federal and Indian lands.

COAL DEVELOPMENT IN WESTERN STATES

Dr. PECORA. If I may first show a chart on what is being done for coal development in the Western States, which include public and Indian lands, one can see immediately that for each of these major coal regions there is an increase in the potential production from these areas. In 1971, for example, the annual production from these areas will total about 17.1 million tons. We project that by 1980 the production will reach 60 million tons by reason of development being done in these broad coalfields in our public and Indian lands.

(The chart follows:)


COAL FOR POWER
Mont.
0.1 2.0
Ft. Union Region
1.0 2.0
Wyo.
.05 1.0
Powder River Region
Rock Springs Field
0.1 4.5
Glenrock Field
1.6 2.0
Hanna Field
.25 5.0
Utah
2.0 5.0
Uinta Region
Colo.
1.25 5.0
Kaiparowits Plateau
& Kanab Fields
0 8.0
San Juan Region
8.5 12.5
Black Mesa
Field
2.5 13.5
FEDERAL and INDIAN LAND COAL FIELDS
1971 ANNUAL PRODUCTION, 17.1 million tons
1980 ANNUAL PRODUCTION, 60.5 million tons

Mrs. HANSEN. What would you say our reserves of coal are on Federal and Indian lands?

Dr. PECORA. My analysis of this as a result of a staff job last year showed that although the production of coal from public lands made up less than 2 percent of the total coal produced in this country, the reserves of coal on the public lands represented more nearly 50 percent of the total reserves of the country.

Mrs. HANSEN. Does that include the Indian lands?

Dr. PECORA. Federal and Indian. So the future production of coal from public and Indian lands will increase with time and become, therefore, more important.

A second feature here. I am sure that the Congressman from Pennsylvania recognizes that the big effort in coal has been in the Eastern States because that is where industry has been. Now, eastern coals for the most part are relatively high-sulfur coals and for the most part your better coking coals are known in the east. The western coals by reason of their different geologic character are comparatively lower sulfur coals.

However, they are so far from the eastern markets that it is almost impossible on an economic basis to get these low-sulfur coals east to the big users, so you have to develop Western uses of the coal. This is what the major long-range plan is, to develop utility uses for coal in the Western States.

Mrs. HANSEN. Isn't there some continuing discussion on what their contribution can be in the utility field?

Dr. PECORA. Again, the growth of electrical generation in the Western States has got to be in the future on something other than hydroelectric power.

Mrs. HANSEN. Yes.

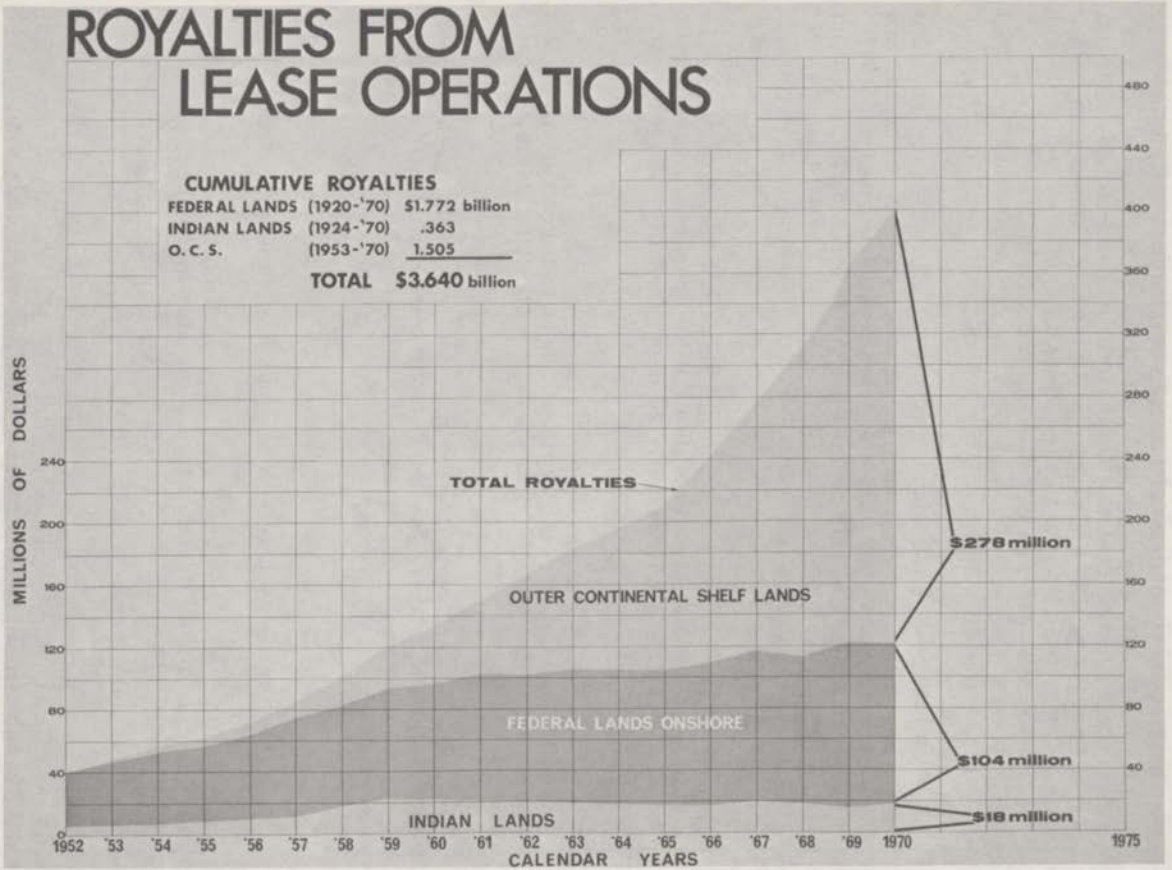
Dr. PECORA. Hydropower developments have pretty much reached their limitation in many States. For this reason coal production in these new areas, and geothermal development in specific areas, will assist the West in its growing energy demand in the future.

ECONOMIC POTENTIAL FOR INDIANS

Mrs. HANSEN. Isn't this also a great economic potential to the Indian peoples?

Dr. PECORA. Yes. Let me show you a chart on the royalty income from public and Indian lands which is our standard chart.

(The chart follows:)


ROYALTIES FROM LEASE OPERATIONS
CUMULATIVE ROYALTIES
FEDERAL LANDS (1920-'70) $1.772 billion
INDIAN LANDS (1924-'70) .363
O. C. S. (1953-'70) 1.505
TOTAL $3.640 billion
MILLIONS OF DOLLARS
TOTAL ROYALTIES
OUTER CONTINENTAL SHELF LANDS
FEDERAL LANDS ONSHORE
INDIAN LANDS
$278 million
$104 million
$18 million
CALENDAR YEARS
1952 '53 '54 '55 '56 '57 '58 '59 '60 '61 '62 '63 '64 '65 '66 '67 '68 '69 1970 1975

Dr. PECORA. Mrs. Hansen, you have pointed out on a number of occasions that the plateau of income from Indian lands is noteworthy and what we can do to increase this. The area of coal development on Indian lands is one area where income can increase in the Indian lands. You will note the sharp distinction with the amount of income from production on the OCS. This sharp increase means, of course, that the great increase in royalties from mineral resources in the future will be on the OCS, but this does not mean that the Indian lands will not be more productive in the future because of the new developments in the coal regions.

Mrs. HANSEN. What is the potential mineral value on the Indian lands?

Dr. PECORA. I don't know that we have this handy. We would like to make an analysis and put it into the record because the total resource potential of the Indian lands is not as great as for the other public lands because they are so small.

Mrs. HANSEN. Please do.

(The information follows:)

The mineral potential of Indian lands in terms of exploitable reserves is very imperfectly known and no accurate estimate can be made for Indian lands as a whole. Data are available for certain mineral reserves on some reservations. No comprehensive survey has been attempted to cover all Indian mineral resources. The following shows a 5-year projection (1972–77) of production and revenue from the mineral operations under Geological Survey supervision on Indian lands.

	Total production	Total royalties
Mineral commodity (1972–77):		
Crude oil	155,000,000 bbl	$81,000,000
Natural gas	585,000,000,000 cu. ft	
Minerals (other than coal)	45,000,000 tons	13,300,000
Subtotal		94,300,000
Coal	90,000,000 tons	14,300,000
Total		108,600,000

PRE-LEASE GEOPHYSICAL DATA

Mrs. HANSEN. Justify your requested increase of $108,000 and one position for OCS geophysical data for presale tract selection and resource evaluation and inventory.

Dr. PECORA. This is the area we discussed earlier in our testimony where the Geological Survey needs some prelease information in order to make sound recommendations to the Bureau of Land Management in its leasing program. This increase would permit the Geological Survey to acquire more geophysical information that is available in the open market and to evaluate this information so that we could make specific recommendations for lease sales tentatively scheduled in the near future. The intent is to lead toward recommendations on prospectively highly valuable areas for these lease sales.

COAL RESOURCES ON FEDERAL LANDS

Mrs. HANSEN. An increase of $150,000 is requested to increase capability to evaluate, classify, and inventory coal resources in Federal lands. May we have your comments in this connection.

Dr. PECORA. Dr. Wayland, who is our chief conservation engineer, would you want to speak to the expenditure of those funds in your program?

Dr. WAYLAND. Thank you. Yes; this will be to increase our efforts with respect to the classification of coal lands by 25 percent due to the increase in interest and, of course, in development of coal lands.

EARTH RESOURCES OBSERVATION SYSTEM (EROS) PROGRAM

Mrs. HANSEN. Justify your requested increase of $3.3 million and seven positions for Project EROS.

Dr. PECORA. Yes. Let me give you a preliminary discussion and ask Mr. Radlinski to pursue it. Through several of our earlier sessions with your committee we have attempted to show that we in the Geological Survey have a great deal of confidence and faith in the utilization of satellites and high flight aircraft in giving us data that we could not acquire by any other means. This program, which we call the Earth Resources Observation Systems, does depend on a satellite flight experiment of NASA. This experiment is called ERTS, Earth Resources Technology Satellite, and our program will be dovetailed with the launching of that satellite which is expected to take place in the spring of 1972.

DEVELOPMENT OF USER FACILITY

In order to make ourselves capable of utilizing that data when it becomes available to us we have had to develop a user facility where not only our own people, but those who work with us, may be able to work together with this data. This committee and the Congress, the Senate as well as the House, provided $300,000 to the Geological Survey toward the development of this center.

I would like Mr. Radlinski to give you a rundown on where we stand with the center.

Mr. RADLINSKI. With the $300,000 we entered into a contract with two A. & E. firms in Sioux Falls, S. Dak., on February 15 for design of the center. Their schedule is to complete the design by about October 1. It will take about 1 year to construct the center, so that as a consequence when ERTS–A flies in April of 1972 we won't be able to have the center completed. In order, then, to provide the data that is necessary in support of the program we will establish a temporary facility at Sioux Falls prior to the completion of the final facility. The Geological Survey was recommended as the agency to provide land-use data to users by an interagency committee, under the aegis of NASA. They agreed that the Geological Survey is the organization to provide data with respect to land-oriented programs. Such data will be provided through the center at Sioux Falls.

Mrs. HANSEN. You had 320 acres donated to the Federal Government?

Mr. RADLINSKI. That is right.

Mrs. HANSEN. Who was that given by?

Mr. RADLINSKI. That was donated to the Government by a nonprofit organization of businessmen in Sioux Falls, the Sioux Falls Industrial and Development Foundation, and was presented to the President in October 1970. It was accepted for the U.S. Government at that time, but the amount of time necessary to file deeds, and so

forth, was such that we were unable to begin our discussions with the architectural firms until about January 1971 when we got our go-ahead from OMB.

FIRST DATA FROM SATELLITE

Mrs. HANSEN. Please insert in the record your first immediate satellite returns.

Mr. RADLINSKI. You mean in terms of the amount of data?

Mrs. HANSEN. Yes.

(The information follows:)

The first earth resources satellite, ERTS–A, will be launched by NASA in April 1972. It is expected that this vehicle will produce a total of 480,000 multispectral remote sensor data sets during its first year of operation.

These images will be delivered to the EROS Data Center in Sioux Falls in the form of photographic negatives. The products will include:

1. Reproductions of the data in a variety of scales and formats to meet the needs of State, local, and Federal agencies and industry. Volumes of data to be produced will be constrained but are believed sufficient to support selective experimentation in a variety of applications areas;
2. Cartographic products, including photoimage maps at scales as large as 1:250,000; and
3. Resources and environmental information derived automatically from the images. This information will include the following:
   (a) The distribution of surface water;
   (b) The distribution of snow and ice;
   (c) The distribution of suspended sediment in water;
   (d) The distribution of agricultural vegetation;
   (e) The distribution of natural vegetation;
   (f) The distribution of gross cultural features, such as city outlines and major highways; and
   (g) Changes in all of the above, with time.

This information will be produced in a variety of map and statistical forms to meet specific needs. For example, maps showing the changes in city outlines, coupled with estimates of increased population, will be supplied to appropriate agencies and industries.

Raw data produced in Sioux Falls will be interpreted in other facilities of the Department of the Interior to produce maps of land use, analyses of geologic structure, locations of potential ground water aquifers, and other earth science and resource management products.

Information automatically derived and interpreted is visualized as being a major input into a national resources and environmental information system. A contract with Boeing Computer Services, Inc., of Seattle, Wash., was recently negotiated, through the Bureau of Indian Affairs, to begin design of this information system as it will apply to the management of public and Indian lands.

INTERNATIONAL USES

Mrs. HANSEN. I had a letter from you on December 5, Dr. Pecora, which included copies of letters you received from the Ministry of Science and Technology of the Republic of Korea and the Indonesian National Aeronautics and Space Institute indicating the interest of these groups.

You say in your letter, "As you know we have been justifying our EROS program strictly on a domestic basis. I think, however, that we should be acutely aware of the interests of other nations in the use of satellite data and the opportunities we have, in conjunction with EROS, to strengthen our ties abroad."

Dr. PECORA. As a matter of fact, we have been getting a great number of such letters from counterparts in other countries and in each case I have been transmitting these letters to the appropriate agencies, including NASA and the Office of Science and Technology.

I thought in this case the committee might like to see what kind of letters we are getting so you would appreciate the foreign interests in this program.

Mrs. HANSEN. I will insert those letters in the record at this point.

(The letters follow:)

DEPARTMENT OF THE INTERIOR,
OFFICE OF THE DIRECTOR,
GEOLOGICAL SURVEY,
Washington, D.C. December 5, 1970.

Hon. JULIA BUTLER HANSEN,
Chairman, Subcommittee on Interior and Related Agencies, Committee on Appropriations, House of Representatives, Washington, D.C.

DEAR MRS. HANSEN: As you know, we have been justifying our EROS program strictly on a domestic basis. I think, however, that we should be acutely aware of the interests of other nations in use of satellite data and the opportunities we have, in conjunction with EROS, to strengthen our ties abroad. The enclosed letter from Mr. Kim, the Minister of Science and Technology of the Republic of Korea, is typical of many similar expressions of interest we have received from nations throughout the world, particularly in the Western Hemisphere. A few samples of other expressions are enclosed.

At one of our hearings you indicated committee interest in these other expressions.

Also of significance is a resolution passed by the Sixth United Nations Regional Cartographic Conference for Asia and the Far East which met in Tehran, Iran in October and November 1970. The meeting was attended by official representatives of 35 countries including the Soviet Union. The resolution states in general that (1) the Conference welcomes the proposal of the United States to make data from earth resources observation satellites available to other countries, (2) recommends that cartographic agencies should study the data, and (3) recommends that the United Nations hold an interregional seminar on cartographic uses of satellite photography and other forms of remote sensing as soon as some satellite results have been studied.

Sincerely yours,

W. T. PECORA, *Director.*

REPUBLIC OF KOREA,
MINISTRY OF SCIENCE AND TECHNOLOGY,
Seoul, Korea, October 13, 1970.

Dr. W. T. PECORA,
Director, U.S. Geological Survey,
Department of the Interior,
Washington, D.C.

DEAR DR. PECORA: We have learned of the earth resources observation satellite program (EROS) that your Department has established and would like to follow its progress closely. Its aims are to provide space and aircraft data to support resources missions, and we understand that the data obtained, on agreement, are to be made available to other nations as well.

I wish to take the liberty of complimenting your Department on its unprecedented scientific pursuit. We feel that many benefits will accrue to mankind from this program and wish to express the desire of the Korean Government to be kept advised of its progress for possible cooperative participation.

Sincerely yours,

KEE HYONG KIM, *Minister*

UNIVERSITY OF PITTSBURGH ANNOUNCES SUMMER COURSE FOR SECONDARY SCHOOLTEACHERS

The University of Pittsburgh announces "Latin American Culture and Society," a summer course (June 24-August 9) for secondary schoolteachers. Further information on the course, which will be conducted under a grant from the U.S. Office of Education, may be obtained by writing to Paul Watson, director, NDEA International Affairs Institute, University of Pittsburgh, 400 South Craig Street, Pittsburgh, Pa. 15213.

BRAZIL TO BUILD EARTH SATELLITE STATION

Brazil plans to build an earth satellite receiving and transmitting station at Itaborai in the state of Rio de Janeiro, to be operational in early 1969. Foreign exchange costs will be defrayed with a $2.4 million credit to Embratel, the Brazilian Goverment's telecommunication agency, from the U.S. Export-Import Bank, plus credits from the Bank of America and the Canadian Export Credits Insurance Corp. Local costs of about $555,000 will be paid by Embratel.

FILMS ON DEVELOPMENT

Jean Marie Ackermann, film critic for the International Development Review, has brought out a guide to films on international development. The guide, which may be obtained for $2.50 per copy from Film Sense, Box 2018, Beverly Hills, Calif. 90213, is a critical review of some of the best in development films. It includes films on Bolivia, Brazil, Chile, Colombia, Haiti, Mexico, Peru, Trinidad, and Tobago. There is a great variety among the subjects covered by films reviewed. Some examples: "Disillusioned Volunteers (from the Peace Corps) in Colombia;" the "Forgotten Village," a story by John Steinbeck about a Mexican boy's struggle with his community over introducing modern medicine; and "Harvest," a Rockefeller Foundation-sponsored film on Latin American agricultural programs.

Film catalog.—Published by the World Health Organization, Avenue Appia, 1211 Geneva, Switzerland, and distributed free, lists films, available in several languages, on health problems. "People like María," for example, tells the story of a nurse who works in the *altiplano* among Andean Indians.

"The Sea River," a film showing the methods being used to develop scientific data on the Amazon river, is available for educational groups. Requests for information on loan or purchase of the film should be addressed to the Information Office, U.S. Geological Survey, Washington, D.C. 20242.

OAS COSPONSORS NEW MATH SCHOOL

The Organization of American States (OAS) has announced that it will cosponsor a Latin American School of Mathematics (ELAM) to be established in Rio de Janeiro, Brazil. ELAM, which is also being sponsored by the U.S. National Science Foundation, the Brazilian Research Council, and the Brazilian Institute of Pure and Applied Mathematics (IMPA), is designed to stimulate and support mathematical research throughout the Americas. Postgraduate courses will be open to researchers and advanced students from all OAS member states, and a limited number of partial fellowships will be available.

Further information on ELAM, which is expected to open its doors in July this year, may be obtained by writing Prof. Heitor G. de Souza, Science Development Unit, Organization of American States, Washington, D.C. 20006; Prof. Chaim S. Honig, Department of Mathematics, University of São Paulo, P.O. Box 8105, São Paulo, Brazil; or to Prof. Lindolpho C. Dias, Director, IMPA, Rua Luiz de Camões 68, Rio de Janeiro (GB), Brazil.

TECHNISCHE UNIVERSITAT CLANSTHAL,
LEHRSTUHL FUR GEOLOGIE UND PALAONTOLOGIE,
May 16, 1970.

WILLIAM A. FISCHER,
Research Coordinator, EROS Program, U.S. Department of the Interior, Geological Survey, Washington, D.C. 20242, USA.

DEAR BILL: If my informations are right, the German Department of Education and Science has, recently, informed NASA that there would be a good chance for setting up a receiving station along with the ERTS project.

This would set a good basis for cooperative research efforts. Therefore, I would like to interest members of the German scientific community for the ERTS project. Would you, please, let me know until which date you would like to be informed on the German scientific interests in EROS.

I would be ready to come to Washington to discuss the subject.

Sincerely yours,

DR. PETER KRONBERG.

ECONOMIC COMMISSION FOR ASIA AND THE FAR EAST,
Bangkok, Thailand, September 15, 1967.

LAURENCE M. CLARK,
Research Associate International Studies, Brooks Foundation, Communications Research in Arts and Science, Riviera, Centre, Santa Barbara, Calif.

DEAR MR. CLARK: It was a pleasure to be able to exchange views with you here in Bangkok on the possible application of Satellite Technology in the ECAFE countries. We have given some more thought to the ideas and plans proposed by you and discussed with our staff and we are prepared to make a concrete first step in that direction. Budget limitations, however, make it necessary for me to enquire whether the Brooks Foundation would be able to provide support to this project from its own funds.

ECAFE would like to convene, possibly in December 1967, a Training Seminar in the application of Space Satellites in Resources Survey to acquaint development technologists from Asian countries with the possibilities offered by Satellites. We would be able to provide transportation and per diem to approximately 15 participants for 7 days in Bangkok, as well as full administrative support. The Seminar would be conducted in English only. If the Brooks Foundation can cover all expenses connected with the participation of suitable lecturers, and provide such documentary material (literature, audio-visual helps) as may be necessary to illustrate the state of the art in the various applications envisaged, it would be possible for us to pursue our proposal further.

We would need, however, at least an interim reply from you to start administrative action at our end. As the funds we may have for this project will lapse at the end of the year I should appreciate it if you would consider the matter as very urgent. If it is not feasible to have the Seminar this year, we may have to wait till July 1968 before we can decide to convene it in late 1968.

With kind personal regards,

Yours sincerely,

V. M. BHATT,
Special Assistant to the Executive Secretary.

LEMBAGA PENERBANGAN DAN ANGKASA LUAR NASIONAL (LAPAN),
INDONESIAN NATIONAL AERONAUTICS AND SPACE INSTITUTE,
Bandung, Indonesia, December 5, 1967.

To the Director of Radio Corp. of America, Astro Electronics, Princeton, N.Y.

DEAR SIR: We came to know that RCA, Inc., is executing research on a satellite system for natural resources. We are much interested on such a family of satellites, as Indonesia is making efforts for the most economical way to explore for a presumed wealth of natural resources in our still unexplored parts of the archipelago. Only 5 percent of the whole country has been surveyed geologically and in this 5 percent of the country deposits of minerals have been found, which have led to centuries of colonialization by European countries. We are sure that in the remaining parts there exists a wealth of resources still waiting to be explored.

We wish to be informed whether your satellite system could be used to expedite such explorations. If this is true, we hope to make discussions with you in the near future, to explore for possible joint enterprises, regarding earth stations for such satellites.

We are optimistic that the present Indonesian Government is willing to accept foreign investments if but these could assist us in developing our whole country.

Hoping to hear further from you, on our mentioned wishes at your earliest convenience.

Yours sincerely,

Dr. KUSUMANTO.

TECHNICAL EXPERTISE SHARED WITH DEVELOPING NATIONS

Dr. PECORA. There is an important event which would likewise, I am sure, be of interest to your committee—the Inter-American Geodetic Service working in Panama, which serves under Colonel Ruthe, is a training facility for countries in the Western Hemisphere, particularly Central and South America, for learning mapping techniques.

We are negotiating with this organization to perhaps serve also as a training ground in the area of utilizing space data that will be forthcoming, if the EROS program does proceed on schedule.

It is important I think in the civilian area, and I mean particularly the civilian area, to have the people of the world understand there are great advantages that can be obtained and shared for the benefit of all mankind. I think the United States has been forthright in the civilian area by sharing its technical expertise with developing nations and here is a program just beginning which I think will have the same influence toward trust and good relationship between the science and technology of the United States and that of other countries of the world.

Mrs. HANSEN. I think this is one area we can take some pride in what we shall be contributing to the total sum of knowledge of mankind in this world.

Dr. PECORA. Yes.

GENERAL ADMINISTRATION

Mrs. HANSEN. Please insert pages 59 through 61 of the justifications in the record at this point.

(The pages follow:)

9. General Administration

FY 1971, $2,761,000; FY 1972, $2,761,000; no change.

	FY 1970 Amount Available	FY 1971 Amount Available	FY 1972 Estimate	Increase (+) or Decrease (-) 1972 Compared with 1971
General administrative expenses	$2,683,000	$2,761,000	$2,761,000	-

Program of work: General administrative expenses provide for management, executive direction and coordination, and administrative support to the Bureau as a whole. This includes such essential functions as budget, finance, personnel, contract negotiation and administration, property management, organization and methods and management analysis.

Other administrative funding: General administrative expenses of the Geological Survey are financed in part by assessments on direct program funds and on funds from other Federal agencies and sundry non-Federal sources (no assessment is levied on cooperative funds from State and local governments). Details of funding are shown in the table on page GS-61.

The expanded substantive program in FY 1972 will necessitate the allocation of additional resources to all areas of administrative support--both at headquarters and in the field. Increased staffing is required in the personnel, budget, finance, procurement, and property management activities in order to keep abreast of the workload. Areas of special emphasis are shown below:

Executive Direction - Increases in executive direction costs derive, in the main, from increased salary costs and a modest enlargement of the Director's staff.

The overwhelming workload imposed on the Directorate will necessitate an increase of one or two top-level professionals. Among the many evolving activities requiring special attention and coordination are the interdisciplinary projects for urban pilot area studies, the Arctic resources investigations, and the EROS Program; planning for the massive move to the Reston headquarters, environmental impact reports; and the preparation of numerous studies and reports in response to natural resource and energy concerns.

Personnel - A strong and active Survey-wide program of employee development and training will be undertaken in FY 1972. Specific target areas are supervisory training, and executive training. Emphasis will also be placed on training disadvantaged and under-utilized workers. A senior level training officer is required to direct these activities and ensure development of an adequate training program.

Additional resources also need to be devoted to the development of classification standards for specialized categories of employees. Internal classification guides are also necessary for Survey-wide application in all geographic areas.

A positive program of recruiting for executive, professional and other hard-to-fill positions will also be developed in FY 1972. Recruiting specialists will visit colleges, and conduct an intensive program of follow up with prospective employees, in order that the Bureau may compete successfully for high quality applicants. Staffing will be provided at the two major field installations for this purpose as well as at headquarters.

Contracting - The number of research grants and contracts negotiated with educational and private institutions continues to grow. Additional resources will be devoted to the contracting function in order to provide quick reaction to the dynamic needs of the scientific program. There is also a vital need to embark on an active and positive program of contract administration to assure that contractual provisions are fully complied with and full value is received by the Federal government.

Property Control - These negotiated contracts and grants also pose problems in the area of property control. It is essential that an inventory be developed of equipment procured under these contracts and grants. Procedures will be developed to identify and control the equipment as an extension of the Bureau's property control system. Guidelines are also needed to outline the latitude which may be exercised in the disposition of the property at the time the contract or grant is closed out.

Space and Communications - The construction phase of the Bureau's headquarters facility at Reston, Virginia will generate a substantial workload for all service and supply units. The most significant impact in 1972 will be on the detailed space planning and communications work involved in this endeavor. It is necessary that the capability be available to provide this type of backstopping to the Bureau's Building Committee and other officials involved in the over-all planning.

Financial Management - It is anticipated that the Survey's new accounting and financial management system will be installed in FY 1972. However, it will be necessary to devote considerable effort to monitoring and maintaining the system in its first year of operation. Additional resources will also be devoted to the design of sub-systems in property accounting and centralized billing in order to take full advantage of the potential of this system.

Funding of General Administrative Expenses
(Dollars in thousands)

	FY 1970	FY 1971	FY 1972	Increased costs associated with ongoing programs	Administrative costs associated with program increases
Source of Funds for GAE:					
Surveys, Investigations, and Research:					
1. Special resource and environmental projects	-	25	61	1	35
2. Alaska pipeline related investigations	4	25	27	2	-
3. Topographic surveys and mapping	142	239	381	55	87
4. Geologic and mineral resource surveys and mapping	153	214	290	55	21
5. Minerals discovery loan program	1	1	2	1	-
6. Water resources investigations	157	291	418	59	68
7. Conservation of lands and minerals	38	112	149	17	20
8. Earth resources observation systems	5	34	152	4	114
9. General administration	2,683	2,761	2,761	-	-
Total, SIR	3,183	3,702	4,241	194	345
Other Federal agencies and sundry non-Federal sources	1,255	1,444	1,372	-	-72
Total, general administrative expenses	4,438	5,146	5,613	194	273
Relationship to total bureau program:					
SIR:					
General administrative expenses	3,183	3,702	4,241		
Bureau total (Budget authority)	102,910	111,350	121,207		
Ratio, GAE to total BA	3.1%	3.3%	3.5%		
State and local governments	0%	0%	0%		
Other funds	4.5%	4.5%	4.5%		
All funds:					
GAE	4,438	5,146	5,613		
Total bureau program	157,387	169,129	177,052		
Ratio, GAE to total	2.8%	3.0%	3.2%		

STATUS OF PROPOSED MOVE TO RESTON

Mrs. HANSEN. What is the current status of your proposed move to Reston?

Dr. PECORA. Let me summarize the recent events which would, I think, place in proper perspective our situation. Bids were opened on January 18, 1971, by Gulf Reston and reviewed by the GSA. Among the bidders the lowest bidder was George Hyman Construction Co.

The bid was within the constraints set by the Government. The low base bid was $40,998,000 with an add-on of $2.5 million for a total of $43,498,000.

Mrs. HANSEN. What was the add-on?

Mr. RADLINSKI. That is for the map reproduction facility.

Dr. PECORA. The total bid, anyway, would read $43,498,000. The GSA needs to approve all of these selections and the approval was given on February 26, 1971.

The Gulf Reston organization is now conducting negotiations with outside sources for funds to assure acceptable financing and we would expect the contract to be awarded by April 18, 1971. There may be some difficulties because of the source of funding and the time required to finalize the arrangement.

If everything goes well, construction should start in late May of 1971 and take a calculated 930 days for completion, so that by November, 1973 we may be in a new headquarters building which will assemble in one place personnel now scattered in 30 different buildings in the Greater Washington area.

It is our belief, Madam Chairman, that a building of this type located, however, some 20 miles from Washington, will make possible much more effective management of the organization. It is utterly impossible for the administration at the Director's level or Division Chief level to have the kind of communication that is desirable with all of these scattered offices throughout the Greater Washington area.

It would certainly be a great saving in time and make more effective the whole management of the organization and I would hope that we don't incur any problems in this.

Mrs. HANSEN. What are the terms of the lease?

Dr. PECORA. The program is a lease with option to purchase so that we are leasing it on an annual basis over the 20-year period. The building becomes the property of the U.S. Government at the end of the 20-year period if in the meantime the Government hasn't purchased it by paying off the remaining unpaid invested funds.

Mrs. HANSEN. What are the rental costs going to be?

Dr. PECORA. This hasn't been calculated out, but we expect that our rental; that is, the lease payment of principal, interest, and taxes, would be between $5.9 and $6.2 million per year.

Mrs. HANSEN. What is your current rental?

Dr. PECORA. We have some figures on that. About half of our space is in Government-owned buildings, the other part of it is rented. Rental costs are in the order of $1.7 million being paid out of Geological Survey and GSA funds. But if we took the equivalent rental of that which is Government-owned plus that which is rented, it would be in the order of $2.6 million.

Mrs. HANSEN. Is your budget in the future going to reflect this?

Dr. PECORA. By our analysis it would have to, although a part of this is being factored into the purchase price of the building for the Government at the end of the 20-year period. In a sense it is a methodology of acquiring a building through lease-purchase rather than a direct appropriation for construction.

NONREIMBURSABLE DETAILS OF EMPLOYEES

Mrs. HANSEN. To what extent is your bureau involved in nonreimbursable details?

Dr. PECORA. I think that any organization needs to detail members of its staff for use at higher echelons in the structure without reimbursement.

One area of nonreimbursable detail I would imagine could include the services we provide the Office of the Secretary, and in addition to that any details we may make on a program where we are working with another Government bureau for a common purpose.

A good example of that is the assistance we provide the State Department in the dealings on the Outer Continental Shelf where we provide a person and his salary. He is maintained on our program because he is our man and he is only detailed on a part-time basis.

Mrs. HANSEN. Please insert in the record for fiscal year 1970 all nonreimbursable details of employees either in or out of the bureau indicating the duration of the detail, other agencies involved, and the type of projects for which the detail was made?

Dr. PECORA. We will place such a report into the record.

Mr. WILES. We are going to supply, Madam Chairman, for every bureau this information. The question came up in salaries and expenses of the Office of the Secretary just for the Office of the Secretary, but we will supply that for every bureau.

(The information follows:)

Details of personnel to other agencies and bureaus

Bureau or Office of Geological Survey

Fiscal Year 1970

Position title and grade	Reimbursable or Non-reimbursable	Agencies or Bureaus to whom detailed	Duration of detail	Amount of reimbursement received	Description of assignment
Clerk-Typing, GS-5	Non	Office of Sec.	30 days	none	Typing assistence.
Secretary (Typing), GS-6	Non	Asst. Sec.-MR	30 days	none	Secretarial assistance.
Secretary (Typing), GS-6	Non	Cong. Liaison	5/27/70 - pres.	none	Secretarial assistance.
Research Asst., GS-12	Non	Pres. Coun. on Youth Opportunity	2/9/70 - pres.	none	Served as Asst. Dir., Private Resources Division.
Confidential Asst., GS-10	Non	The White House	10/30/66 - 10/3/70	none	Asst. to member of Pres. steff.
Program Analyst, GS-15	Non	Asst. Sec.-MR	10/13/69 - 2/26/71	none	Assisted in dev. of program data within purview of Asst. Sec.-MR.
Chemist, GS-15	Reimb.	NASA	3/68-4/70	F/Y 70 Salary $19,278 Other 900	Geochemical instrumentation development.
Geologist, GS-13	Reimb.	NASA	7/65-pres.	F/Y 70 Salary $21,068 Other 1,000	Analyzing and evaluating the Manned Lunar Exploration Program and various techniques in relation to lunar surface delivery systems.
Geologist, GS-14	Reimb.	NASA	4/70-pres.	F/Y 70 Salary $5,054 Other 5,442	Geochemical instrumentation development.
Secretary (Typ), GS-6	Non	Cong.Liaison	5/70-pres.	None	Secretarial
Geologist, GS-13	Reimb.	NASA	10/69-1/71	F/Y 70 Salary $17,688	To assist in the Returned Lunar Sample Program.

Details of personnel to other agencies and bureaus

Bureau or Office of Geological Survey

Fiscal year 1970

Position title and grade	Reimbursable or Non-reimbursable	Agencies or Bureaus to whom detailed	Duration of detail	Amount of reimbursement received	Description of assignment
Supv. Hydrol., GS-14	Reimb.	AID/Chile	8/2/69 - 10/30/69	$8,350	To evaluate the existing data and review the current status of the Government of Chile's program of water resources investigations.
Hydr. Engineer, GS-11	Reimb.	AID/Chile	8/2/69 - 10/29/69	$6,150	To evaluate the existing data and review the current status of the Government of Chile's program of water resources investigations.
Res. Geol., GS-14	Reimb.	UNESCO/ UK	9/1/69 - 9/18/69	$700	To assist in the preparation of the IAGC Working Group meeting on Applied Biogeochemistry.
Hydrologist, GS-12	Reimb.	AID/Brazil	8/15/69 - 9/30/69	$5,000	To assist in establishment of a sediment laboratory at DNAE District headquarters.
Res. Hydrol., GS-14	Reimb.	UNESCO/Paris	8/24/69 - 8/31/69	$900	To participate in the Second Session of the Panel of Experts for the Preparation of a Guide for Activities on Ground-Water Exploration.
Supv. Hydrol., GS-15	Reimb.	UNESCO/Paris	9/5/69 - 9/24/69	$900	To attend the meeting of Editors of the Guide on SAPHYDATA.

Details of personnel to other agencies and bureaus

Bureau or Office of Geological Survey

Fiscal year 1970

Position title and grade	Reimbursable or Non-reimbursable	Agencies or Bureaus to whom detailed	Duration of detail	Amount of reimbursement received	Description of assignment
Supv. Carto., GS-13	Reimb.	AID/Colombia	9/7/69 - 10/2/69	$2,500	To assist in the final scheduling, programming, and processing of the cartographic report for the Colombian Project.
Res. Hydrol., GS-14	Reimb.	UNESCO/Hungary & IAEA/Austria	9/22/69 - 10/4/69	$1,100	To participate in Expert Meeting on the Cooperative Role of Hydrogeology and Geophysics in Ground-Water Exploration in Budapest, Hungary (UNESCO) and to give advice on technical report on nuclear logging recommended by the IHD Working Group on Nuclear Techniques to Hydrology, Vienna, Austria (IAEA).
Civil Eng. Tech., GS-12	Reimb.	Saudi Arabian Government	9/20/69 - 1/3/70	$8,300	To provide supervisory production assistance and expert guidance in photogrammetric mapping to the Aerial Survey Department (ASD) of the MPMR.
Res. Hydrol., GS-14	Reimb.	IAEA/Brazil	11/7/69 - 11/26/69	$1,250	To participate in the Regional Training Course on the Application of Isotope Techniques in Hydrology.
Res. Hydrol., GS-14	Reimb.	WMO/Switzerland & France	12/1/69 - 12/16/69	$1,300	To serve as a consultant in connection with the preparation of a WMO Report on Network Design for the International Conference on the Practical and Scientific Results of the International Hydrological Decade.

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Details of personnel to other agencies and bureaus

Bureau or Office of Geological Survey

Fiscal year 1970

Position title and grade	Reimbursable or Non-reimbursable	Agencies or Bureaus to whom detailed	Duration of detail	Amount of reimbursement received	Description of assignment
Assoc. Chief Geol., GS-16	Reimb.	AID/Indonesia	10/8/69 - 11/15/69	$5,300	To inspect, review and complete initial plans for USGS technical assistance to be implemented under the Agency for International Development Grant Funding.
Cart. Tech., GS-8	Reimb.	AID/Liberia	8/18/69 - 2/12/70	$6,600	To assist in preparation of base materials for index maps.
Geologist, GS-12	Reimb.	AID/Turkey	9/22/69 - 11/24/69	$5,300	To work with MTA personnel on procedures and techniques of X-Ray diffraction, especially as applied to clay minerals.
Res. Hydrol., GS-14	Reimb.	UNESCO/Paris	6/26/69 - 9/5/69	$1,800	To attend the second and third sessions of consultations on the Guide for Activities on Ground-Water Exploration.
Supv. Hydrol., GS-13	Reimb.	AID/Brazil	9/18/69 - 12/18/69	$5,400	To provide advisory services to Brazilian agencies engaged in hydrologic and meteologic investigations, particularly to the Ministry of Mines and Energy, National Department of Water and Energy.

Details of personnel to other agencies and bureaus

Bureau or Office of Geological Survey

Fiscal year 1970

Position title and grade	Reimbursable or Non-reimbursable	Agencies or Bureaus to whom detailed	Duration of detail	Amount of reimbursement received	Description of assignment
Geologist, GS-14	Reimb.	AID/Turkey	5/25/69 - 11/1/69	$8,300	To advise and train MTA geologists in search for base metal and sulfide deposits and to undertake 1:5000-scale surface geologic mapping in mine areas.
Geologist, GS-15	Reimb.	AID/Brazil	9/21/69 - 10/28/69	$3,500	To review plans and programs for ultrabasic rock investigations and undertake field investigations of various localities that may assist in establishing criteria for recognition of different rock types and possibly associated mineral deposits.
Asst. Director, GS-17	Reimb.	UNESCO/Paris	9/10/69 - 10/3/69	$1,200	To advise on water-well problems in connection with the UNESCO/UNDP Special Fund project "Survey of groundwater resources in the Northern Sahara".
Elec. Tech., GS-11	Reimb.	Saudi Arabian Government	3/18/70 - 4/8/70	$5,000	To install and check out Digital Acquisition System being purchased by the USGS for the Saudi Arabian Project.
Cart. Tech., GS-8	Reimb.	Saudi Arabian Government	2/13/70 - 4/20/70	$4,900	To provide cartographic support of the publishing activities of the project.

Details of personnel to other agencies and bureaus

Bureau or Office of Geological Survey

Fiscal year 1970

Position title and grade	Reimbursable or Non-reimbursable	Agencies or Bureaus to whom detailed	Duration of detail	Amount of reimbursement received	Description of assignment
Geologist, GS-13	Reimb.	AID/Indonesia	2/23/70 - 3/18/70	$1,600	To discuss Geoproject with USAID/GOI, review available reports, make aerial and surface reconnaissance, prepare scope and investigative work and cost estimates thereof.
Geologist, GS-14	Reimb.	Saudi Arabian Government	12/26/69 - 5/1/70	$8,800	To serve as Regional Geologist for district studies of 30-minute quadrangles in Saudi Arabia and to perform complex and responsible research and technical work in the field of regional geology.
Hydrologist, GS-12	Reimb.	AID/Pakistan	1/3/70 - 4/9/70	$5,400	To evaluate needs for programming an IBM 360 computer and to train Pakistani personnel in transposing water-quality data to punch cards for computer analyses and storage.
Geologist, GS-14	Reimb.	AID/Indonesia	1/5/70 - 2/6/70	$11,000	To serve as USGS tectonic map compilation specialist to the USGS Chief of Field Party for Indonesia and to the Tectonic Map of Asia Project.
Res. Hydrol., GS-15	Reimb.	UNESCO/Paris, France, and Zagreb, Yugoslavia.	1/28/70 - 2/18/70	$400	To attend a seminar "Application of Mathematical-Statistical Methods in Hydrology".

Details of personnel to other agencies and bureaus

Bureau or Office of Geological Survey

Fiscal year 1970

Position title and grade	Reimbursable or Non-reimbursable	Agencies or Bureaus to whom detailed	Duration of detail	Amount of reimbursement received	Description of assignment
Res. Hydrol., GS-15	Reimb.	Government of Australia	5/9/70 - 5/30/70	$3,550	To lecture on groundwater hydraulics at the 1970 Groundwater School being held at the University of Adelaide.
Geologist, GS-15	Reimb.	UNESCO/Thailand and Ceylon	4/11/70 - 4/29/70	$1,992	To visit the site for the Second Seminar on Geochemical Prospecting Methods and Techniques, scheduled to be held in Sept. 1970, and to assist in the preparation of the detailed agenda and to inspect the physical arrangements for the seminar and laboratory facilities and equipment.
Supv. Hydrol., GS-15	Reimb.	UNESCO/Canary Islands	5/1/70 - 5/16/70	$1,910	To advise on the work plan under preparation by a team of experts for a Special Fund Project concerning the Scientific Study of the Water Resources of the Canary Islands.
Supv. Hydrol., GS-14	Reimb.	UN/Argentina	6/10/70 - 6/30/70	$3,800	To review the existing facilities, equipment and methods for collection of hydrologic data and make recommendations for improvement of existing system and assist in preparations of specifications for hydrographic equipment and instruments required to implement the foregoing recommendations.

Details of personnel to other agencies and bureaus

Bureau or Office of Geological Survey

Fiscal year 1970

Position title and grade	Reimbursable or Non-reimbursable	Agencies or Bureaus to whom detailed	Duration of detail	Amount of reimbursement received	Description of assignment
Geologist, GS-14	Reimb.	AID/Liberia	5/10/70 - 7/12/70	$9,700	To serve as geologic advisor to the USAID Mission to Liberia and the Government of Liberia in matters relevant to regional, quadrangle and detailed geologic studies and mapping.
Geologist, GS-12	Reimb.	AID/Liberia	5/10/70 - 7/10/70	$7,900	To work as a member of a four-man team engaged in ari reconnaissance, rapid road-trail reconnaissance of central and eastern Liberia.
Res. Hydrol., GS-15	Reimb.	UNESCO/Venice, Italy	5/21/70 - 6/6/70	$1,300	To participate in scientific studies relating to the geological, oceanographic, hydrological, biological, and engineering problems involved in the physical protection of Venice.
Hydrol., GS-14	Reimb.	WMO/Switzerland	5/28/70 - 6/16/70	$1,100	To participate in the CHy Working Group of Machine Processing of Hydrometeorological Data.
Geologist, GS-14	Reimb.	AID/Colombia	1/30/70 - 4/2/70	$5,183	To advise on phosphate regional physical exploration program.

Details of personnel to other agencies and bureaus

Bureau or Office of Geological Survey

Fiscal year 1970

Position title and grade	Reimbursable or Non-reimbursable	Agencies or Bureaus to whom detailed	Duration of detail	Amount of reimbursement received	Description of assignment
Supv. Civil Eng., GS-13	Reimb.	AID/Brazil	6/16/69 - 8/20/69	$5,330	To train Brazilian personnel in computer programming, adapt USGS computer programs to local computer and train personnel in USGS techniques of computational photogrammetry.
Geologist, GS-12	Reimb.	AID/Brazil	8/21/69 - 11/21/69	$7,200	To provide guidance and advisory services to DNPM and CNEN in geological exploration for uranium.
Res. Chemist, GS-13	Reimb.	AID/Colombia	8/24/69 - 9/20/69	$2,000	To assist in placing spectrograph into operation and making adjustments on the ARL densitometer.
Geologist, GS-12	Reimb.	AID/Brazil	8/21/69 - 11/22/69	$7,400	To provide guidance and advisory services to DNPM and CNEN in geochemical exploration.
Geologist, GS-12	Reimb.	AID/Colombia	10/21/69 - 11/23/69	$2,600	To visit lead-zinc deposits in lower Cretaceous sediments of eastern Cordillera.
Supv. Hydrol., GS-13	Reimb.	AID/Chile	10/19/69 - 1/3/70	$7,400	To review current and past hydrologic investigations in the Aconcagua River Valley of central Chile.

Details of personnel to other agencies and bureaus

Bureau or Office of Geological Survey

Fiscal year 1970

Position title and grade	Reimbursable or Non-reimbursable	Agencies or Bureaus to whom detailed	Duration of detail	Amount of reimbursement received	Description of assignment
Geologist, GS-12	Reimb.	AID/Indonesia	12/6/69 - 2/7/70	$7,600	To conduct a class and infield course of instructions in systematic and regional geologic mapping.
Res. Hydrol., GS-14	Reimb.	AID/Brazil	11/13/69 - 11/29/69	$3,200	To conduct a training course for Brazilian personnel of NDAEE in the moving boat technique of streamflow measurement.
Mathematician, GS-11	Reimb.	Saudi Arabian Government	12/10/69 - 2/20/70	$6,500	To establish a working relationship with the Computer Center Director and his staff at Dhahran.
Geologist, GS-14	Reimb.	Saudi Arabian Government	1/6/70 - 4/8/70	$8,300	To assist in editing and processing geologic manuscripts being prepared for publication.
Res. Hydrol., GS-14	Reimb.	AID/Laos and Thailand	5/25/70 - 6/18/70	$3,900	To conduct a working seminar to retrain riparian hydrologists on the rigid principles and techniques of computation of hydrologic data and to review the existing Mekong River hydrology records and spare parts program for the equipment used to obtain hydrological data.

Details of personnel to other agencies and bureaus

Bureau or Office of Geological Survey

Fiscal year 1970

Position title and grade	Reimbursable or Non-reimbursable	Agencies or Bureaus to whom detailed	Duration of detail	Amount of reimbursement received	Description of assignment
Res. Geologist, GS-15	Reimb.	AID/Turkey	5/29/70 - 7/15/70	$4,700	To inspect the geology of the Ergani Area vicinity copper mine and associated mineralized fault fracture zones and to advise geological and geochemical staff of the Turkish Mineral Research and Exploration Institute on mineral exploration techniques.
Supv. Hydrol., GS-15	Reimb.	UNESCO/Paris	6/5/70 - 6/13/70	$800	To attend a meeting of the SAPHYDATA Panel in Paris.
Res. Chemist, GS-15	Reimb.	IAEA/Brazil	3/15/70 - 4/15/70	$3,800	To serve as an expert in the field of isotopes in hydrology at the Centro de Energia Nuclear na Agriculture, Piracicaba, Sao Paulo, Brazil.
Cartographer, GS-13	Reimb.	AID/Indonesia	3/5/70 - 4/11/70	$3,800	To consult and plan cartographic compilation requirements including training, equipment and supplies.
Supv. Hydrol., GS-13	Reimb.	AID/Brazil	2/25/70 - 6/26/70	$12,580	To provide advisory services to Brazilian agencies engaged in hydrologic and meteologic investigations. This was a continuation of services performed from September to December 1969.

Details of personnel to other agencies and bureaus

Bureau or Office of Geological Survey

Fiscal year 1970

Position title and grade	Reimbursable or Non-reimbursable	Agencies or Bureaus to whom detailed	Duration of detail	Amount of reimbursement received	Description of assignment
Res. Hydrol., GS-15	Reimb.	UNESCO/Italy	2/16/70 - 2/22/70	$1,000	To attend meetings on water pollution & meet & participate in discussions with other scientists on the subject of Venice pollution studies.
Hydrologist, GS-12	Reimb.	AID/Pakistan	4/2/70 - 7/27/70	$5,750	To provide training in the Analog Model Section of WAPD-WASID. This was an extension of previous assignment during the period April through July 1969.
Res. Hydrol., GS-15	Reimb.	UN/Ethiopia	4/23/70 - 6/23/70	$8,400	To assist in designing the minimum network required for data collection and to recommend training programs for junior staff for the operation and maintenance of equipment.
Res. Hydrol., GS-14	Reimb.	OAS/Chile	6/19/70 - 7/2/70	$900	To participate in a study group on isotopic techniques in hydrology convened by the Inter-American Nuclear Energy Commission, Organization of American States.

Details of personnel to other agencies and bureaus

Bureau or Office of Geological Survey

First 6 months of Fiscal Year 1971

Position title and grade	Reimbursable or Non-reimbursable	Agencies or Bureaus to whom detailed	Duration of detail	Amount of reimbursement received	Description of assignment
Secretary (Typing), GS-6	Non	Cong. Liaison	5/27/70 - pres.	none	Secretarial assistance.
Research Asst., GS-12	Non	Pres. Coun. on Youth Opportunity	2/9/70 - 3/1/71	none	Served as Asst. Dir., Private Resources Division.
Confidential Asst., GS 10	Non	The White House	10/30/66 - 10/3/70	none	Asst. to member of Pres. staff.
Program Analyst, GS-15	Non	Asst. Sec.-MR	10/13/69 - 2/26/71	none	Assisted in dev. of program data within purview of Asst. Sec.-MR.
Clerk-Typist, GS-4	Non	Cong. Liaison	1/4/71 - pres.	none	Clerical support.
Geologist, GS-13	Reimb.	NASA	7/65-pres.	F/Y 71 Salary $11,022 Other 498	Analyzing and evaluating the Manned Lunar Exploration Program and various techniques in relation to lunar surface delivery systems.
Geologist, GS-14	Reimb.	NASA	4/70-pres.	F/Y 71 Salary $10,679 Other 546	Geochemical instrumentation development.
Secretary (Typ), GS-6	Non	Cong.Liaison	5/70-pres.		Secretarial
Geologist, GS-13	Reimb.	NASA	10/69-1/71	F/Y 71 Salary $16,066	To assist in the Returned Lunar Sample Program.

Details of personnel to other agencies and bureaus

Bureau or Office of Geological Survey

First 6 Months
Fiscal year 1971

Position title and grade	Reimbursable or Non-reimbursable	Agencies or Bureaus to whom detailed	Duration of detail	Amount of reimbursement received	Description of assignment
Hydraulic Engineer, GS-12	Reimbursable	UNESCO/Peru	7-17-70 to 7-28-70	$ 850.00	Co-director of Regional Seminar of Hydrology of Droughts.
Technician (Drilling Operator), FC-4	Reimbursable	AID/Thailand	7-20-70 to 8-20-70	4,200.00	Evaluate drilling equipment and crews; recommend requirements for additional equipment and personnel
Research Chemist, GS-13	Reimbursable	AID/Indonesia	8-2-70 to 8-26-70	3,800.00	Search for springs representing leakage from hot-water resevoir; collect samples from thermal springs.
Geologist, GS-14	Reimbursable	AID/Colombia	7-26-70 to 8-28-70	5,700.00	Field investigations with counterpart geologists of iron deposits and preperation of report.
Geologist, GS-12	Reimbursable	UNESCO/USSR	8-15-70 to 9-3-70	500.00	Attend symposium on geology and genesis of Precambrian iron/manganese formations and ore deposits
Geologist, GS-15	Reimbursable	UNESCO/USSR	8-15-70 to 9-7-70	500.00	Attend symposium on geology and genesis of Precambrian iron/manganese formations and ore deposits
Geologist, GS-13	Reimbursable	AID/Brazil	9-1-70 to 9-13-70	2,500.00	Present briefing on lunar investigations and remote sensing exploration and speak before Brazilian Geological Congress on results of lunar samples.

Details of personnel to other agencies and bureaus

Bureau or Office of Geological Survey

First 6 Months
Fiscal year 1971

Position title and grade	Reimbursable or Non-reimbursable	Agencies or Bureaus to whom detailed	Duration of detail	Amount of reimbursement received	Description of assignment
Research Chemist, GS-15	Reimbursable	UNESCO/Ceylon	8-30-70 to 9-25-70	$2,300.00	Conferences with personnel of Division of Industrial and Natural Resources, ECAFE and with UNESCO officials; check equipment; prepare preliminary report and edit final report.
Geophysicist, GS-13	Reimbursable	Saudi Arabia	11-30-70 to 3-15-71	11,000.00	Geologic interpretations of aeromagnetic data in relation to magnetic properties of the anomaly.
Hydrologist, GS-12	Reimbursable	AID/Chile	8-19-70 to 10-22-70	5,400.00	Assist Chilean hydrologists in problems of construction and calibration of digital simulation model.
Chemist, GS-15	Reimbursable	AID/Turkey	9-4-70 to 10-5-70	3,500.00	To assist in setting up and calibrating spectrometer system.
Geologist, GS-15	Reimbursable	UNESCO/Ceylon	8-30-70 to 10-7-70	2,500.00	Technical Director for Second Seminar of Geochemical Prospecting Methods and Techniques organized by UNESCO in cooperation with ECAFE and the Government of Ceylon.
Research Chemist, GS-15	Reimbursable	Saudi Arabia	9-26-70 to 10-23-70	3,800.00	To review analytical facilities and advise on analytical methods and procurement of laboratory equipment and supplies.

Details of personnel to other agencies and bureaus

Bureau or Office of Geological Survey

First 6 Months
Fiscal year 1971

Position title and grade	Reimbursable or Non-reimbursable	Agencies or Bureaus to whom detailed	Duration of detail	Amount of reimbursement received	Description of assignment
Geologist, FC-4	Reimbursable	AID/Paraguay	9-25-70 to 10-20-70	$1,500.00	Advisory assistance in geological evaluation of phosphate deposits to determine feasibility of utilization as fertilizer material for agricultural application.
Research Hydrologist, GS-13	Reimbursable	AID/Thailand	7-15-70 to 11-7-70	11,400.00	Preliminary studies of existing well samples and data, etc; recommendations on scope of work for second phase.
Research Hydrologist, GS-15	Reimbursable	UNESCO/Poland	11-21-70 to 11-28-70	900.00	To confer with UNESCO and Polish officials relative to equipment needs of a UN Special Fund Project in Poland.
Research Hydrologist, GS-14	Reimbursable	UNESCO/New Zealand	11-28-70 to 12-20-70	575.00	To take part in panels in Working Group on Representative and Experimental Basins.
Geologist, GS-13	Reimbursable	AID/Indonesia	7-14-70 to 10-16-70	8,100.00	Guidance in support of national geologic mapping and mineral exploration; and training in geochemical prospecting.
Geologist, GS-13	Reimbursable	UN/Turkey	7-30-70 to 10-7-70	10,300.00	Organize and lead geochemical exploration teams; order reagents and equipment for field laboratory work; instruct and train counterpart staff.

Details of personnel to other agencies and bureaus

Bureau or Office of Geological Survey

First 6 Months
Fiscal year 1971

Position title and grade	Reimbursable or Non-reimbursable	Agencies or Bureaus to whom detailed	Duration of detail	Amount of reimbursement received	Description of assignment
Geologist, GS-13	Reimbursable	AID/Thailand	7-20-70 to 10-29-70	$8,700.00	Study and evaluate geologic data, drill samples and records pertinent to determination of investigation for potash and prepare recommendations for work; study drilling and lab capacity and equipment, prepare report with plan and schedule.
Research Hydrologist, GS-15	Reimbursable	UN/India	9-20-70 to 11-11-70	5,000.00	To instruct and train local geophysicists and geologists in practical application of various geophysical methods to groundwater exploration.
Hydrologist, GS-13	Reimbursable	AID/West Pakistan	11-1-70 to 1-8-71	6,050.00	To assist in upgrading Reports and Publications Unit of Water and Soils Investigations Division of West Pakistan Water and Power Development Authority.
Research Hydrologist, GS-15	Reimbursable	IAEA/Austria	9-26-70 to 10-3-70	1,210.00	U. S. representative 5th Session of International Decade Working Group on Nuclear Techniques in Hydrology.
Geologist, GS-15	Reimbursable	AID/Iran	7-1-70 to 10-4-70	10,600.00	To conduct CENTO field seminar for professionally young geologists and mining engineers from Iran.

Details of personnel to other agencies and bureaus

Bureau or Office of Geological Survey

First 6 Months
Fiscal year 1971

Position title and grade	Reimbursable or Non-reimbursable	Agencies or Bureaus to whom detailed	Duration of detail	Amount of reimbursement received	Description of assignment
Geologist, GS-13	Reimbursable	Saudi Arabia	7-6-70 to 10-13-70	$7,900.00	Make geophysical interpretation of shield aeromagnetic data to aid geologic mapping.
Geologist, GS-14	Reimbursable	AID/Argentina	9-21-70 to 12-3-70	12,000.00	To assist DNGM counterpart field geologists in photogeologic and map compilation techniques.
Geologist, GS-14	Reimbursable	UNESCO/Spain	9-26-70 to 10-3-70	1,550.00	To evaluate bids on infra-red scanning of Canary Islands.
Hydrologist, GS-14	Reimbursable	AID/India	10-21-70 to 11-25-70	7,400.00	To assist preparation of AID contract for consultant services for groundwater evaluation with related in-service training and institutional development.
Sup. Hydrologist, GS-15	Reibursable	AID/Vietnam	9-18-70 to 11-12-70	8,000.00	To review previous studies of water control applications and conduct field trips with Government of Vietnam and U.S. personnel.
Geologist, GS-13	Reimbursable	Saudi Arabia	12-28-70 to 5-28-71	13,400.00	To plan, advise, coordinate and assist in systematic geochemical and geologic study of Al Kusheymiyah area.

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Details of personnel to other agencies and bureaus

Bureau or Office of Geological Survey

First 6 Months
Fiscal year 1971

Position title and grade	Reimbursable or Non-reimbursable	Agencies or Bureaus to whom detailed	Duration of detail	Amount of reimbursement received	Description of assignment
Geologist, GS-15	Reimbursable	AID/Liberia	9-16-70 to 10-23-70	$8,150.00	To complete analysis of available geologic geophysical and geochemical data on Eastern Liberia.
Technician(Drilling Operator) FC-5	Reimbursable	Saudi Arabia	11-15-70 to 12-12-70	5,150.00	To serve as technical advisor in physical exploration in Saudi Arabia; to review progress of work being done.
Cartographic Technician,GS-9	Reimbursable	AID/Liberia	12-3-70 to 5-3-71	7,400.00	To collect field geologic and geographic data needed for 1:125,000 scale form-line maps for GERA Project.
Research Chemist, GS-15	Reimbursable	AID/Indonesia	10-28-70 to 11-23-70	3,900.00	To review analytical facilities and advise on analytical methods and procurement of laboratory equipment and supplies.
Geologist, GS-14	Reimbursable	AID/Brazil	10-4-70 to 12-11-70	9,000.00	To evaluate field and laboratory activities of Brazilian AEC.
Hydrologist,GS-11	Reimbursable	UNESCO/Canary Islands	9-12-70 to 10-11-70	2,500.00	To advise on application of digital computer methods to processing of hydrologic data and advise on scientific formulation prior to computerizing systematic analysis.

Details of personnel to other agencies and bureaus

Bureau or Office of Geological Survey

First 6 Months
Fiscal year 1971

Position title and grade	Reimbursable or Non-reimbursable	Agencies or Bureaus to whom detailed	Duration of detail	Amount of reimbursement received	Description of assignment
Geologist, GS-15	Reimbursable	UNESCO/France & Switzerland	10-22-70 to 11-5-70	$ 750.00	Representative for paleobotany at meeting of Editorial Committee and to study Renault collection of fossil plants, French Natural Historical Museum.
Research Physicist, GS-15	Reimbursable	AID/Turkey	11-9-70 to 1-1-71	7,600.00	To assist in setting up spectrographic laboratory.
Research Geologist, GS-15	Reimbursable	AID/Argentina, Peru	10-20-70 to 12-8-70	8,000.00	To conduct study and evaluation of existing information for "Plan Cordillera Norte" and prepare general recommendations for future and examine known mineral localities.

Mrs. HANSEN. In your justifications you say the number of research grants and contracts negotiated with educational and private institutions continues to grow. What portion of your total program is accomplished on this basis?

Mr. MCCORMACK. I can give you some statistics showing that in fiscal year 1968 there were 92 research grants and negotiated contracts, in fiscal year 1969, 113; in fiscal year 1970, 144; and in fiscal year 1971 we had 141 finished or pending at midyear. In dollars, this represents approximately 2 percent of our total program in fiscal year 1969, 2½ percent in fiscal year 1970 and 3 percent in fiscal year 1971.

Mrs. HANSEN. Please insert in the record a listing of the research grants you made in fiscal year 1970 indicating the name of the grantee, the amount of the grant, and the description of the activity for which the grant was made.

Dr. PECORA. Yes, Madam Chairman.

(The information follows:)

Grantee and purpose	*Amount*
Grants awarded, fiscal year 1970:	
Colorado School of Mines, earth strain studies	$25,000
University of Nevada, application of ERTS data to arid regions	29,670
Old Dominion University Research Foundation, crustal strain measurements	3,500
Total grants	58,170
Contractor and purpose	
Contracts awarded, fiscal year 1970:	
Western Geophysical Co., seismic reflection data	97,435
APL-Washington, Inc., time sharing	10,000
Ocean Science Ships Inc., transportation	18,486
General Electric Lamp Division, equipment	12,498
Teledyne Exploration, equipment	36,720
Oregon State University, study of continental margin	52,000
National Academy of Sciences, study of geological science in human affairs	33,140
Woods Hole Institute, investigate Saudi Arabian side of Red Sea	203,345
Chelsea Clock Co., equipment	5,450
University of Iowa, remote sensing	71,871
Environmental Systems, aerial photography	4,000
South Dakota State University, remote sensing	400,000
AGA Corp., lab equipment	11,100
Telecomputation, Inc., time sharing	50,000
Fischer & Porter Co., equipment	14,458
Geophysical Services, seismic data	8,300
General Electric Co., computer time sharing	50,000
Texas A. & M., geophysical data	11,193
Wendell E. Bryan, M.D., service and study of vision care	16,618
University of Minnesota, research facilities	13,000
Fisher Scientific Co., equipment	6,540
Digital Products Corp., equipment	48,102
Sperry-Sun Surveying, repairs	4,000
Decca Survey Systems, equipment	15,927
Applies Research Laboratory, equipment	7,330
Woods Hole Institute, conduct marine geologic studies	70,000
Louisiana State University, study of Continental Shelf	22,478
National Academy of Sciences, space programs for earth observation	30,000
Peat, Marwick, Livingston, financial management system	25,000
Association of American Geographers, remote sensing research	7,876
Aerojet General, microwave investigation of snowpack	67,700

Contractor and purpose	*Amount*
Contracts awarded—Continued	
Applied Research Laboratory, equipment	525
University of Michigan, multispectral data and Santa Barbara oil slick	15, 150
Tracor Science Supply Division, time variations of the spectral signature	35, 500
Fischer & Porter Co., equipment	19, 298
Duke University, study of North Carolina margin sedimentation	19, 400
Motorola Communication, equipment	19, 501
Dwight L. Greene, printing and reproduction	3, 000
Stanford University, computer services	5, 000
Stanford University, computer services	6, 000
Arctic Institute of Northern Alaska, study of northern slope	23, 000
Woods Hole Institute, study of sea floor off Atlantic coast and adjacent areas	191, 000
Computer Sharing Services, computer services	10, 000
Ferguson & Associates, aerial photography	3, 300
Scientific Instruments, equipment	3, 865
General Electric Co., equipment	7, 592
Photo Science, aerial photography	7, 500
General Electric Co., computer time sharing	10, 000
Global Marine Inc., oceanographic studies	57, 750
Grumman Aerospace Corp., New England SLAR survey	17, 000
Colorado State University, research facilities	42, 600
Motorola Communication & Electronics, equipment	17, 238
Aerospace Corp., systems management assistance for EROS	56, 068
Peat, Marwick, Mitchell & Co., financial management system	100, 741
Georgia Institute of Technology, hydraulic research	7, 200
Computer Network Corp., computer time sharing	50, 000
Intertype Co., repair and maintenance	5, 000
University of Michigan, remote sensing data compilation	9, 740
Philco-Ford Corp., photographic enhancement of Apollo IX	11, 000
University of Virginia, remote sensing	96, 447
APL-Washington, time sharing	50, 000
RCA, radio frequency interference	37, 953
Computer Sharing Services, time sharing	50, 000
University of Waterloo, computer services	2, 907
Telecommunications Inc., time sharing	10, 000
Keen Electronics Corp., repair and maintenance	6, 000
Intertype Co., repair and maintenance	5, 000
General Electric, equipment	5, 770
Lanston Monotype Co., equipment	5, 973
Motorola, Inc., equipment	4, 596
Hewlett-Packard Co., equipment	4, 911
Engineering Computer Services, ADP contractual services	15, 649
Fischer & Porter Co., equipment	1, 536
Leasco Systems Research Corp., time sharing	10, 000
Control Data Corp., computer time	10, 800
Long Island University, reflectance spectra of mineralized trees	9, 815
Perkin-Elmer Corp., equipment	18, 000
Data Computing Inc., equipment	6, 152
Paleo-Data, Inc., study of Gulf of Mexico	25, 000
Olympic Geophysical Co., seismic reflection data	66, 066
Texas A. & M., Marine studies in the Gulf of Mexico	38, 850
Association of American Geographers, Application of remote sensing	5, 372
South Dakota School of Mines & Technology, Investigation of gold potential of the Black Hills Region	78, 050
Western Geophysical, Seismic reflection data	26, 000
Precision Instrument, Lab instrumentation	23, 308
Standard Oil Co., Geophysical data	105, 210
Jeolco, Lab equipment	63, 330
Wendell E. Bryan, M.D., Optical services	16, 200
U.S. Time Sharing, Computer service	132, 400
Allen Babcock, Computer service	10, 000

Contractor and purpose	
Contracts awarded—Continued	*Amount*
ITT Data Service, Computer service	10, 000
VIP Systems, Computer service	10, 000
Association of American Geographers, Remote sensing research	10, 150
Fischer & Porter Co., Equipment	412
University of Washington, Study bottom of northern Bering Sea	30, 000
University of Southern California, Study of continental borderland of southern California	14, 000
Harris-Seybold Co., Equipment	400
Stanford University, Computer services	20, 000
RCA, Observation satellite data center	55, 200
A. E. Ferguson & Association, Aerial photography	3, 366
Tracor, Time variation spectral signature	11, 421
Teledyne Exploration, Seismic profiling cruise	3, 755
Stanford University, Computer services	10, 000
Raytheon, Multispectral photography	429
Computer Sciences, Transient energy methods of measuring	495
Ocean Science Ships, Inc., Transportation	1, 638
Control Data, Computer time	2, 000
National Academy of Sciences, Space programs for earth observation	4, 795
Raytheon, Multispectral photography	6, 385
National Academy of Sciences, Postdoctoral research program	16, 000
University of Denver, Commuter services	50, 000
Georgia Institute of Technology, Hydraulic research program	7, 200
University of Minnesota, Research facilities	23, 000
Colorado State University, Research facilities	63, 584
Cubic Corp., Repair of electrotapes	10, 000
Sperry-Sun, Repair of elevation meter	4, 000
Harris-Seybold Co., Repair and maintenance	5, 500
University of Washington, Computer services	12, 000
Raytheon Co., Multispectral photography	35, 110
Computer Network Corp., Time sharing	10, 000
University of Arizona, Training course	6, 500
Stanford University, Computer service	22, 400
University of Kansas, Space photography	88, 000
Clark University, Remote sensing	20, 441
University of Toronto, Remote sensed data	36, 800
Hewlett-Packard, Electronic desk calculator	8, 916
Johnson Helicopter, Helicopter services	21, 750
Schlumberger Offshore Service, Well casing operation	4, 232
Thiokol Chemical, Field hydrologic data reporting units	9, 960
Teledyne, Subbottom energy storage system	3, 650
Teledyne, HR amplifier system	5, 000
CM^2, CM^2 pumping system	4, 500
Schonstedt Instrument Co., Magnetomer	9, 195
E.G. & G. Geodyne Division, Accoustical profiling system	3, 200
Mar-Tec Northwest, Salt water distillation unit	3, 745
Develco, Seismic preamp	7, 650
Thiokol Chemical, Field hydrologic data reporting	5, 100
Cameron Engineers, Reporting services	4, 500
Spectro Systems, Equipment	3, 100
Convair Division, Aircraft repair	10, 129
Petroleum Information, Reports	3, 379
Total contracts	3, 832, 817

Mrs. HANSEN. Are these grants usually on a matching basis?

Dr. PECORA. Usually they are not on a matching basis. Usually they are executed for the purpose of acquiring expertise outside of the Government service to assist Geological Survey in its program. For the most part they are not on a matching basis.

JUSTIFICATION MATERIAL

Mrs. HANSEN. Please insert pages 62 through 66 of the justifications in the record at this point.

(The pages follow:)

PERSONNEL SUMMARY

	Actual 1970	Estimate 1971	Estimate 1972
Total number of permanent positions	5,606	5,626	5,867
Full-time equivalent of other positions	579	625	635
Average number of all employees	6,024	6,156	6,465
Average GS grade	9.6	9.6	9.6
Average GS salary	$13,262	$13,417	$13,547
Average salary of ungraded positions	$9,791	$10,785	$10,785

ITEMIZATION OF ESTIMATE

Department of the Interior
Appropriation Title: Surveys, Investigations, and Research

Geological Survey

	Actual 1970	Estimate 1971	Estimate 1972	Increase (+) or Decrease (-)
Program and Financing				
Total obligations	$103,308,299	$111,621,000	$121,212,000	$ + 9,591,000
Recovery of prior year obligations	- 278,585	- 121,000	- 5,000	+ 116,000
Unobligated balance available, start of year	- 721,415	- 550,000	- 400,000	+ 150,000
Unobligated balance available, end of year	550,000	400,000	400,000	-
Unobligated balance lapsing	51,553	-	-	-
Budget authority	102,909,852	111,350,000	121,207,000	+ 9,857,000
Budget authority:				
Appropriation	99,990,000	106,392,000	121,207,000	14,815,000
Pay increase (Public Law 91-305)	2,030,000	-	-	-
Transfer from other accounts	889,852	-	-	-
Proposed supplemental for civilian pay act increases	-	4,958,000	-	- 4,958,000

		Actual 1970	Estimate 1971	Estimate 1972	Increase (+) or Decrease (-)
Obligations by Objects					
11	Personnel compensation	$ 72,507,933	$ 77,642,000	$ 82,025,000	$ + 4,383,000
12	Personnel benefits	6,145,746	6,760,000	7,180,000	+ 420,000
21	Travel and transportation of persons	3,563,577	4,269,000	4,500,000	+ 231,000
22	Transportation of things	1,228,610	1,400,000	1,460,000	+ 60,000
23	Rent, communications, and utilities	4,826,661	5,025,000	5,515,000	+ 490,000
24	Printing and reproduction	1,423,113	1,670,000	1,747,000	+ 77,000
25	Other services	5,733,177	7,240,000	9,210,000	+ 1,970,000
26	Supplies and materials	4,403,750	4,420,000	4,812,000	+ 392,000
31	Equipment	3,231,255	2,693,000	4,507,000	+ 1,814,000
33	Investments and loans	229,000	350,000	84,000	- 266,000
41	Grants, subsidies and contributions	9,740	155,000	175,000	+ 20,000
42	Insurance claims and indemnities	8,970	-	-	-
	Subtotal	103,311,532	111,624,000	121,215,000	+ 9,591,000
	Quarters and subsistence charges	- 3,233	- 3,000	- 3,000	-
	Total obligations	103,308,299	111,621,000	121,212,000	+ 9,591,000

Authorization for Purchase of 40 Passenger Motor Vehicles, for Replacement Only

The vehicles requested are used to transfer men and equipment over all types of roads and terrain and in all kinds of weather, in the conduct of the field work of the Geological Survey. These vehicles must provide dependable service at all times, since a great deal of the transportation required is in areas where repair services are not available. Field use tends to shorten the efficient life of a vehicle.

The 40 vehicles to be replaced, as shown below, will meet or exceed the age or mileage replacement standards prescribed by the General Services Administration, and can no longer give dependable and economical service. The vehicles will be used in areas not serviced by vehicle pools maintained by the General Services Administration.

	Sedans	Station Wagons	Total
Replacements based on:			
Mileage			
60,000 - 80,000 -------	8	23	31
80,000 or over --------	3	-	3
Age ----------	3	3	6
Total ----------	14	26	40
Total passenger vehicles owned by Geological Survey	56	112	168

Miscellaneous Services to Other Accounts

Miscellaneous services performed for other Federal agencies and the public, on a reimbursable basis, by central services unit of the Geological Survey are summarized below:

	Actual 1970	Estimate 1971	Estimate 1972
Electronic data processing and related services	$1,691,669	$2,345,000	$1,789,000
Map reproduction services for other agencies	116,286	138,000	132,000
Sale of maps to other agencies	200,001	194,000	207,000
Sale to the public of photographs and copies of records (43 U.S.C. 45)	27,293	26,000	26,000
Property maintenance services and sale of material from stock to other Federal agencies	153,880	102,000	97,000
Total central services reimbursable program	2,189,129	2,805,000	2,251,000

Central Services and Consolidated Accounts

Services to Geological Survey programs, similar to those rendered to other agencies, as well as motor vehicle fleet operation and other common-use services, are financed for reasons of economy through central service and consolidated accounts. Charges initially made to these accounts are ultimately charged to the activity benefited.

The actual costs of these services for 1970 and the estimates for 1971 and 1972, and their distribution by activity, are summarized below:

Central Services	Actual 1970	Estimate 1971	Estimate 1972
Electronic data processing and related services	$ 4,931,328	$ 5,564,000	$ 5,449,000
Map reproduction	2,869,709	3,249,000	3,346,000
Editing and illustration of publications	2,797,467	3,005,000	3,144,000
Distributing of maps and reports, response to public inquiries and related functions	3,046,079	3,187,000	3,329,000
Property maintenance and instrument development	591,345	655,000	702,000
Payroll services for other bureaus	95,365	61,000	50,000
Total central services	14,331,293	15,721,000	16,020,000

Consolidated Accounts	Actual 1970	Estimate 1971	Estimate 1972
Motor vehicle fleet operation	$ 751,512	$ 795,000	$ 830,000
Rental and maintenance of certain facilities at headquarters and field centers	1,430,324	1,450,000	1,520,000
Warehouse stock of common-use supplies and materials	710,278	714,000	727,000
Survey's proportionate share of departmental charges, Safety Committee, and contingencies arising from operation of field centers	217,188	392,000	393,000
Total consolidated accounts	3,109,302	3,351,000	3,470,000
Grand total	17,440,595	19,072,000	19,490,000
Less inter-office charges	981,438	1,042,000	1,118,000
Net cost	16,459,157	18,030,000	18,372,000
Distribution by activity:			
Special resource and environmental projects	-	-	60,000
Alaska pipeline related investigations	5,059	-	-
Topographic surveys and mapping	5,043,415	5,459,000	5,675,000
Geologic and mineral resource surveys and mapping	5,077,173	5,367,000	5,525,000
Water resources investigations	3,524,474	3,670,000	3,981,000
Conservation of lands and minerals	215,549	234,000	240,000
Earth resources observation systems	75,098	153,000	243,000
General administration	329,260	342,000	397,000
Miscellaneous services to other accounts	2,189,129	2,805,000	2,251,000
Net cost	16,459,157	18,030,000	18,372,000

VEHICLE REPLACEMENTS

Mrs. HANSEN. Justify your request for 40 vehicle replacements.

Mr. STEARNS. Those are replacements of vehicles that have met the normal Government standards prescribed by the General Services Administration for replacement. These vehicles are used for fieldwork particularly in rough terrain and away from metropolitan centers where GSA fleets are available.

Mrs. HANSEN. Please insert in the record the locations at which these vehicles will be used.

Mr. STEARNS. We will do that.

(The information follows:)

LOCATIONS AT WHICH MOTOR VEHICLE REPLACEMENTS WILL BE USED

Vicinity	Sedans	Station wagons	Vicinity	Sedans	Station wagons
Tuscaloosa, Ala		4	Lincoln, Nebr		1
Nome, Alaska		1	Carlsbad, N. Mex	2	
Flagstaff, Ariz	2	1	Roswell, N. Mex	4	
Visalia, Calif		1	Mineola, N.Y	1	1
Dover, Del		1	Asheville, N.C		1
Ocala, Fla		1	Meadville, Pa	1	
Hawaii National Park, Hawaii		1	San Angelo, Tex		1
Champaign, Ill		1	Wichita Falls, Tex		1
Iowa City, Iowa	1	1	Charlottesville, Va		1
Lawrence, Kans	2		Madison, Wis		7
Augusta, Maine		1			
Rolla, Mo	1		Total	14	26

POLLUTION CONTROL AND ENVIRONMENTAL PROTECTION

Mrs. HANSEN. Please insert in the record a tabulation indicating the activities of your bureau that are directly related to pollution control indicating the amount in the 1972 budget for each activity.

I would also like to insert a similar tabulation in connection with environmental protection.

Dr. PECORA. This is a very interesting subject area and we shall do that.

(The information follows:)

Pollution Control and Environmental Protection Activities
Funding - In Thousands of Dollars - Directly Appropriated Funds

	1968	1969	1970	1971	1972
Alaska pipeline related investigations	-	-	709	1,320	1,320
Research on water pollution - sources and effects	1,090	910	900	950	1,200
Water quality monitoring and surveillance	2,880	3,310	3,680	4,170	4,620
Flood hazard mapping	97	371	413	433	433
Mineral lease management:					
OCS lands	290	365	700	2,000	2,200
Federal and Indian lands	1,440	1,525	1,700	1,880	1,935
Geochemical surveys	600	600	624	830	825
Earthquake hazards	1,056	1,150	1,312	1,470	1,665
Volcano hazards	607	494	520	530	528
Engineering geology	683	719	800	1,030	1,025
Total expenditures directly related to pollution control and environmental protection	8,743	9,444	11,358	14,613	15,751

In addition to the above activities which are directly related to pollution control and environmental protection, many of the Survey's programs contribute to the understanding, description, and prediction of the environment, and in this sense, to environmental protection and enhancement. These programs include research in hydrologic principles and techniques; water resources areal appraisals, study of specific problems, data collection and processing, coordination; topographic and geologic mapping; Earth Resources Observation Systems (EROS program); and urban pilot area studies.

PERSONNEL CEILING

Mrs. HANSEN. You have budgeted 5,867 permanent positions for 1972. What is the end of the year personnel ceiling that has been assigned to you?

Dr. PECORA. For fiscal 1971 it is 8,201 plus 150 increase requested for 1972 in this budget, 8,351. This compares with a total of 8,465 positions consisting of 5,867 in the direct appropriation and 2,598 financed by reimbursements from other agencies.

Mrs. HANSEN. You had 217 unfilled permanent positions at the end of fiscal year 1970, yet you indicate only 114 unfilled at the end of fiscal year 1972. How do you explain this reduction in unfilled positions at the end of the year?

Mr. STEARNS. Madam Chairman, that is a result of our efforts to have as many as possible—looking toward the ultimate objective of 100 percent—of our positions filled by the end of the fiscal year. It is objectionable, we feel, to carry an unduly large number of vacancies. You don't get the job done with vacancies.

Mrs. HANSEN. Thank you. Dr. Pecora, I want to thank you and your staff for your usual excellent presentation. The committee always feels it is an education to have the Geological Survey testify. We benefit far more than you do.

Mr. MCDADE. It has been a most interesting day, Dr. Pecora. We thank you and your staff for your forthright presentation.

Dr. PECORA. Thank you again. You have both been very kind.

MONDAY, APRIL 26, 1971.

NATIONAL PARK SERVICE

WITNESSES

GEORGE B. HARTZOG, Jr., DIRECTOR
RAYMOND FREEMAN, ACTING DEPUTY DIRECTOR
J. LEONARD NORWOOD, ASSISTANT DIRECTOR
ROBERT M. UTLEY, CHIEF HISTORIAN
PHILIP O. STEWART, CHIEF, DIVISION OF LAND ACQUISITION
GEORGE A. GOWANS, CHIEF, DIVISION OF PROGRAM PLANNING
WILLIAM C. QUICK, CHIEF, BRANCH OF BUDGET FORMULATION
RUSSELL E. DICKENSON, GENERAL SUPERINTENDENT, NATIONAL CAPITAL PARKS
JOHN A. RUTTER, DIRECTOR, PACIFIC NORTHWEST REGION
FRANK F. KOWSKI, DIRECTOR, SOUTHWEST REGION
HENRY G. SCHMIDT, DIRECTOR, NORTHEAST REGION
LAWRENCE C. HADLEY, DEPUTY ASSISTANT DIRECTOR FOR PARK MANAGEMENT
FRANCIS M. WILES, DIRECTOR OF BUDGET, DEPARTMENT OF THE INTERIOR

Mrs. HANSEN. The committee will come to order.

This morning we have the National Park Service and our principal witness is our friend, George Hartzog, the Director. Please introduce any new members of your staff present this morning.

INTRODUCTION OF ASSOCIATES

Mr. HARTZOG. Madam Chairman, I would appreciate it very much. Let me say again to you and to the members of the subcommittee what a great delight it is to be here. I do have one new member of my staff who has not appeared before you, Mr. Ray Freeman, who is Deputy Director in charge of field operations. I have three of our Regional Directors here, Mr. Henry Schmidt, Director of our Northeast Region in Philadelphia, Mr. John Rutter, Director of our Pacific Northwest Region in Seattle, and Mr. Frank Kowski, Director of our Southwest Region in Santa Fe. It has been my custom to bring our Regional Directors before the Appropriations subcommittee. This is their turn. The other three came before you last year.

DIRECTOR'S GENERAL STATEMENT

Mrs. HANSEN. Please insert your statement in the record at this point and summarize it for us.

(The statement follows:)

Madam Chairman: I am pleased to appear before you again to discuss the programs of the National Park Service and to review with you our plans and needs for the next fiscal year.

It has been a pleasure to work with this subcommittee over the years in our joint effort to preserve and to present America's natural and cultural heritage for the benefit and enjoyment of all our citizens. It is a pleasure, also, to appear before the new members of the subcommittee.

The interest, support, and enthusiasm of each of you mean much to us in the National Park Service in our management of the National Park System.

We look forward to working with each of you in this first session of the 92d Congress. Please let me know of any way in which we may serve you.

ACCOMPLISHMENTS

I am pleased to report to you that with the funds you have made available to us in the 1971 fiscal year, we have been able to initiate and accelerate several important programs: Volunteers-in-parks; the continuation of preparations for the celebration of the centennial of national parks in 1972 at Yellowstone and Grand Teton National Parks; improve our staffing and strengthen our training programs in law enforcement; accelerate our wilderness studies and related master plans in order to meet the congressionally established deadline of 1974; proceed with the studies needed to determine the impact of a proposed jetport in south Florida; provide mass transportation to visitors at Yosemite National Park to cope with ever proliferating automobile traffic; to expand our signally successful summer-in-the-parks program in Washington, D.C., into a broader program of parks-for-all-seasons to respond to the desperate need of our urban citizens—and especially the children in our city; to expand our living history program to more than 40 areas of the system, thereby providing a more imaginative and a more creative interpretation of the values of our inheritance to an urban population; and to initiate the vital historic American engineering records program. Importantly, also, Hon. Ben Reifel, a former Member of the Congress has accepted a position without compensation to assist us in making the expertise of the National Park Service available to many Indian tribes of our Nation.

I am most grateful to the committee for its support in these innovative thrusts of the national park programs to enhance the quality of the daily lives of all of our citizens.

DONATIONS

I am again pleased to report on the donations of cash, lands, and other objects received by the Service. During the 1970 calendar year, cash donations of $991,000 were received and donations of land and other objects valued at approximately $238,000 were also received.

In addition to the donations from sources outside the Service, I should like to call the subcommittee's attention to contributions made by our employees. On a servicewide basis for the leave year ended January 9, 1971, our employees forfeited a total of 32,400 hours of annual leave valued at more than $250,000 while they stayed on the job to serve national park visitors. Also, during the period from July 1, to December 31, 1970, our employees contributed 166,400 hours of uncompensated overtime with a value of about $1 million. Projected over a 12-month period, the value of uncompensated overtime could be at least $2 million. I am very proud of the dedication and devotion to duty of our employees, which these voluntary contributions reflect.

MAJOR OBJECTIVES OF THE 1972 PROGRAM

The budget request before you, seeks to implement several significant objectives to strengthen park operations:

1. For years we have been trying to operate our small areas with a staff of only two or three permanent positions. This has proved to be ineffective in achieving good management. The result is that either we have imposed undue burdens on the personnel involved, requiring many, many hours of uncompensated overtime in order to just "get by" or resources management has suffered and visitors have been served inadequately. A detailed study of the staffing requirements of small areas during the past year by the Washington Office and Field Directorate indicates that basic minimum staffing requirements are: four permanent full-time management and protection employees; and one maintenance employee; except in those limited instances where small areas in close proximity to each other are grouped under one superintendent or park manager.

This basic minimum management and protection staffing needs to be a local manager, a professional (naturalist, historian, archeologist, depending upon the resources involved), a guide or other technician; and, an administrative assistant to carry out the day-to-day personnel, financial management, property and procurement functions. The maintenance position may be either a laborer, caretaker, or maintenanceman, depending upon the workload and nature of the duties.

2. Over the past several years, we have called the committee's attention to the serious lack of staff to manage adequately the resources and serve the visitors, particularly in our larger park units. Careful study of this matter indicates that the management load in our larger parks is such that the superintendent must be provided onsite professional services to guide sound management judgments. In some instances, this professional staff can serve two large parks where they are in close proximity to each other and where the workload is seasonal in nature. Therefore, in our larger parks, or in park groups or clusters as detailed in the service's budget, we propose (depending upon the resources involved and the special management requirements of each area) to staff each large park or cluster with the following onsite professional help: an ecologist, historian and/or archeologist; a landscape architect, architect and/or historical architect; engineers (mechanical, civil, sanitary and/or electrical); and, a museum curator.

For the small areas (see No. 1 above) in which the continuing workload does not justify such full-time onsite professional assistance, we propose to provide similar professional assistance through a strengthening of the park support staff in each regional office.

The details on these professional positions are set forth in the budget justifications.

3. A few years ago we initiated a program of consolidation of park management units to provide direction by field group offices or clusters under a general superintendent, thereby reducing the amount of administrative overhead. We are continuing to expand this program and establish new groups. (The groups are shown as clusters in the budget justifications.)

4. Provision is made for strengthening the staffing for visitor services and for law enforcement in the parks.

5. Maintain the accelerated schedule of wilderness studies and related master plans necessary to meet the statutory deadline for completion established by the Wilderness Act of 1964, basic funds for which were provided in 1971.

6. A program of pollution abatement within the areas of the National Park System to achieve the President's goal of eliminating air and water pollution at Federally owned properties by 1972.

7. Continue the implementation of the major programs needed for the American Revolution Bicentennial Celebration in 1976. In connection with this objective, the National Park Service has identified 20 areas, sites and battlefields within the National Park System that directly or indirectly symbolize the significance of the Nation's 200th birthday.

In addition to the 20 sites within the National Park System, some 63 significant Revolutionary War sites are being preserved and interpreted by other public agencies or private organizations. These will play a significant role in the bicentennial celebration. The National Park Service, under the authorization of the National Historic Preservation Act, anticipates involvement in the preparation of these sites for their part in the celebration of the bicentennial. For this purpose, $32 million should be forthcoming from the grantees.

The National Park Service has three basic objectives for the Bicentennial:

(*a*) Promote the fullest understanding of the significance of the American Revolution and its present relevance to all Americans.

(*b*) Cooperate with and assist other agencies involved in order that the effort of each will contribute the maximum to achieving the objectives of the Bicentennial.

(*c*) Accommodate the anticipated influx of visitors to revolutionary parks, administered by the National Park Service, by providing adequate visitor facilities without damaging the historic resources.

SUMMARY OF THE 1972 FISCAL YEAR ESTIMATES

In addition to land acquisition which is included in the budget of the Bureau of Outdoor Recreation, the 1972 budget for the National Park Service totals $191,645,000, an increase of $30,819,700 over the amount of $160,825,300 provided in 1971.

The gross increase is distributed among the following major purposes:

1. *New park areas ($1,777,100.*—An increase of $500,000 is requested in fiscal 1972 for the initial operating expenses of the Andersonville National Historic Site, Ga.; Apostle Islands National Lakeshore, Wis.; Fort Point National Historic Site, Calif.; Sleeping Bear Dunes National Lakeshore, Mich.; which were authorized late in calendar year 1970, and the St. Croix National Scenic Riverway in Minnesota and Wisconsin which was designated in 1968. The estimate also includes an increase in the amount of $1,277,100 to provide a portion of the need for operations at acceptable standards of areas placed in operation since 1960.

2. *Operation of new facilities and new programs in parks ($334,700).*—The estimate provides $159,700 for the operation of new facilities which will be placed in operation in the parks during 1971 and 1972. These are such items as a visitor center at Jewel Cave National Monument, the completion of the second floor at Independence Hall and the opening of an information station at the Frederick Douglass Home in the National Capital Parks. The budget also includes $175,000 for two new programs; continuing on a full year basis the system for controlling traffic and providing public transportation at Yosemite National Park, initiated in 1971, and continuing the program of bear management at Yellowstone National Park, started in a limited way with supplemental funds in 1970.

3. *Portion of funds needed to operate older parks at acceptable standards ($8,724,400).*—The largest operating increase is $5,724,400 for a portion of the need for operations at acceptable standards in areas operating prior to January 1, 1960. This increase will allow for meeting part of our operating deficiency needs, with special emphasis on law enforcement and on safety. In this connection, we will continue the program initiated in 1971 with supplemental funds of moving United States Park Police from park to park to assist and train personnel in crowd control tactics and law enforcement. To improve our safety program, we will, if you approve, locate a safety officer in each region. The officer will be based in a large park where there is the greatest need and from where the entire region can best be serviced.

The budget also includes $2 million for wage rate increases and $1 million for emergency fire suppression and rehabilitation of burned areas.

Even with the increases requested here, the Service will fall short in fiscal 1972 of having sufficient funds to operate and maintain all areas at acceptable standards. However, with the amounts provided in this budget, the deficiency at the end of 1972 ($10.2 million) will be lower than it will be at the end of 1971 ($13.4 million).

4. *Master Planning and Wilderness Act implementation ($105,000).*—This estimate provides fund increases for Master Planning and Wilderness Act implementation in the amounts of $50,000 and $55,000, respectively. The master planning and wilderness study programs are companion programs and the rate of wilderness studies, reviews and approvals is directly related to progress on completion of master plans. We will continue the effort which was accelerated in 1971 with supplemental funds to keep the wilderness area determinations on schedule to meet requirements of the Wilderness Act of 1964.

5. *Historic preservation ($369,000).*—Grants to the States and to the National Trust for Historic Preservation are proposed at the $5,980,000 level provided in 1971. This program is lagging behind both the congressional authorization and the amount which could be matched by the States and the National Trust for this important work. For example, over $25 million is needed for assistance in preparing or servicing State historic preservation plans, conducting site surveys to identify and describe historic properties and for acquisition and preservation of properties as projected in State plans. The National Trust will need an additional $1.75 million.

A proposed increase of $35,000 will provide for developing a system for the automatic processing of data for the National Register of Historic Places; an increase of $20,000 will provide for more adequate support to the Advisory Council on Historic Preservation. An increase (by transfer) of $314,000 for appropriation to the service for the archeological investigations and salvage program previously funded through the Bureau of Reclamation represents no funding increase for the program.

6. *Development programs ($19,180,000).*—The amount of $37.4 million proposed for construction of buildings, utilities, and other facilities, is an increase of $19.2 million over 1971. This program will permit construction to meet the following basic objectives:

Provide for air and water pollution abatement at Government facilities—$17.5 million

To plan and construct projects associated with the American Revolution Bicentennial Celebration—$7.3 million

To maintain capacity of existing park use—$1.6 million

To develop new park capacity for meeting increasing visitor demands—$6.9 million

To provide for general support, including planning to permit systematic future development—$4.1 million.

7. *Parkways and Roads Construction ($850,000).*—The amount of $18.5 million in the budget represents the cash needed to make payments as requirements accrue in the liquidation of obligations incurred under the contract authorization for construction of parkways and roads and trails. This is an increase of only $850,000 over the amount appropriated in fiscal 1971.

8. *Other Increases and Adjustments (—$520,000).*—There is included in the park and recreation activity of management and protection an amount of $104,000 for recreation planning in the Missouri River Basin previously financed through the Bureau of Reclamation. An increase of $46,500 is requested to cover additional cost of payments to the employees' compensation fund and $37,000 representing increases for operation and maintenance of the Roosevelt Campobello International Park. Decreases in the fiscal 1972 budget consist of a non-recurring payment of $100,000 to the Plymouth-Provincetown Celebration Commission and $30,000 provided in 1971 for study of the Cherokee Strip area. The budget also reflects savings in information activities of $150,000 and $428,000 in paperwork management.

CHANGES IN FINANCING

The budget for 1972 provides for changes in financing certain items, as follows:

Tree preservation work is transferred in the estimate from "Management and protection" to "Maintenance and rehabilitation."

Archeological salvage activities outside the parks are transferred from "Management and protection" to the "Preservation of historic properties" appropriation.

Archeological salvage work in the Missouri River Basin is financed in this budget under "Preservation of historic properties" rather than from Bureau of Reclamation appropriations with no increase in funds provided for this work.

CONCLUSION

Questions are inevitably raised with you and with us—and rightly so, I believe: For what purpose is this work and this expenditure in the context of our economy? And, of what benefit is it in the daily lives of our citizens?

As for the first—our economy—let me suggest that the $60 billion travel industry in the United States is among the most dynamic contributors to the economic vitality of our Nation.

Travel expenditures of $7.8 billion by visitors in 1970 on their way to, and in the vicinity of, the areas of the National Park System, amount to more than 10 percent of the total expenditures in the travel industry.

Significantly, this gross expenditure of park visitors resulted in personal income of $5.9 billion to employees and businesses providing tourist services along the way and in the parks.

Of this personal income, an estimated $1.2 billion was returned to the Federal Treasury in Federal taxes, to say nothing of uncounted taxes at the State and local levels of government.

To bring the economic contribution of the National Park System into sharper focus, let me share with you one example. In Montezuma County, Colo., in which Mesa Verde National Park is located, personal income in the quarter June-August, 1970, amounted to $8.7 million. This was at the height of the park visitation to Mesa Verde, approximating 130,000 visits per month. Contrast this with the personal income in Montezuma County for the quarter January-March, 1970 of $253,000 when the park had monthly visitation of less than 4,000 visits.

These economic benefits alone would justify adequate funding for the establishment and operation of the National Park System. But, there is a greater and a higher purpose of the National Park System, namely: its contributions to the quality of life of all of our citizens now and for future generations.

This purpose speaks to the second question.

A national park is an idea which in the fullness of its meaning is a link between the generations of men in their continuing search to be "at home" in their world.

National parks and historic landmarks help give us all a "sense of place" in a mobile America. They contribute to our sense of both the beautiful and the familiar. Love of locality is one of the roots of social cohesion, according to Charles E. Merriam, who was one of our greatest political scientists. But in a new country like the United States, and in a society where one family in five moves each year, and where we have over 80 million automobiles, we have a hard time developing local roots of the kind familiar to Englishmen in Sussex, Frenchmen in Brittany, or Irishmen in County Cork. Our national parks like Yosemite and Grand Canyon, and our historic places like Independence Hall and the Washington Monument take the place of local roots for tens of millions of mobile Americans. They give us the assurance of a "sense of place" expressive of our country that we can tie to permanently, whereever we move or live.

I believe many people go to the national parks and historic landmarks not simply to satisfy a need to get back to nature from crowded cities or for outdoor recreation. Many people go to the national parks and landmarks to strengthen their identity with their country. "Seeing is believing," and touching the Liberty Bell or setting foot in Yosemite Valley is worth a long trip to experience a sense of identity with America where it is unchanging. It isn't subtle. It's the deep human need to know "I was there" at Independence Hall or Yosemite Valley; and, as a result am a little more an American—am a little more "at home" in my world and with my fellow man.

A noted journalist friend told me recently of his experience in Yosemite where he encountered a group of youngsters sometimes identified as "hippies." One of them readily acknowledged that he had been on dope but proudly told my friend that he was not now, explaining he had no need to be amidst the majestic, towering granite faces of El Capitan and Half Dome.

When the bill to create a National Park Service was under consideration in Congress in 1916, J. Horace McFarland testified before the House Committee on Public Lands. His words echo today's needs of our urban society:

". . . The word 'park' in the minds of most of us suggests a place in which there are a number of flowerbeds, and probably stone dogs, and iron fountains, and things of that kind, and a road over which an automobile may travel. We forget that the park has passed out of that category in the United States. *The park now serves the people; the park decreases the demand on the forces for*

keeping order; the park is the direct competitor, in the United States, of the courts, of the jail, of the cemetery, and a very efficient competitor with all of them." (Emphasis supplied.)

The beauty of the parks in the National Capital was just coming to fruition in 1916 when Congress was talking about a National Park Service. The McMillan Commission had made its great report on the plan for Washington in 1902, the Mall was rescued shortly afterward, the Lincoln Memorial was authorized in 1911, and the Arlington Memorial Bridge followed along. In his testimony, McFarland linked this to the idea of establishing a National Park Service:

"I had the great pleasure one day to bring here a sort of wild man from Iowa, who had never seen the East at all; who had never seen any great buildings, and, while a man of tremendous business ability, he had no conception of the value of beauty. We reached Washington about 9 o'clock one night and he was so eager to see what this town looked like that we went on top of one of the buildings just back of the Capitol, and he had his first glimpse of the whole scene by moonlight. He was fairly crazy about it. *He said he had never been a good American citizen before. There was made that very instant a good, strong, fighting unit out of a man who was merely a businessman before—in it for what he could get out of it. There was born in his bosom at that instant a devotion to the country because of the beauty of the city which has been created by the hand of man.* (Emphasis supplied.)

"Now, gentlemen, if that can happen in Washington—and it happens constantly— * * * it will happen to a much greater extent in connection with these great national wonders that are comprised in the national parks."

The National Park System has a deep stake in the urban park idea, and it goes back to the founding of the service in 1916; and, to a realization that the National Capital and the National Parks are both symbols of the Nation.

Beyond our need to identify with the nation is the urgent need to understand our place in the world environment and to join hands in doing our part to rescue it from impending ecological disaster. As Freeman Tilden put it, we need "to understand our place in nature and among men." We will reach this objective more quickly and we will heal our environment more rapidly if we develop social cohesion "at home" by learning we are one people with a common heritage well expressed in your National Park System. As we achieve social harmony we will do better in joining together to recover our natural heritage and that of the world around us.

Through program innovation in response to the changing needs of our society and by sensitive management the National Park System can contribute enormously to our national goals of enhancing the life of every American and supporting the effort to articulate an environmental ethic as a rule of human conduct. This larger objective is our constant guide and daily challenge.

Your continued guidance, confidence, and support are essential to the making of this objective a reality of our management.

I shall be pleased to answer any questions you may have.

Thank you very much.

ACCOMPLISHMENTS

Mr. HARTZOG. I would appreciate it very much, Madam Chairman; if you would include in the record all of my general statement. I have a few charts here to summarize the substance of that general statement. This is the 1972 program of the National Park Service. As has been our custom, I would like to summarize very briefly for you and for the members of the committee some of the significant accomplishments of the past year with the funds that you have given us. We have been able to launch the volunteers-in-parks program, which was a new authorization last year. This program was inaugurated by Mrs. Richard Nixon at Custis-Lee Mansion in Arlington Cemetary in February. I am happy to tell you we have had tremendous response to that. I have the details of those who have volunteered for inclusion in the record at a later date. We have also continued our preparations for the 1972 National Parks Centennial. This is the 100th anniversary of the concept of National Parks in Yellowstone.

We have been able to improve our staffing and training for law enforcement not only with the regular budget in 1971 which you gave us, but especially with the 1971 supplemental. In connection with that, Madam Chairman, I would like to express my gratitude and that of my colleagues for your providing for the expenditure of funds in response to emergences such as that we have had here, because these are things which have had a drastic impact on our overall operation. We have been able to accelerate our wilderness and related master plan studies with the supplemental funds which you gave us in 1971, and I am happy to report to the committee that this study schedule is on time, and we expect to complete the program by the target date of 1974. We have been studying the impact of the proposed jetport in the Florida Everglades, and a report on the Big Cypress Swamp has been cleared by the advisory board and sent to the Secretary.

Mr. WYATT. Is that the SST?

Mr. HARTZOG. No, that is the jetport site in the Florida Everglades.

Mr. YATES. You are right. It was a supersonic site, originally intended for one.

Mrs. HANSEN. The problems at the Florida jetport site are similar to the problems at the Portland Airport but no one seems to be interested in solving these problems.

Mr. HARTZOG. I am deeply interested but it is not my responsibility.

(Discussion off the record.)

Mr. HARTZOG. Madam Chairman, with the funds which you have provided us, we have initiated the transportation system for visitors in the east end of the Yosemite Valley and we have been able to close those roads to private automobiles. This has had a tremendously beneficial impact.

Mrs. HANSEN. The other day a Sacramento, Calif., newspaperman made the comment that the Meadows area in Yosemite National Park was terribly undermanaged.

Mr. HARTZOG. Yes, ma'am. This is part of the deficit that we have in our total management, operating, interpretive and maintenance program which I brought before this committee before.

Mrs. HANSEN. This committee increased the funding level for park management and protection in fiscal year 1971 over what was appropriated in fiscal year 1970.

Mr. HARTZOG. You did but even after approval of all of that budget there is still a deficit of more than $10 million to manage parks at an acceptble standard.

Mrs. HANSEN. Do you plan to spend your funds in some of these areas that have the greatest needs?

Mr. HARTZOG. I am trying to spend it at some of my worst places and my worst places are some of those which you saw in the photographs this morning. With the problems we have there isn't enough money.

Mrs. HANSEN. I think you should leave the litter where it is to show the public the mess they have created.

Mr. HARTZOG. It is coming home to a lot of people at the Washington Monument this morning. I was down there this morning and the visitation is heavy today. They are leaving by the droves.

Mrs. HANSEN. I saw the litter that was left. It was a disgrace.

Mr. HARTZOG. It was pretty bad.

Mrs. HANSEN. Some of the same people who litter are the people asking for a better environment.

Mr. HARTZOG. We have been able to expand our Summer In The Parks to a Parks For All Seasons program which has had a tremendously beneficial impact on the programs here in the District of Columbia and in this immediate area. With your support, Madam Chairman, we have been able to expand our living history program now to more than 40 parks. This has been one of the most highly acceptable and enthusiastically received programs that we have. The object of it is to make history three dimensional, to make it come alive and to let the visitor experience it as it actually occurred. Our people are enthusiastic about it, and our visitors are even more so. We have initiated the Historic American Engineering Records program with the funds that you provided last year, and we have also offered support and assistance to the Indian tribes.

Mrs. HANSEN. We will discuss that in detail later in the hearing.

DONATIONS

Mr. HARTZOG. Madam Chairman, as is our custom each year we report to you on the donations received from the public for the benefit of the National Park System. In the last year we received $991,000 cash and $238,000 in land and objects. The most significant contribution to the National Park System continues to be the efforts of its employees who last year forfeited annual leave valued at $250,000 and contributed uncompensated overtime valued at $2 million in order to manage the resources and to serve the unprecedented and ever-increasing visitation to the National Park System.

OBJECTIVES OF 1972 PROGRAM

This budget before you has as its purpose seven major objectives. First is to establish and maintain basic staffing for small areas. For a number of years we have been trying to operate these parks with two or three permanent staff. The result has been that either the employees, through their commitment and their dedication to the park have been forced into working unconscionable overtime at no compensation, or else they have closed up areas and the resources have suffered and the visitors have not been received.

Mrs. HANSEN. Is this the reason you close the Jamestown park area at 5:30 p.m.?

Mr. HARTZOG. That is part of it, yes, ma'am, but that was an unexcusable administrative omission which has in the meantime been corrected. They simply got too enthusiastic. In cooperation with the regional directors we have analyzed this problem, and we have concluded, Madam Chairman, that at a very minimum it takes five permanent positions to manage these small areas, a manager, an administrative assistant, two uniformed employees, naturalists, historians or archeologists and a maintenance man.

Mrs. HANSEN. How do you differentiate between a historian or an archeologist?

Mr. HARTZOG. Depending upon the resource. In other words, if it is basically a natural history area, an historian, if it is a prehistoric area, an archeologist.

The remaining staff, of course, would be employed seasonally to serve the visitor load at the peak of the season. This would be true in all cases except where we have two small areas that are close together, such as Montezuma Castle and Montezuma Well, where you really only need one manager to manage both of those facilities, but you still need that basic staff, in order to meet and adequately manage those kinds of areas.

Mrs. HANSEN. Your seasonal staff is employed according to the visitor load at each park area?

Mr. HARTZOG. And the resource needs.

Mrs. HANSEN. I noticed in your justifications that seasonal employment is increasing.

Mr. HARTZOG. Yes, ma'am, they are, and this is increasingly a problem for us, to find seasonals who can work 5 or 6 months instead of the traditional college vacation.

Mrs. HANSEN. What percent of your parks areas are showing increased visitations?

Mr. HARTZOG. Madam Chairman, practically 100 percent. Even in parks like Yellowstone, which heretofore have had primarily summer use last year we had over 5,000 snow vehicles at Old Faithful, the load being so large we were required to put two permanent rangers at Old Faithful to serve the visitors. The second major objective in this budget is to meet what has become a crucial need in the management of large areas. Yosemite is a typical area in which we have been trying to manage these areas without having the on-site professional capability to analyze the problem and advise the superintendent on appropriate action on resources management. The natural resources and cultural resources of the system have been two of the primary areas in which we have suffered as a result of not having the in-residence archeologist, historian or ecologist to advise and counsel with the superintendent.

We likewise, because of the sophistication of our developments, are in urgent need of having capable engineering competence on the ground. At one time we tried to manage a road system of 345 miles in Grand Canyon without an engineer. No city with a comparable system would even think of such a thing.

Mrs. HANSEN. The Friends of the Earth feel that you shouldn't build any more roads in the park areas.

Mr. HARTZOG. That is true, but the vast majority of the American public do. When we provide them, it is incumbent upon us to manage and operate them in a competent way.

The third great need is in connection with these prime historical properties, to have on-site a historical architect or in the case of the natural areas, a landscape architect to advise and counsel with the superintendent. We propose to provide this competence in this budget, if you, the committee and the Congress approve.

The third objective is to continue one of the things that we started a number of years ago, after consultation with this committee and

with our legislative committees. This is a consolidation of our park management units where we have a number of small areas. Arizona is a typical place. Florida is another typical situation, where in one State or in one geographical area we will put one overall manager in charge, so that the needs of management in that particular geographical region can be served locally instead of having to go into the regional office to get the service. These groups will also have the same professional competence to deal with those problems and to advise and counsel with those local managers.

The fourth objective, Madam Chairman, is to staff for our visitor services and law enforcement programs. We have discussed this with you and the committee in connection with the 1971 fiscal year supplemental estimates, and the need for this is increasing at a tremendous rate.

For example, in 1965 we had in excess of 300 special events and demonstrations in the District of Columbia, and in 1970 we had over 1,900. It is just absolutely imperative that we get the law enforcement, visitor protection and visitor services staff.

Mrs. HANSEN. Did the demonstration occur at Death Valley as you anticipated?

Mr. HARTZOG. It was necessary to send 25 park police to Death Valley one of whom unfortunately was seriously injured in an accident. He is unconscious. His spinal cord was severed at the base of his skull. He is in Las Vegas totally paralyzed. It was necessary to send 25 park policemen out there. The demonstration didn't materialize to the extent that the advance information and intelligence indicated it would, but there was quite a crowd there.

The fifth objective of this budget, Madam Chairman, is to accelerate our wilderness studies and related master plans, to keep them on the accelerated schedule provided in the 1971 budget. This will provide necessary funding for the full year.

The sixth objective is to augment the pollution abatement efforts as directed by the President in an Executive order last year, for which you gave us supplemental funds in 1971. There is $17.3 million for construction and planning money in this budget with a slightly larger amount anticipated in the 1973 budget to meet the President's directive to bring pollution under control in the park areas.

The seventh objective is to improve the program and staffing in connection with America's bicentennial in 1976.

Our objective in connection with the Bicentennial, Madam Chairman, is threefold: To promote the fullest understanding, the significance of the American Revolution and its present relevance to all Americans; secondly, to cooperate with and assist other agencies involved so that the efforts of each will contribute to the maximum achievement of the objectives of the Bicentennial; thirdly, to get those 20 areas of the National Park System that are directly involved in telling the story of the American Revolution up to acceptable levels of management and development by the time of the Bicentennial.

Mrs. HANSEN. Will you have all your historical material published at least a year prior to the opening of the Bicentennial celebration?

Mr. HARTZOG. Not without drastic improvement in this budget situation, Madam Chairman.

Mrs. HANSEN. That is always your excuse.

Mr. HARTZOG. At the rate we are going on the on-site historic survey material, it will be 1990 before we finish the basic research themes related to the historic sites survey, unless a substantial amount of money is provided to edit these theme studies and get them in condition that they can be published by the Government Printing Office. These are the series of books that I have been bringing to you. The reason I didn't bring any to you this time is that during this year we haven't published one. There simply isn't enough money to publish a book a year, and there are 32 of these. Thus far I think we have published something like six.

Mr. YATES. What are the books about?

STORY OF AMERICAN HISTORY

Mr. HARTZOG. They tell the story of American history from colonization until now, broken down into 32 major themes of the history of the United States.

Mrs. HANSEN. They are excellent books.

Mr. YATES. Why should the Park Service be doing this?

Mr. HARTZOG. Because this is provided for in the Historic Sites Act of 1935, which charged the National Park Service with the management of the historical resources of the United States, telling both its present historic as well as as its national historic story.

Mrs. HANSEN. It is an excellent series.

Mr. YATES. I would like to see it.

Mr. HARTZOG. We will send you a set of these books.

Mrs. HANSEN. You always make the mistake, Mr. Hartzog of forgetting something.

Mr. HARTZOG. I came without something. I am always short. Last year I was missing a map showing cities with population of 250,000 or more. I have this report, Madam Chairman. This is one of the projects under the Historic Sites Survey Act to provide for the recordation of the historic American buildings. I have a copy for each member of the committee this morning. This is the only publication we have been able to bring out this year.

Mr. YATES. What does it cost to put one of these out?

Mr. HARTZOG. Bob Utley, who is our Chief Historian, may provide it.

Mr. UTLEY. I would have to supply it for the record.

Mr. HARTZOG. It is several thousand dollars. I have a figure in my statement. The Government Printing Office recoups more of our printing budget than any other agency in the Federal budget. We have the largest sales program in the Government Printing Office of any agency of the Government for the sale of materials to the public.

Mrs. HANSEN. This is excellent.

Mr. HARTZOG. These seven objectives in our budget are proposed to be met with the increases as reflected here for new park areas. These are the areas placed into operation since January, 1960, $1,777,100. The operation of new facilities——

Mrs. HANSEN. How many new park areas have been added since 1960?

Mr. HARTZOG. In the vicinity of 85, Madam Chairman. The operation of new facilities and programs in parks, $334,700. A portion of the funds needed to operate the older parks, and these are the parks

that were in operation prior to January 1960, at acceptable standards, $8,724,000. To continue for a full year the accelerated master planning and wilderness act implementation, $105,000, historic preservation, and these are increases for the advisory council and for the National Register program $369,000, and no increase in the matching grants-in-aid portion. Development programs, $19,180,000, is for the buildings and utilities part of the program, and for parkways and road construction there is an increase in liquidating of cash, $850,000. There are other increases and adjustments of $520,000. In these other increases and adjustments, Madam Chairman, on the next chart——

Mrs. HANSEN. What does this involve?

Mr. HARTZOG. They cover increases that would transfer the tree preservation work in our estimates from management and protection to maintenance and rehabilitation. We feel this is more appropriately a part of the maintenance program than it is a management program of the parks. Second is archeological salvage activities outside of the parks which involve the river basin surveys, such as Dr. Daugherty has recently been communicating with you about in the Ozette Indian Reservation. We had heretofore combined in our budget the archeological work inside of parks with the archeological work outside of parks. We have transferred all of the external archeological programs that we have to the historic preservation appropriation beginning in 1972.

The third is the archeological salvage work in the Missouri River Basin, which was heretofore financed out of the Bureau of Reclamation funds, transferred to our appropriations with no increase, Madam Chairman, in the amount of money available to the program.

Madam Chairman, in light of the size of this budget, it is appropriate, of course, to ask what purpose is it in the context of our economy, and what purpose is it in the daily lives of our citizens. In the context of our economy, the tourist industry is a $60 billion industry in the United States. The visitors to the National Park System on their way to and in the vicinity of the National Parks contribute more than 10 percent to the tourist industry of the United States. These expenditures of $7–8 billion return to the Treasury in direct Federal tax revenue approximately $1.2 billion. Clearly from an economic standpoint, the National Park Service makes a major input into the tourist industry and the tax revenues of the United States.

In the purpose of the daily lives of our citizens, however, the National Park System has a much more important value. The National Park Service preserves the remnants of our natural inheritance, beginning with the preservation of Yellowstone in 1872, and continuing through almost 100 years in which the American public has been setting aside those scenic and scientific areas that are relevant in communicating to this generation and to the future generations the kind of land that these people inherited. Also in the National Park System are the landmarks of our cultural inheritance of all of the people who lived on this continent, not only the prehistoric Indians of the Southwest, but also the various episodes of colonizations of this continent from the Spanish forts of the Southeast to the Spanish missions of the Southwest, to Yorktown where this Nation won its

independence, Independence National Historical Park where our Constitution was written, all the way through to the western expansion of this country, and all of the national recreation areas set aside by the Congress of the United States to provide opportunity for healthful outdoor recreation of our people.

These are links in a total fabric, Madame Chairman, that bespeak of the substance and essence of the American Republic. They tell of the courage, deprivation, hardships and the victories of people who came to lay the foundations for a new way of life in these United States, and in our judgment they are extremely important symbols today in answering the question of "Who am I, where did I come from and where am I going". Madam Chairman, I suggest for your consideration and that of the committee that this is one of the reasons perhaps why the areas of the National Park System are becoming focal points for special events or demonstration that have made so complex the management job of the National Park System today.

These young people are in search of answers to these very basic questions, and sometimes they don't always pursue them with a reverence, or with the demeanor that we would expect, but nevertheless I suggest that fundamentally these are the great questions to which they are in search of answers and they are finding their expression in going to the areas of the National Park System, where also many millions of other Americans find recreation and inspiration. This is what I think they mean in terms of the lives of our citizens, and in enhancing the quality of our daily lives. Through them I believe we can develop an environmental ethic that will lift us to a new rule of conduct among people. It is a great delight to be here. I will be pleased to try to answer any questions which you and members of the committee may have.

Mrs. HANSEN. Have there been any changes made in the general Park Service philosophy?

Mr. HARTZOG. No, ma'am. I think what we have tried to do, however, is that we have tried to give expression in new programs and in new thrusts which implement the basic philosophy which was always there, but which sometimes perhaps had been expressed differently or in fact not implemented at all. For example, in our living history program which is one of the new changes that has been introduced, we simply changed the expression of it from cartoons, museum exhibits, and billboards into living programs.

PARK VISITATION

Mrs. HANSEN. What have been the visitations in the national parks in 1950, 1960, and for the last 5 years.

Mr. HARTZOG. I don't have the visitation for 1950 and 1960. I have the visitation beginning in fiscal 1962, when it was 92,160,000. In 1970 it was 166,900,000, and we estimate at the end of 1972 it will be 183,900,000. In 1950 it was considerably less than 50 million. As a matter of fact, at the beginning of Mission 66 in 1956 it was only 50 million. It was estimated then that at the end of 1966 it would be 80 million, whereas at the end of 1966 it was 127,440,000.

Mrs. HANSEN. What do you think is the reason for this tremendous increase in the number of visitations?

Mr. HARTZOG. I think it is related to several factors, Madam Chairman. I think one, of course, is the growing affluence of our society, the increased mobility resulting from the ease of transportation, both in air as well as in the Interstate Highway System and private automobiles, because there has been a fantastic increase in the private automobile visitation. I think it also relates to the fact that people need to understand where they came from, and with one out of five families on the move in the United States every year, I think many people go back to the National Park System for identification purposes and for understanding the continuity of the flow of civilization of which they are a part, and not necessarily strictly for outdoor recreation.

Mrs. HANSEN. How many of the visitations do you think are related to outdoor recreation?

Mr. HARTZOG. We have broken the visitation down into those who go to natural areas and historical areas and recreation areas. I will be pleased to put that in the record, but interestingly as I recall the computation offhand, there are about 50 million visits to the national recreation areas, and something like 57 million to the historical areas, and 52 million to the natural areas.

Mrs. HANSEN. Isn't that increasing each year?

Mr. HARTZOG. Indeed it is, drastically.

CENTENNIAL CELEBRATION

Mrs. HANSEN. Have you had any recent reorganizations within the National Park Service?

Mr. HARTZOG. Yes, ma'am. In order to take care of the centennial and bicentennial as well as almost 50 commissions which have been established by the Congress in connection with new area legislation, we have redesignated Mr. Bill, who is our Deputy Director for Operations, as our Deputy Director for Commissions and the Centennial, and to handle policy development in connection with the programs for the bicentennial, and established a new deputy director's job. Mr. Freeman, whom I introduced to you earlier, has been our Associate Deputy Director for Design and Construction and will be our new Deputy Director in charge of field operations.

Mrs. HANSEN. The American Revolution Bicentennial celebration will be upon us in the not too far distant future but I think the public and Members of Congress should also be aware of how many other centennials we will be celebrating within the next year.

Mr. HARTZOG. I would agree with you completely, and with your permission I would like to put the whole list in the record, because it is growing at a tremendously rapid rate. In addition to this the Congress authorized last year general authority for the establishment of advisory commissions in connection with each of our field operations, and we are beginning to implement that this year by establishing a regional advisory committee for each of our regions. In other words, we are not going to try to establish one for every area at this time, because we just simply don't have the money and the personnel to handle it. In addition, Mr. Bill supervises the operations of the National Park Foundation, which the Congress authorized 4 years ago, and which incidently, as you know from the land acquisition program,

referrals alone that I have been sending to you, has been doing a tremendous job in acquiring privately owned lands before they pass into the hands of speculators.

The Foundation also undertook and has financed the development of the environmental education material which we have presented to this committee before. I am happy to say the State of Pennsylvania has adopted it for use in connection with its program of environmental education in the State of Pennsylvania for this year.

(The information follows:)

CENTENNIAL CELEBRATIONS

There are four centennials affecting areas of the National Park System during 1972. They are the centennial of the First Telegraph sent from the Pipe Spring outpost of the Desert Telegraph at Pipe Spring National Monument, Ariz.; centennial of the Pig War, San Juan Island National Historical Park, Wash.; the centennial of the Modoc Indian War at Lava Beds National Monument, Calif.; and the centennial of the National Park System.

CRIME AND LAW ENFORCEMENT IN THE PARKS

Mrs. HANSEN. For the last several years we have discussed the increase in crime in the national parks, and also the problems of law and order, particularly in those park areas adjacent to the urban areas, such as Yosemite National Park. You will recall that this committee appropriated $550,000 in the first fiscal year 1971 supplemental appropriation bill for this activity.

Mr. HARTZOG. Yes, ma'am.

Mrs. HANSEN. Would you please give the committee an overall review of what you are doing in this connection.

Mr. HARTZOG. I would be pleased to. Madam Chairman, we took the money that you gave us, and based on the recommendations of the Association of International Chiefs of Police we decided we should not try to establish a national park police organization. The concept of it was not good, and we didn't think that it was necessary.

We think that the bulk of the law enforcement activities in the parks can be handled by the rangers, provided they have professional support and guidance, so it was recommended and the Secretary has approved that we will use National Capital Park Police in Washington as a nucleus around which we will build the professional law enforcement capability of the National Park Service. We have established in the Washington office, at the recommendation of the association, a division of law enforcement which is headed by the detail of an inspector of the U.S. Park Police, Frank Arthur, who incidentally was the captain who went to Yosemite last year when we had those riots and did a superb job there. We are assigning to each regional office an officer of the Park Police at either the lieutenant or captain rank who will serve as a special assistant in evaluating the effectiveness of the law enforcement programs in the region and also assist in coordinating the law enforcement efforts of our rangers with supporting law enforcement organizations in that vicinity, such as the military, the U.S. marshals, the border patrol, State and county organizations, highway patrols and sheriff's departments.

We will also detail an officer to the 15 or 20 parks in which we have been having major law enforcement problems over the last few years.

Mrs. HANSEN. What are the national parks in which you are having major law enforcement problems.

Mr. HARTZOG. I have a list of them and I will be happy to provide it for the record. They are such parks as Lassen Volcanic, Olympic, Lake Mead, Grand Teton, Natchez Trace Parkway, Blue Ridge Parkway, Badlands, Yellowstone, Yosemite, Grand Canyon, Cape Cod, Great Smokies, Fire Island, Ozark, Point Reyes and Mount Rainer, larger units where the visibility of the parks have been attracting these demonstrators.

Mr. YATES. What does visibility mean?

Mr. HARTZOG. Visibility to the press and to the television.

(Discussion off the record.)

Mr. HARTZOG. There are 15 or 20 parks in which we will detail these officers during the height of the visitor season, either of sergeant or lieutenant rank. Those that are assigned to the regions are going to be on 2-year details because we think it is going to take that long for them to get a familiarity and an understanding of the problems within the region, and to be effective in coping with them. We will maintain in National Capital Parks itself, a strike force of 125 privates under the command of an officer. They will be given assignments to work in the District of Columbia, but will be available on 12 hours notice to go wherever the problems may be. This is, of course, the group that we sent to Death Valley when we were advised that we were going to have that difficulty during the Easter season. We will rely for supplementing that strike force in the park on the U.S. marshals and the local law enforcement officers and the military as needed.

Mrs. HANSEN. When you have law and order difficulties in the national parks, the park rangers are having to tackle a job with which they are unfamiliar. Park rangers are not trained or equipped to handle law enforcement situations.

Mr. HARTZOG. Two things came out of that study, Madam Chairman. One is that we needed to identify more clearly the rangers whose duties were primarily law enforcement in nature, and give them professional law enforcement training. We have done that, and we have expanded the training schedule of our Washington, D.C. training center that we operate in connection with National Capital Parks to be the central law enforcement training program, because it is under the operation and supervision, and has the availability of criminologists on the faculties of George Washington University and American University.

It also has the central training facility of our U.S. Park Police and of the Metropolitan Park Police. We have been bringing our Rangers into that facility. We started with one class already for this summer.

Another thing which we have done to identify 100 of the seasonal Ranger positions whose responsibility is primarily law enforcement, and we have brought them together over the Easter recess of the college programs for 1 week of law enforcement training. We have had a 2-week law enforcement seminar here in Washington for our Chief Rangers and for the middle management level of our parks, our assistant superintendents and district managers, to give them an overview

of the elements involved in an effective law enforcement program. We have also made a concerted effort to go out and identify the professional backgrounds of personnel applicants other than in the field of natural science, such as social science and police science, and get these young people into the system, to supply us with a cadre of law enforcement personnel in the future.

(Discussion off the record.)

Mrs. HANSEN. I think the American public is entitled to know what the cost is. It is a cost that is escalating. How much did you spend in fiscal year 1960 for law enforcement?

Mr. HARTZOG. Identifiable?

Mrs. HANSEN. Please explain that.

Mr. HARTZOG. I only have it for a 5-year period for the National Capital. I don't have it computed service-wide, but I will be glad to try to supply that for the record. Let me say in this connection there is one thing that needs to be understood in connection with these statistics. Getting back to your question about the growing crime rate in 1966 in the urban parks—and I will be glad to give you the break-out of the urban parks and what we classify as non-urban parks. Incidentally, 62 percent of all the money that is in this budget is for urban parks, those parks within 40 miles of metropolitan areas of 250,000 or more. Interestingly, more than 61 percent of all our money in the last fiscal year is being spent on areas that are east of the Mississippi and more than 60 percent of our employees are assigned to areas east of the Mississippi, which gives you some overall perspective on the dramatic growth of the National Park System as a truly national system.

(The information follows:)

FISCAL 1960 LAW ENFORCEMENT COSTS

Law enforcement costs during fiscal 1960 are estimated at $1.9 million.

Mr. HARTZOG. What I wanted to come back to is that in 1966 in these urban parks we had 2,337 major crimes.

Mrs. HANSEN. What were the type of crimes you had?

Mr. HARTZOG. These are what they call class one offenses, punishable by 1 year or more incarceration.

Mr. DICKENSON. Crimes against the person.

Mr. HARTZOG. Increased to 5,104. This is a chart of the increase I am speaking of, major crimes against property, automobile accidents, the whole works. In other words, I have had all these charts reduced to a scale that you can include in the record, if you wish. The important point I would like to call to your attention, Madam Chairman, is that the great majority of the tremendous property damage in law enforcement costs involved never reflect themselves in offenses. For example, with this devastation over the weekend of which I showed you photographs, there was not a single solitary case, but nevertheless the cost of it may be as much as a quarter of a million dollars before we finish.

Mrs. HANSEN. What is the amount of the damage?

Mr. HARTZOG. We have had a statement made and, Madam Chairman, I am reluctant to give it to you because it represents a survey and not a detailed examination, these people may have missed something, but

on the basis of the survey of damage on Saturday and Sunday and the costing out this morning before we got here, the estimate is $135,000, but I am confident that we have missed a lot of things. When you go to reconstructing the Sylvan Theater, for example, I seriously doubt that our cost estimate is sufficient to include it. That kiosk at the Washington Monument, for example, is one item that was missed in that estimate. I doubt if there are a dozen panes of glass left in that kiosk. It is inoperable.

Mrs. HANSEN. What happened to your azaleas?

Mr. HARTZOG. They have been hacking limbs off the cherry trees with axes and hatchets. We don't really know what the dimension of it is. Thus far we have not been able to find that any of the trees have been physically cut down, but they have cut off branches. We think that the estimate of overtime, cleanup, rehabilitation, and construction costs, is going to approximate a quarter of a million dollars just for this week end, to say nothing of the fact that already, in addition to the $550,000 supplemental you gave me, I am now, as of about 3 weeks ago, in the hole $853,000 for unanticipated emergencies for which you simply can't program. I suspect that before we get out of this year we are talking about $1 to $2 million.

Mrs. HANSEN. How many special events and demonstrations did you have this last fiscal year?

Mr. HARTZOG. I don't have it by fiscal, but by calendar year. In calendar year 1970 in the District of Columbia, we had 1,900 special events and demonstrations, which necessitated assignment of police officers. In other words, an event that doesn't necessitate assignment of a police officer is not called a special event. We have tried to break it off there, in order to relate police costs and cleanup. They have escalated from 309 in 1965 to 1,900 in 1970. The estimated attendance at those has gone from 1,948,000 in 1965 to 3,985,000 in 1970. Maintenance costs on these in 1970 are $379,453, and the police costs for regular officers assigned we estimate at $107,000, and for overtime at $81,000. This is over and above anything that we have programed.

COST OF LITTER CLEANUP

Mrs. HANSEN. What part of that total is just pure litter cleanup costs?

Mr. HARTZOG. Maintenance is what that is. That is cleanup, which is financed under the grounds maintenance, $379,453. That doesn't include the cleanup that has been going on all weekend. You see in the photographs the piles and piles of trash. That is the monument grounds, the Sylvan Theater and the Washington Monument. When I left there this morning, they were sweeping with a fine-tooth comb because there must be millions of pieces of litter that are utterly impossible to pick up, yet you have to get it out of the grass. Of course, the grass is totally destroyed so at some point you have to resod or plow it up and reseed.

Mrs. HANSEN. This is just one park area?

Mr. HARTZOG. That is right.

Mrs. HANSEN. You have about 15 such park areas?

Mr. HARTZOG. We have between 15 and 20.

Mrs. HANSEN. What is the total cost of litter maintenance?

Mr. HARTZOG. I don't have it. Unfortunately, in the accounting system that we have, until this thing started really getting to be a big item in this fiscal year, we had no accounting structure to pick out these costs separately. We are now trying to establish subaccounts in our accounting system so we can identify these costs and give them to you.

Mrs. HANSEN. Can you identify what the costs of the demonstration in Yosmite National Park were?

Mr. HARTZOG. Yes, ma'am; we can do that, because when that thing erupted we kept separate accounts.

Mrs. HANSEN. Please insert the information in the record.

Mr. HARTZOG. I don't have it with me, but I will put it in the record when I come back at noon.

(The information follows:)

ADDITIONAL COSTS AT YOSEMITE NATIONAL PARK

The additional cost incurred during the July 4 weekend for which supplemental funds have not been provided, totaled $281,200. This amount includes $271,200 for the additional law enforcement activities there and $10,000 for cleanup, site restoration, and other maintenance-type work required.

SAFETY OF VISITORS DURING DEMONSTRATIONS

Mrs. HANSEN. Aside from the destruction and the cost of the destruction in an area such as Yosemite National Park, you also have the problem of the security of the other people who are visitors to the parks.

Mr. HARTZOG. That is a very serious problem. We had some visitors in Yosemite who were injured as a result of missiles hurled and that kind of thing, during that last episode. We had literally hundreds of visitors who left the park. The concession as a result suffered in its operation, as a result of people canceling reservations or leaving the park early. This is one thing, Madam Chairman, we simply cannot allow to happen. We have to maintain the security of the visitors to those parks, because a visitor who goes to Yosemite goes there in order to be relieved from the tensions and the anxiety and the confusion and the chaos in the urban community. He goes to rest and to relax and to be recreated. We have got to maintain that kind of an atmosphere and that kind of a posture; otherwise, we are going to totally destroy the national park system.

Mrs. HANSEN. In anticipation of this current demonstration in Washington, D.C., did you receive instructions from the Justice Department or the White House? You don't seem to have much to say on this subject.

Mr. HARTZOG. No, ma'am.

Mrs. HANSEN. What did happen?

(Discussion off the record.)

Mr. HARTZOG. Madam Chairman, I will be pleased to provide you with a statement no later than tomorrow morning for inclusion in the record.

Mrs. HANSEN. You have to talk to your lawyer?

Mr. HARTZOG. I sure do.

Mrs. HANSEN. I think you should insert in the record the steps that were taken in anticipation of this demonstration, and what decisions were made and by whom. I think this is important because some of your park police were quoted by reporters as saying that they were not going to try to enforce the laws.

Mr. HARTZOG. Talking when they should have been listening.

Mrs. HANSEN. When you establish rules for your parks, you anticipate that they are to be obeyed. You have to be rather careful that you establish rules that can be enforced and made to stand.

Mr. HARTZOG. I think, Madam Chairman, the question you asked is one that must be answered, and I think that it involves a lot of people in addition to us. I would appreciate an opportunity to consult with those people before I supply an answer for the record.

Mrs. HANSEN. I do think the question needs answering.

Mr. HARTZOG. It does indeed. It is a very valid point.

ENFORCEMENT OF REGULATIONS IN THE PARKS

Mrs. HANSEN. This isn't the first time this committee has discussed this subject with you. You remember former Congressman Marsh asked you about this problem last year and the year before, and the debate has not diminished. If you are going to have rules in the national parks that can't be enforced, then you might as well close your facilities.

Mr. HARTZOG. I will be pleased to give you a statement for the record.

Mrs. HANSEN. That will be an intriguing document.

(The information follows:)

STATEMENT OF EVENTS INVOLVING APRIL 1971 DEMONSTRATION IN WASHINGTON, D.C.

Washington has witnessed many major demonstrations in recent years; these have occurred, for the most part, on public park lands of the Nation's Capital. The use of public lands for the exercise of first amendment rights has been well established.

Due to several recent court cases, however, the National Park Service regulation (CFR 36; 50.19) concerning demonstrations and public gatherings has been enjoined. By order of the courts, demonstrations may occur on public park lands upon 15 days notice by the demonstrating group. If demonstrations appear to affect Presidential security, constitute a threat to the security and welfare of the city, or if there is a likelihood of irreparable damage to park resources and facilities, the Government must carry the burden seeking injunctive relief.

1. Initially, it should be noted that arrangements, strategy and negotiations for large demonstrations are handled by an interagency group led by the Department of Justice. The concerned agencies include the District of Columbia government, the Department of the Interior, National Park Service, and the Military Services.

2. On March 24, 1971, a "Notice of Proposed Demonstration" form was received from the Vietnam Veterans Against the War (veterans), concerning their plans for their forthcoming demonstration for the period April 18 through April 23.

3. A meeting was then held with representatives of National Capital Parks, National Park Service on March 29, 1971. The meeting was introductory in nature but several clear problems were noted—principally the veterans' proposed parade route and campsite—and a second meeting was scheduled for Friday, April 2, 1971.

4. Discussion was then held between the representatives of National Capital Parks that were present at the meeting and the General Superintendent, National Capital Parks, concerning the veterans' request for a campsite on the Mall area. It was determined that absolutely no camping would be permitted.

5. A second meeting was then held with the representatives of the veterans on April 2, 1971. At this meeting the representatives of the Vietnam veterans were informed that there could be no camping on land under the jurisdiction of National Capital Parks that had not been designated as a public campground pursuant to 36 CFR 50.27. It was further noted that the Mall area had not been so designated.

6. Subsequently, another meeting was held April 9, 1971, to attempt to deal solely with the problem of the parade route. This was essentially the only topic of concern and a possible compromise route was developed. The ban against the use of the Mall as a campsite was reiterated. Alternative areas involving District of Columbia or military lands were suggested for discussion and rejected.

7. In light of the impasse on the question of camping on the Mall, discussions within the Government were then undertaken as to the best legal approach to take. It was decided by the Department of the Interior, that it would be desirable to enjoin the veterans' proposed camping activities. A letter to this effect was then sent to the Attorney General, Department of Justice from the Office of the Solicitor, Department of the Interior.

8. Pursuant to this request a letter was drafted jointly by the Department of the Interior and the Department of Justice and sent to the veterans stating that the decision of the Department of the Interior remained that there would be no camping on nondesignated park land.

9. An injunction was then sought and granted by the U.S. District Court for the District of Columbia on April 16, 1971.

10. The veterans appealed this order to the U.S. Court of Appeals for the District of Columbia Circuit on Monday, April 19, 1971. The Court of Appeals reversed the district court and permitted the veterans to camp on the Mall area subject to certain provisions.

11. Department of Justice sought a reversal of the Court of Appeals' decision through an appeal to Chief Justice Burger of the U.S. Supreme Court on April 20, 1971. Chief Justice Burger reversed the Court of Appeals and reinstated the injunction of the U.S. District Court that evening. This decision was subsequently supported by the remainder of the Supreme Court Justices that heard the case.

12. Decision was reached by the Department of Justice that the Vietnam veterans would have until 4:30 on the following afternoon to comply with this order.

13. After offering the veterans alternate camping sites and transportation to and from these sites, the Department of Justice then negotiated with the veterans to let them occupy the Mall site for continuing demonstration purposes but no tents or sleeping would be permitted. General Superintendent, National Capital Parks, concurred with this position. Representatives of both the Department of Justice and the Department of the Interior believed that this was consistent with the terms of the District Court order. A decision was then made by the Department of Justice, that no attempt would be made to enforce the order by the Executive Branch and it was subsequently rescinded. This decision was based upon several factors; first, for the reason set forth above, the Vietnam veterans had occupied the Mall as a campsite for three nights under color of law and legally; second, only one night remained under their permit; third, their numbers at all times were small and substantially less than the 5,000 originally estimated by the Vietnam veterans; fourth, they were at all times orderly, neat and peaceful.

14. The National Peace Action Coalition's proposal for a rally and march on April 24, 1971, resulted in intensive and continued negotiations with key members of the interagency task force. A permit for this event was issued by the Department of Justice on Apirl 22, 1971, for all of the concerned agencies. The following preparations were made.

15. On April 19 at Fort McNair a meeting was held with members of the following agencies in attendance:

The Department of Justice, the Secret Service, the Military District of Washington, the D.C. National Guard, the Metropolitan Police Department, the U.S. Park Police and others.

At this meeting it was announced that Chief Jerry Wilson, Metropolitan Police Department would have overall command of all police activities for the demonstrations taking place over the weekend of April 24 and 25.

16. On April 22, officials of the U.S. Park Police and the Metropolitan Police met to discuss the police activities for the 24th and 25th. It was decided that the Metropolitan Police would handle the Mall area east of 14th Street to the Capitol and all demonstration areas north of Constitution Avenue. The primary responsibility of the U.S. Park Police would be west of 14th Street and south of Constitution Avenue.

17. To provide as much police manpower, as possible, the U.S. Park Police went on two 12-hour shifts and reduced the number of regular patrols to a minimum. Days-off for the Force were canceled.

Dupont Circle, a favorite gathering place in past demonstrations was closed and secured by the Metropolitan Police. The area around the White House was roped off with signs stating "Police Line." This area extended from 15th Street to 17th Street and from H Street to E Street.

DRUG PROBLEMS IN THE PARKS

Mrs. HANSEN. We have discussed with you several times the increasing problem of drugs in the national parks. May we have your comments in this connection?

Mr. HARTZOG. It is very, very serious. As a matter of fact, we took over 20 people out of those groups last night to the hospital, who were in need of medication, and we have no idea how many more there may have been who didn't come to our attention. It is very serious. It is not confined to here.

Mrs. HANSEN. Don't you also have similar problems in parks in other sections of the country, such as Yosemite National Park?

Mr. HARTZOG. Yes, ma'am, we have it there too.

Mrs. HANSEN. What happens, for example, to a teenage youngster in a national park when somebody comes along and offers him a drug and then abuses him if they don't take it. What do you do about such situations?

Mr. HARTZOG. We have been arresting them and we have been coping with it, but it is a growing problem and one that requires an increased law enforcement capability, in order to handle it, in such parks as Yosemite and here in the Nation's Capital, as well as in Teton and Yellowstone. In other words, none of these parks are immune any longer from invasion of the same problems with which our urban society is afflicted now in these great metropolitan areas. We get a cross section of the American public in these national parks so we are getting that element in the national parks. This is a strange element. We are getting a new visitor, and I am sure that this either has been or will be told you in connection with our safety program. We are getting the urban visitor, and he is in a foreign environment when he gets to a national park. We simply must strengthen these management programs to deal with him. We must change the attitude of our employees with respect to the kind of visitors they are getting. This is also a very serious part of it.

Mr. WYATT. George, I have a feeling that some of the problems of increased drug use in the parks is caused by the fact that young people and other potential drug users find it increasingly difficult to use drugs in the cities, so therefore they go out into the wide open spaces, into the parks, feeling they can get away with it there. Does this have any factual basis?

Mr. HARTZOG. I think it is very valid, Mr. Wyatt. We had at least one case of that in connection with a group that was in Yosemite.

Mr. WYATT. This would make it a necessity for effective dealing with these people all the more critical and crucial, because if that problem isn't met head on, then more and more people are going to look at the parks as a perfect refuge for the use of narcotics in various forms, and the problem is going to become geometrically an increasing problem.

Mr. HARTZOG. Very true. This is why I have been making such a desperate plea to the Congress and to the administration to provide me with the money to operate these parks at acceptable standards, particularly where it involves the management of the resources and the protection of visitors and the enforcement of the laws that are applicable to these visitors as well as to these resources. In other words, I don't think you can just say that we are going to deal with law enforcement while not dealing creatively and constructively with trying to communicate the value of these parks to these people, because you know they may go there to sin, but they may go away converted if they have some better understanding of what they are there for. This is, I think, a legitimate purpose of parks.

HANDLING OF THRONGS OF VISITORS

Mrs. HANSEN. Mr. Hartzog, as you well know, it is easier to talk to a dozen people, than it is to talk to a thousand people. When you get a thousand people together in a park, who are there to demonstrate, how do you talk sensibly to them?

Mr. HARTZOG. It is very difficult. There is not any question about it. I think we have been successful in dealing with groups of that size here. For example, following the 4th of July celebration we had about a thousand youngsters that gave every indication they were going to do that. With the cool level-headed work of our U.S. Park Police, there was not a single solitary incident in connection with them. It can be done. It is difficult, and it takes a very patient, experienced group of employees to do it. This is where we need to increase the capability of our people in the National Park System.

At the same time that we were having that problem, we had less capability in Yosemite and we had a riot because there were mistakes of judgment made in that operation. There is no point in denying it. We had people who were not equipped to deal with the problem that existed there. That was in contrast with the situation in which you had more people with apparently the same objectives in mind being encountered by our Park Police in Washington, with no incidents. We had less people at Yosemite with inexperienced people and we had a riot.

I do think it is possible to communicate. I do not think it is possible in a situation like last night where you have tens of thousands of people, to really communicate any meaningful message. I do think where the groups are not that large it is possible to handle them without destruction and chaos.

Mrs. HANSEN. If your rural parks areas in the Nation become known as a refuge or a habitat for criminals, drug users, and every other person that wants to escape the urban restrictions, you are going to have increasing difficulties.

Mr. HARTZOG. Madam Chairman, I am aware of that.

Mrs. HANSEN. If this happens you will have an uproar from the American public.

Mr. HARTZOG. I have had discussions on several occasions with our new Secretary, Mr. Morton, a former member of this body. You know him and you know he is as committed to the ideals and objectives you are talking about as anybody in the world. I can assure you from what he said to me that he has this commitment, and together we are going to implement it with the help of the Congress in providing the money to do it.

Mrs. HANSEN. It will take more than money to solve this problem.

Mr. HARTZOG. It will. It is an attitude. We have to come to grips with this with our own employees. That is why I brought these regional directors.

Mrs. HANSEN. Don't you think this is also a responsibility of the general public?

Mr. HARTZOG. Certainly. It is the responsibility of the public. But very interestingly, Madam Chairman, I had three people this summer go through the parks looking at these problems for me and they came back and told me these things which are really upsetting. Nevertheless this is the substance of their reports, that in the thrust of what I have been trying to say for the last 7 years, we have pretty much convinced the committees of Congress that change is necessary. We are beginning to convince the American public that change in attitude and the use of parks is necessary.

This is why we have had such resounding acceptance of closing of roads in Yosemite Valley. Can you imagine closing roads there 5 years ago to passenger automobiles and substituting a tram? You remember the uproar when 5 years ago I eliminated the firefall, which should have been done 25 or 50 years ago. We just did it 5 years ago. We got hundreds and hundreds of protests. If I had terminated the firefall and closed the roads at the same time we probably really would have had something. They have not only accepted it, they are delighted with it.

One element that seems most reluctant to change is the attitude of the employees of the National Park Service. We are trying to come to grips with this through training programs and seminars, to get them to understand that indeed it is necessary to recognize that there is a different kind of visitor today, and we have to cope with the special problem of the visitor and not with the problem that we envisaged the visitor ought to have when he comes there, because these are different people. They are in an environment that is totally strange to them, many of them coming to a national park for the very first time, having been born and reared in a jungle of concrete and asphalt and never having experienced a living tree other than one they might have seen, riding down Constitution Avenue.

Mrs. HANSEN. This is the substance of the problem.

Mr. HARTZOG. This is the substance of it.

ENVIRONMENTAL EDUCATION

Mrs. HANSEN. Every agency dealing with Federal lands that has appeared before us has the same problems. The destruction of the en-

vironment is not confined to one particular area. You also are seeing an increase in the number of man-made fires on the Bureau of Land Management, Forest Service and the Bureau of Indian Affairs lands. So it would seem to me that it is time that every school began to educate the public on how to properly manage our lands.

Mr. HARTZOG. Madam Chairman, I agree with you. This is what you and I have talked about for the past 6 years at least, and this is one of the reasons why the very first project that I asked the National Park Foundation to finance was the development of a curriculum for the teaching of environmental education, because I believe that the issue is perhaps—and I humbly and respectfully suggest this to you—larger than teaching them respect for public land. It is teaching them respect for the strands of our inheritance, whether they be natural or cultural.

Look at the base of the Washington Monument, it is inconceivable to me that people who live in an environment of freedom such as exists in this country could so totally disregard one of the symbols that cuts across every ethnic, geographic part of our Nation, and deface it. Yet it happened. It happened because they simply have no understanding and no appreciation for that symbolism in our society. Therefore, I suggest to you that we really have to broaden this educational effort to deal with the totality of our environment, to try to get to this young generation that they are not the only ones who have sacrificed and are sacrificing to change a system. Notwithstanding its shortcomings, there are systems that are a lot worse than this system, and their ancestors performed a much more valiant and serious effort, because they put their very lives at stake. These people protest in the context of the sacrifice of their ancestors. That includes the Bill of Rights. That includes the Constitution. That includes the republican form of government. That incorporates all of the blood and tyranny that the generations of men have been capable of and they threw off the yoke and it can be changed. It was not changed because those people who threw it off had no appreciation of what their ancestors before them had done. They threw it off in the context of the Magna Carta and that of the Roman judicial system. You go right on back and you find that it began to be thrown off with the beginning of the Judean-Christian tradition. Each generation has built on it, not by tearing out the roots and undermining the foundation, but by changing the edifice. This is what the environmental education system has to do.

Mrs. HANSEN. Don't you think the media, who were not even present at the writing of the Constitution, should be as conscientious about making American citizens responsible for the destruction of our heritage as they are about covering the reasons for a demonstration and what it is accomplishing? I think it should be as important to preserve the integrity of the country.

Mr. HARTZOG. Madam Chairman, I certainly agree with the general concept you are talking about. I suggest for your consideration that really that is the mission and the objective of the press. I have been the object of as much misreporting as perhaps anybody else in the system because some of the efforts that I thought were beneficial and were being helpful have been commented upon and reported on to the point where they turned out to be fiascos. I still give them high marks and on this basis.

Mrs. HANSEN. I am not trying to be critical of the press in general.

Mr. HARTZOG. I know what you are talking about, the actual reporting of the substance of the program.

Mrs. HANSEN. But I think the press needs to give more emphasis to keeping our land clean.

Mr. HARTZOG. Madam Chairman, I suggest for your consideration that they really are doing this.

Mrs. HANSEN. They are in certain instances.

Mr. HARTZOG. That is the point I think we need to get at. It really is not the fact that the freedom of the press means that each and every individual, because they are human beings, is going to be as objective an observer of this or that issue as we might hope they would be. But really that the system of the freedom of the press will eventually together present the totality of the picture. I think that is coming through.

Mrs. HANSEN. When there is a demonstration in a national park, can't there be some urging to remember that the national parks belong to everyone?

Mr. HARTZOG. They do. One of the interesting things that has been done by television journalism this year for us in the National Park System is that without charge they have been running a series of television shorts on the need not to break off the branches of the cherry trees, which has become a very serious issue. With millions of tourists looking at those beautiful trees in full flower the inclination is to reach out and pick one for a souvenir.

Mrs. HANSEN. When there is a large-scale demonstration, it seems the only consideration is the demonstration itself. Don't you think there should be some responsibility about keeping intact, for example, the park benches?

Mr. HARTZOG. Yes, ma'am.

Mrs. HANSEN. I am very disinclined to appropriate funds to fix the park benches which were destroyed in the latest demonstration in Washington, D.C.

Mr. HARTZOG. I am not sure that is the answer.

(Discussion off the record.)

PARKS-FOR-ALL-SEASONS PROGRAM

Mrs. HANSEN. Are there any other problems peculiar to the Park Service administration of facilities within the District of Columbia?

Mr. HARTZOG. Yes, Madam Chairman. One of the things that we have done, and we have done it with your active leadership and support, is that parks-for-all-seasons program, which has been one of the greatest things. I hope in the next 2 or 3 weeks that your schedule will be such that we can take you off to Madison School and let you see what has happened as a result of the inspiration of a program which you took the leadership in financing. These youngsters have taken a barren hillside—I was over there just before I left town the other day because I wanted to see it before you got there to make sure it was as good as they were telling me, it is better than they were telling me—under the leadership of one of our young interpreters working with that school system and our environmental education and parks-for-all-seasons program, they have taken a barren hillside, they have terraced it and they have created four environments.

I would like to take the subcommittee over there and show it to you. A forest environment, a grasslands environment, an agricultural environment, and a desert environment. They have created all four of those things, and those children are working there. The young professor who took me around told me with great pride that in the agricultural environment last summer they raised enough squash to serve as a luncheon vegetable at their school in one school session. It is just thrilling to see what is happening to the young people. The part we were talking about is simply one aspect of what is going on in the District of Columbia, and all across the National Park System. We had one of our creative young superintendents at Richmond who has been doing this in cooperation with the school system down there, in what they call Nature Day. They take them out to the Richmond battlefield and tell them about the relationship of man to the natural world and deal with the whole ball of wax, not in terms just that you have to save this resource or this public land, but that this is a whole world and you are simply a part of it.

Then they have a History Day in which they take them out and talk about the sacrifice and the courage of the people who experienced that terrible event there and the values that came out of it and how it has continued to nourish our society rather than tearing it apart. Then they have Recreation Day and they take them out for outdoor picnics and let them cook and have fun and play ball. The title of their program is "Some Fun in Richmond."

Interestingly, the Richmond newspapers editorialized about the program at the end of the summer. So it is spreading throughout the system.

Mrs. HANSEN. What are you doing in New York, Philadelphia, and on the west coast in this regard?

Mr. HARTZOG. We are trying to export the benefits of these programs to both places. We have an active on-going program in New York with the school system and we hope to use it at Fire Island.

Mr. SCHMIDT. We are doing this in all the metropolitan areas. Last year our program reached over 40,000 school children. We have developed a new program now in the Merchants Exchange Building in Philadelphia, and this was publicized to some extent in the last 2 or 3 weeks. This is something that is new since January 1. The teacher is hired through the auspices of the Philadelphia School System. The program is so well accepted that it is on a reservation basis. This is reaching all the school children in Philadelphia, Montgomery County, and the surrounding counties. We are also starting a similar program in the Boston area, which will be instituted in the bicentennial parks, principally Minute Man, and so forth. I think this is something that is very necessary in our urban areas. This is the first chance for the school children nowadays to reach out and touch the period of the Revolution and what it means to them.

Mr. HARTZOG. I would invite your attention, Madam Chairman, I do not know what page it is, to the need program where you can see how many States we have been working with, and in which it has been tested: Pennsylvania, Maryland, Massachusetts, Kentucky, Virginia, West Virginia, Colorado, Missouri, Oklahoma, and the District of Columbia.

This is catching on like wildfire.

The great value, Madam Chairman,—and this is a role which I believe the Federal Government needs to play in the park and recreation program—program innovation.

Mrs. HANSEN. I told you that 5 years ago.

Mr. HARTZOG. Many States don't have the money to finance the program innovation. The validation of it is, will it work or will it not work. If it works, then share it with other park and recreation agencies at other levels of Government.

That is what we have been trying to do. We have provided you with the reports on the summer-in-the-parks program each year which we share with all the Park Directors throughout the United States. We have had a number of requests come in to our people to come out and help them develop the program with their local capability and resources. We find this to be an extremely important part of bringing parks to people. It is not just providing land. It is providing program innovation, valid and adaptable to their particular situation and to serve their individual needs. We have had remarkable success with this.

PLANS FOR THE NATIONAL PARK CENTENNIAL CELEBRATION

Mrs. HANSEN. What other general plans do you have for the centennial celebration?

Mr. HARTZOG. Madam Chairman, I have a file of material that is not yet complete which I intended to share with the committee for its files, which gives an overview of our entire bicentennial program.

Mrs. HANSEN. I am talking about the national park centennial celebration.

Mr. HARTZOG. I beg your pardon, I misunderstood the question. You are talking about the national park centennial year program.

Mrs. HANSEN. Yes.

Mr. HARTZOG. We are proposing to have a series of events that go to the celebration of a birthday, and these we hope to make nationwide. The Congress has provided for the appointment of a National Park Centennial Commission. The members of that Commission representing the Congress have already been appointed, eight in total. Six are to be appointed by the President, and I understand that they will be appointed and announced within the next few weeks.

Mrs. HANSEN. Please insert in the record a list of the members of the Natonal Park Centennial Commission.

Mr. HARTZOG. Yes.

(The information follows:)

CONGRESSIONAL MEMBERSHIP OF THE NATIONAL PARK CENTENNIAL COMMISSION

From the Senate

Hon. Henry M. Jackson, Washington
Hon. Alan Bible, Nevada
Hon. Paul J. Fannin, Arizona
Hon. Clifford P. Hansen, Wyoming

From the House of Representatives

Hon. John P. Saylor, Pennsylvania
Hon. Joe Skubitz, Kansas
Hon. Thomas S. Foley, Washington
Hon. John Melcher, Montana

Mr. HARTZOG. The Secretary of Interior makes the 15th member of this Commission. In the meantime, Madam Chairman, because this Commission has not yet been activated, I have appointed a National Park Centennial Advisory Committee, representative of employees of the National Park System, cooperating organizations such as the State Park Directors, members of the Secretary's Advisory Board, and members from the Council of the Advisory Board, former employees of the Service, to counsel and develop a program for the centennial. This would involve the events of celebration.

We are hopeful to kick off the program March 1, 1972. It would involve a series of official stamps to commemorate the occasion. We are considering the authorization of a series of official medallions, one for each of the national parks in the system. These are the 36 national parks, not the 285 areas of the system. This would be an official medallion series under the auspices of the National Park Centennial Commission. We are hopeful also of convening a general National Park Service Superintendents Conference, which will be the first such conference we have had in many years. In consultation with the committee we decided not to have these general conferences because of their costs but to concentrate on regional superintendent conferences. We believe the event of 1972 is significant enough that we ought to convene a general Superintendent's Conference and this may run us $100 or $125 thousand. We will cover that in part by eliminating the regional Superintendent's Conferences before and after the date of that one.

Mrs. HANSEN. Can't you use the funds that you will have to expend to repair the park benches for this program?

Mr. HARTZOG. It is not in the appropriate fiscal year. One of the impediments I have right now is that the legislation establishing the Commission provides for $300,000 of private money, and $250,000 of appropriated money. The appropriated money was not asked for in this budget because the Commission had not yet been established. It is important, I think, that we take this program into consideration in planning, because a part of the celebration involves the sponsorship of the Second World Conference on National Parks at Yellowstone and Grand Teton and we are going to need that money to pay the participating nation's expenses in connection with the Conference.

PLANS FOR THE AMERICAN REVOLUTION BICENTENNIAL CELEBRATION

Mrs. HANSEN. What are your general plans for the bicentennial celebration?

Mr. HARTZOG. I will give you the answer to the question that I thought you asked earlier. I am having a compendium of information put together and I should have that in the next few days. I would like to present an off-set press copy and later we will print it for the information of the committee. Generally, what we are thinking of is that there are 20 areas that are directly connected with the revolution. On these we need to get developments up, the land acquisition programs completed, and the staffing at acceptable levels in anticipation of the influx of visitors in the bicentennial year.

The second thing is that an important facet of the bicentennial is to commemorate 200 years of history. We have literally thousands of

artifacts and research materials that have not been shared with the public and are not now in the mainstream of the knowledge of our Nation. We are proposing as a part of our bicentennial to get these artifacts catalogued, to get the research documents released. That is why I answered your question the way I did a while ago on these historical theme studies. We simply must get the theme studies published before 1976; otherwise, we lose a major impact.

Mrs. HANSEN. What is the amount of funds you need to complete this program?

Mr. HARTZOG. We have a five-year program for you.

Mrs. HANSEN. You seem to be unusually deficient today in supplying information.

Mr. HARTZOG. You are unusually sensitive on my areas of omission, so I do not know which way we ought to say that. You are sure hitting me where I am vulnerable this morning. I have it, but it is not here. You ought to see the tubfuls of information I have here that you have not asked for.

Mrs. HANSEN. Please insert the information in the record.

Mr. HARTZOG. Yes, Ma'am; I will.

(The informaiton follows:)

PRESERVATION OF HISTORIC PROPERTIES

Five-year program for completion of publication of historic landmark book series:

Fiscal year	*Proposed amount*
1973	$260,000
1974	260,000
1975	260,000
1976	260,000
1977	260,000

The program level includes $50,000 already available with a proposed recurring increase of $210,000.

DAMAGE TO FACILITIES BY FIRE, STORM, FLOOD, ETC.

Mrs. HANSEN. How much damage has been done to your facilities by acts of God during the past year?

Mr. HARTZOG. I have that. That is in our supplemental estimate. I have it here. This is not all of it. This is what we were able to ask for in connection with the submission of that supplemental. It is $1 million for fire, and $496,000 for buildings and utilities. And $1,323,000 for parkway and road construction that the Bureau of the Budget is releasing from reserves.

Mrs. HANSEN. Why were those funds in reserve?

Mr. HARTZOG. I am told it is unprogramed.

Mrs. HANSEN. That is a substantial amount of funds.

Mr. HARTZOG. The answer to the question is, "Yes, ma'am."

Mrs. HANSEN. How much did you request in the second fiscal year 1971 supplemental for damage caused by acts of God?

Mr. HARTZOG. That is the figure I was trying to give you $539,000 of buildings and utilities, $496,000 is in the supplemental.

Most of the damage that was left out was the Cape Hatteras Dunes that were cut back from $554,000 to $172,000.

Mrs. HANSEN. The committee will decide whether that item for Cape Hatteras Dunes will be cut back.

Mr. HARTZOG. Yes, $1,323,000 for parkways, roads and trails. Then as I indicated earlier this morning, $853,000 which I am behind now in maintenance and law enforcement costs incident to special events and demonstrations.

Mrs. HANSEN. Those are not acts of God.

Mr. HARTZOG. I stand corrected, I am sorry. I lost sight of the question.

POLICY ON CONCESSIONAIRE OPERATION OF FACILITIES

Mrs. HANSEN. Has there been any change in your policy with regard to operation of facilities by concessionaires?

Mr. HARTZOG. No change in policy, Madam Chairman, but a change in operating proposals. That is on its way through the processes of the budget now. We have simply reached the point at Everglades and Yellowstone, where we can no longer have the physical facilities there owned and constructed by private capital. It is simply uneconomic. The parent company of Yellowstone and Everglades has notified me they will not make any further capital investments in those facilities because their rate of return on both investment and gross receipts in Yellowstone is down to 4.18 percent of gross, and 4.54 percent return on equity.

Mrs. HANSEN. What is the reason for this decrease in the rate of return?

Mr. HARTZOG. The high cost of construction in those winter parks such as Yellowstone in which they have to overbuild in order to maintain the viability of the structure against the snow load. The rising cost of construction, and the fact that the season is so short. When you build a room which costs you $8,000 to $10,000 to $12,000, normally your rate ought to be at least $1 to $1.50 a thousand on a year-round occupancy of 80 percent or better to pay for it. They have an occupancy of 98 or 99 percent for 10 weeks, which spread over a period of a year means it just simply is not economic.

At Everglades there is a highly seasonal operation. Their occupancy, year long, of facilities is 49 percent. They cannot, in that isolated operation, finance the capital structure that is necessary to provide the facilities.

Mrs. HANSEN. Who is going to operate these facilities?

Mr. HARTZOG. We will still have them run by private enterprise under contract. We are not proposing to run them. We are proposing to pick up the burden of the capital structure. The concessionaire will be required to do ordinary maintenance and pay the operating costs and run them as private operations.

Mrs. HANSEN. If this occurs at Everglades and Yellowstone National Parks won't it set a pattern for the rest of the national parks?

Mr. HARTZOG. It will. The pattern has already been set because the policy of the Congress is that these facilities will be provided and operated by private capital where feasible, and where not feasible, the structures will be provided by the Government and operated by private capital.

Mrs. HANSEN. Are you doing any long-range planning so you will know what concessionaire facilities will of necessity have to be operated by the Federal Government?

Mr. HARTZOG. Yes, ma'am; we are. There is no question but what a number of other parks will be under this policy within the next 3 to 5 years.

Mrs. HANSEN. The committee will adjourn until 1 p.m.

AFTERNOON SESSION

CHANGES IN ACTIVITY STRUCTURE IN THE BUDGET

Mrs. HANSEN. The committee will come to order. Please discuss any changes in the activity structure as listed in your budget estimate. For example, discuss the lumping of sums for historic preservation, which is still below the authorization.

Mr. HARTZOG. Of course historic preservation is one great way in which you communicate values to the public, so that they are respectful of both private and public property.

What we have done in this historic preservation program this year is to try to bring together in one place for you the historic preservation work of the National Park Service as it relates to all of our cooperative programs, and as it relates to the programs that are outside of the areas of the national park system. This includes the archeological salvage work which we do outside of the areas of the national park system, because as you and the members of the committee know, the Secretary has authority under the 1906 act for archeology on the public lands and in connection with those responsibilities that have been invested in him under that act and the 1960 Reservoir Salvage Act are performed by the National Park Service. Our chief archeologist is the chief archeologist and adviser to the Secretary for all archeological programs and responsibilities in the Department.

MATCHING GRANTS-IN-AID PROGRAMS

We have the matching grants-in-aid program, which as you mentioned is below the authorized ceiling. In other words, there was authorized for this program $10 million this year, and it is proposed to be funded at exactly the same level as last year. Yet the capability of the States for matching is about two and a half times the authorized level, which makes it about four times the level that is provided for in this budget, so we are simply not living up to our commitments to the States as expressed in the authorizing legislation.

I think this is unfortunate because the first authorization of $32 million was funded something less than $1.5 million, and last year $7 million was authorized and $5,980,000 was funded. This year the authorization is $10 million and we are proposing to fund at the same level as last year.

The authorization for next year is $15 million, and the legislative committee gave a 3-year annual authorization, so that any authorization not funded in the current fiscal year lapses. Really what we are doing is denying this money for all time to the States.

Mrs. HANSEN. Why didn't you request more funds for this activity?

Mr. HARTZOG. I simply didn't have the ceiling sufficient to change it.

Mrs. HANSEN. Do you expect to find a different ceiling in this committee?

Mr. HARTZOG. I am simply presenting the problem in response to your question, and recognizing your ingenuity I assume that——

Mrs. HANSEN. I think funds in a sufficient amount could be provided from those funds in the deep freeze.

Mr. HARTZOG. That is a distinct possibility.

INDIAN ASSISTANCE FOR RECREATION PLANNING AND OPERATIONS

Mrs. HANSEN. Please comment on programs in the 1972 budget estimate related to Indian assistance.

Mr. HARTZOG. We have no money in it, Madam Chairman. This program which we initiated last year, in response to the directive of the Secretary and by agreement with the Appropriations subcommittee we funded out of our contingency reserve money. As I explained to you, when we undertake these special projects and fund them out of contingency reserve, I have tried to make it a rule of my tenure as Director, and you have supported me in this, that we fund them for the part of the year that we have to start them. Then we lay the question before the Congress, and if you don't provide the money we don't fund it. If there is no money provided in this budget for it, and in the absence of some other direction from you, there will be none for next year.

Mrs. HANSEN. Why didn't you include funds in the budget for Indian assistance?

Mr. HARTZOG. Because this item was specifically stricken by the Office of Management and Budget.

Mrs. HANSEN. You mean an item related to Indian assistance was stricken from the fiscal year 1972 budget requests?

Mr. HARTZOG. Yes, ma'am.

Mrs. HANSEN. After all the speeches that have been made on behalf of the Indians.

Mr. HARTZOG. I don't know about that, but I know this item was specifically eliminated. I asked for an increase of $500,000 to provide for recreation planning and operation assistance to the Indian tribes. This item was specifically eliminated in connection with the budget consideration.

POLICY ON BUILDING PARK ROADS

Mrs. HANSEN. What general policy do you have on building park roads, and to what extent must they conform with public roads specifications?

Mr. HARTZOG. Madam Chairman, this is a matter of continuing argument between us and the Federal Highway Administration, and especially their new Office of Safety, for the simple reason that they want these roads to be built to primary and secondary State highway road standards, and our roads are just not for that purpose and I have been refusing to build park roads to those standards. It is a matter of unresolved contention.

I am happy you brought it up, because I think it is something that you need to take a look at. I don't believe that a road in the heart of Yellowstone National Park or Canyonlands National Park ought to be built to a primary State roads standard, suitable for commercial traffic, for that is not the purpose of a park road. They are designed to make areas accessible to visitors to the national park.

Mrs. HANSEN. They are designed to make areas accessible for a national park experience.

Mr. HARTZOG. For a national park experience.

Mrs. HANSEN. The roads are not built as just throughways for traffic.

Mr. HARTZOG. Not as a throughway for commercial traffic, which is the basis of the standards for design and everything else that is built into the primary and secondary road systems for the States and for the Federal Government.

Mrs. HANSEN. How successful have you in getting this point across?

Mr. HARTZOG. Thus far I have been fairly successful, but it is getting increasing difficult. For example, the Federal Highway Administration actions have caused the NPS sign program to be held in abeyance. What I am trying to do is to implement an innovative sign program in preparation for the Second World Conference of Parks which will be held in this country. A sign language has been developed internationally which uses symbols to guide motorists. The system is used in Europe.

The Federal Highway Administration has not approved this program for use in the national parks, because they think that people can't read symbols and understand them. We have a brochure that interprets these signs which we plan to give to each visitor. Signs identifying the availability of food service will use a knife and a fork as a symbol. If they think anybody doesn't understand when they see a knife and fork, it refers to food, I think they are underestimating the intelligence of the people of the United States, and especially our park visitors.

We hadn't planned to sign the trails with this, but just the road system. Madam Chairman, in order to insure that park roads are compatible with the environment of the park we have adopted a review procedure. I have directed that no new road can be built in National Park Service areas, and no major change can be made in an existing road in a national park area until the alignment for that road has first been received by a roads committee composed of our chief scientist, if it is a natural area, our chief of interpretation, and our park superintendent as a team, because the purpose of that road is to make the features of that park accessible and interpretable to enhance the quality of the park experience, and not simply to accelerate the volume of traffic through it. If it is an historic archeological area, then the committee is made up of either the chief archeologist or the chief park historian as a substitute for the chief scientist, and the interpreter and a superintendent.

When that alinement is selected, then we ask the engineers and landscape architects to design a road to meet standards. Which we have prescribed. I will be pleased to give these to the committee .

Mrs. HANSEN. What if this matter isn't resolved, what is going to happen?

Mr. HARTZOG. Thus far there haven't been any unresolved questions, because the only one that we really had an impasse on was the road at Mesa Verde, and I simply took that project away from the Federal Highway Administration and assigned it to National Park Service professional staff.

Mrs. HANSEN. Maybe this should be the policy with all of your roads.

Mr. HARTZOG. I think this is a matter that you as chairman of the Appropriations Subcommittee ought to look into, because I think it can be done more economically by us. It is a tremendous price which we pay to the Federal Highway Administration for their services. We have been doing it at the insistence of the Public Works Committee.

I think there are very real savings that could be made by having park roads built by National Park Service engineers, rather than going through another subcontract. In other words, what I am trying to say simply is that I think the matter of building roads in parks is an entirely different matter than building roads on public domain lands and through national forests which are designed to handle commercial traffic volumes. Do you see the point I am trying to make?

Mrs. HANSEN. Yes. Also, many people do not want the usual interstate type of highway in a national park.

Mr. HARTZOG. That is right; nevertheless this is a continuing argument that has been going on for a considerable time, and it is getting sharper all the time. When Rex Whitten was over there and for awhile with Frank Turner, it was different; but now Frank has moved up to Administrator, and we have a new crew in there, and the argument is getting sharper all the time.

One that I am very much concerned about is this sign program, because at the time of the Second World Conference of Parks we are going to have people there who don't read English as efficiently as we do.

Mrs. HANSEN. Don't they understand the situation?

Mr. FREEMAN. Mostly the difference, Madam Chairman, is in the safety signs rather than the symbols. Apparently they feel that the international safety signs that have been worked out through the United Nations but not adopted by this country are different in certain instances than the ones we came up with. It is more that than it is the symbols for eating, restrooms, and that sort of thing. The safety signs and traffic regulation signs are the holdup.

Mr. HARTZOG. But it is holding up the entire sign program.

Mrs. HANSEN. I hope you get this problem settled.

Mr. HARTZOG. I am trying to.

YOUTH CONSERVATION CORPS

Mrs. HANSEN. Please comment on how the Youth Conservation Corps will operate in the Park Service?

Mr. HARTZOG. We have eight or nine approved installations for this coming summer.

Mrs. HANSEN. Where will they be located?

Mr. HARTZOG. They will be at Mount Rainier, Delaware Water Gap, Catoctin, Great Smoky Mountains, Rocky Mountain, Everglades, Grand Canyon, Harpers Ferry, National Capital Parks.

Mrs. HANSEN. How many youngsters will be at each location?

Mr. HARTZOG. In Mount Ranier there will be a camp of 50; Delaware Water Gap, 50; Catoctin, 50; Great Smokies, 50; Rocky Mountain, 25; Everglades, 50; Grand Canyon, 25; Harpers Ferry, 20; National Capital Parks, 50.

Mrs. HANSEN. When do you plan to begin this program?

Mr. HARTZOG. They will activate them this summer, when school is out in June or the end of May.

Mrs. HANSEN. How long will the program continue?

Mr. HARTZOG. During the summer until school starts.

Mrs. HANSEN. What type of work will be done?

Mr. HARTZOG. Generally it is conservation work, trails and resource management programs and this kind of thing. I am not sure that we have it.

Mrs. HANSEN. How did you select the locations?

Mr. HARTZOG. We selected them in negotiation with the Department. We had proposed a great many more than this, but what happened is that they split them half between Interior and half between Agriculture, and then of course it became a matter of assigning to Bureau of Land Management, Bureau of Indian Affairs, Bureau of Sport Fisheries and Wildlife, and to us. We got the ones that I read to you.

Mrs. HANSEN. How are the students chosen?

Mr. HARTZOG. Russ, how are you choosing yours?

Mr. DICKENSON. We worked out a system with the local schools in the District of Columbia, and they make the selection.

Mrs. HANSEN. Is this done on an experimental basis?

Mr. DICKENSON. A pilot project.

Mrs. HANSEN. You haven't asked for any funds in the fiscal year 1972 budget for this activity.

Mr. HARTZOG. That money is not handled in our budget.

Mr. WILES. There is no money in the budget for next year as of this moment.

Mrs. HANSEN. No additional funds have ben requested in any of the agencies' budgets for fiscal year 1972 for this program.

Mr. WILES. That is right. It is only in for 1971.

Mrs. HANSEN. I want the record to show that you aren't requesting any additional funds in this budget. This is an experimental program and since this program is going to be continued in fiscal year 1972 you should make certain that adequate funds are available.

Mr. WILES. That is right, Madam Chairman. There will need to be a supplemental.

Mrs. HANSEN. Will you have an appraisal of this program completed in time so funds will be able to be requested in a supplemental?

Mr. WILES. I would think so, Madam Chairman. There is enough money in now to take us through this summer, and the money that is available goes beyond the fiscal year, so we would have until next winter to send up a supplemental. I believe there would be time.

STATUS OF REDWOOD NATIONAL PARK

Mrs. HANSEN. Please give the committee a general analysis of the Redwood National Park situation. Also what is happening especially with regard to the California State Parks?

Mr. HARTZOG. Madam Chairman, that matter is still unresolved with respect to those State parks. We have had some discussions with representatives of the State of California. In order not to prejudice those discussions with any information in advance, I would like to tell you about it off the record.

(Discussion off the record.)

YOUTH PROGRAM

Mrs. HANSEN. Please insert in the record a summary of the Youth Programs in the National Parks.

(The information follows:)

NATIONAL PARK SERVICE—SUMMARY OF YOUTH PROGRAMS IN THE NATIONAL PARKS

Youth Volunteer Programs: Those programs where Service area and personnel were involved in youth activities which resulted in tangible benefits to Service area at no direct cost to Government.

Organized Youth Programs: Those programs where Service area and personnel were involved in youth activities.

Environmental Education Programs: Service participation and resource use in the NEED and NESA programs.

YOUTH VOLUNTEER PROGRAMS

State and region	Park and group	Number of participants and duration	Activities
Maine (NE.)	Acadia:		
	SCA	15—2 weeks	Improved wilderness campground.
	Outward bound	18—2 days	Removed abandoned structures from park.
Pennsylvania (NE.)	Delaware Water Gap: Boy Scouts	18—1 day	Appalachian Trail maintenance.
New York (NE.)	Fire Island:		
	Student conservation program	2	Interpretive services, Beachgrass planting and litter clean up.
	Girl Scouts	3 troops	
	Boy Scouts	1 troop	Do.
Pennsylvania (NE.)	Hopewell Village: Scouts	20	Cleared primitive trail through NESA.
Do	Independence: Junior League of Philadelphia	9 weeks	Interpretive services.
Utah (SW.)	Golden Spike: NYC	4	Area maintenance; interpretive services; office functions.
Texas (SW.)	Padre Island: Girl Scouts		"Ranger Aid" program.
New Jersey NE.)	Morristown-Edison: Boy and Girl Scouts		Developing NESA.
New York (NE.)	Sagamore Hill: Boy Scouts	1 day	Trail building and beach cleanup in NESA.
Colorado (MW.)	Rocky Mountains: SCA	17—3 weeks	Trail maintenance, back country campsite maintenance.
New Mexico (SW.)	Gila Cliff Dwellings: NYC	2—800 hours	
Do	Aztec Rains:		
	Boy Souts	75	Area cleanup; tree planting; indian garden planting; historic trail work.
	Girl Scouts		Do.
	4-H Club		Work-training program.
Arizona (SW.)	Petrified Forest: NYC	6	
Do	Grand Canyon:		Cleanup programs; conservation badge equipments; trail maintenance.
	Boy Scouts		Do.
	Girl Scouts		Do.
	Fremont, California Youth Organization		
	Grand Canyon School		
California (W.)	John Muir:		
	Boy Scouts	12—201 hours	
	Contra Costa Volunteer Bureau	5—201 hours	
	Martinez School District	4—120 hours	
Do	Redwood: NYC	10—8 weeks	
Washington (P NW.)	Olympic:		
	SCA	60—Summer	
	Boy Scouts	6 groups	Cleanup projects.
Do	Mount Rainier:		
	SCA	60—Summer	
	Boy Scouts	40	Trail building, litter clean up.
	do	700 hours	Rehabilitation of trails, patrol cabins, meadows and other facilities and features of the park.

Do	North Cascades:		
	SCA	30—Summer	
	Boy Scouts	3 troops	Clean up, trail work.
Do	Coulee Dam: Boy Scouts	12	Trail work.
Texas (SW.)	Sanford: Girl Scouts	1 day	Area clean up for conservation badge.
Oklahoma (SW.)	Platt-Arbuckle:		
	Explorer Scouts		Conservation programs.
	Girl Scouts		"Ranger Aid" badge.
	NYC		Conservation projects.
Virginia (SE.)	Petersburg: Disadvantaged youth	850—2 park visits for each	"Summer in the Parks," living history, recreation.
Do	Richmond: Inner-city youth	4,500—3 park visits for each	Living history, cook-out, camp-out.
Colorado (MW.)	Dinosaur: Senior seminar	100—9 days	Raft trip emphasizing environmental awareness.
Missouri (MW.)	JNEM: Inner-city youth	1,450	"Outdoor adventures program" visiting Missouri Botanical Garden, Ralston Purina Research Farm.
Colorado (MW.)	Rocky Mount:		
	Blind youth		Special study area visit.
	Underprivileged	65	Special program for migrant workers' children.
Arizona (SW.)	Casa Grande: Operation outreach	200	
Texas (SW.)	Amistad: Community Action	100—4 1-week sessions	Campout, crafts, recreation (NPS personnel did not participate).
New York (NE.)	Saratoga: Underprivileged	50—per week	
Pennsylvania (NE.)	Delaware water gap:		
	Boy Scouts	300—August	Paddle-Rama.
	YMCA	40 per day—2 months	Summer day camp.
	Lutheran Church	20 per weekend	Weekend campouts.
	Boy Scouts	16 per weekend	Waterfront campsite.
New York (NE.)	Fire Island	880—55 per day	"Day at Seashore."
Pennsylvania (NE.)	Gettysburg:		
	WASO, SITP	560	
	Scouts	5,900	Heritage Trail program.
Do	Hopewell Village: Elementary schools	12,850	Standard park tours.
Do	Independence: City Schools	11,057	History lesson program.
New Jersey (NE.)	Morristown-Edison	2,000	Organized youth groups.
California (W.)	Lake Mead	60 per week—10 weeks	
Washington (P NW.)	Mount Rainier:		
	Scouts	160	Traced the White River.
	Inner-city youth	60—1 day	Park visit.
Do	Olympic	90—6 weeks	Primitive camping experiernce.
Do	North Cascades: Outward Bound	25	Wilderness training.
Alaska (P NW.)	Glacier Bay	10—3 days	Wilderness campout.
Kansas (MW.)	Fort Larned:		
	Boy Scouts	25—1 day	Standard interpretive tours.
	Boy Scouts	70—3 days	Campout program.
	Girl Scouts	60—3 days	Do.
	Sr. trips	3,600–1 day	Standard Interpretive tour.

NEED PROGRAM: TEST AREAS

State	Region	Park	Number of workshops	Number of teachers involved	Number of students participating	Activities
Virginia	NCP	Prince William				NEED centers: These centers offer teachers and students the opportunity to live and learn in an outdoor environment for 5-day periods.
New York	NE	Fire Island				
Massachusetts	NE	Cape Cod				
California	W	Whiskeytown				
Kentucky	SE	Cumberland Gap				Former Job Corps centers now used for testing NEED program materials
Tennessee	SE	Great Smoky Mountains (Tremont).				
Maryland	NCP	Catoctin				
Oklahoma	SW	Platt (Goddard youth center).				
Total			20	550	8,500	

Note: States where NEED program materials have been tested: Pennsylvania, Maryland, New York, Massachusetts, Kentucky, Tennessee, Virginia, West Virginia, California, Texas, Colorado, Missouri, Oklahoma, District of Columbia. NEED program materials are being tested and evaluated extensively in the State of Pennsylvania. A series of workshops sponsored by the State board of education were held to introduce the program to the teachers and administrators of the State.

NATIONAL ENVIRONMENTAL STUDY AREA (NESA)

[Statistics by region from September 1969–70]

	Number of NPS areas	Site use—student		Workshops		Number of States involved
		Number of groups	Number of participants	Number held	Number of participants	
Region:						
SERO	23	594	20,413	70	1,636	13
NCP	7	168	8,681	21	526	3
NERO	11	136	1,494	16	442	5
MWRO	11	164	6,508	2	37	6
SWRO	15	96	3,576	10	131	5
WRO	9	46	2,275	3	31	3
PNWRO	1	95	1,795	3	170	1
Total	77	1,299	44,742	125	2,973	

NUMBER OF NPS AREAS INVOLVED IN NESA PROGRAM ACCORDING TO STATE

State	Number	National Park Service areas involved in NESA
Alabama	1	Horseshoe Bend National Military Park.
Arizona	7	Organ Pipe Cactus National Monument, Saguaro National Monument, Montezuma Castle National Monument, Walnut Canyon National Monument, Sunset Crater National Monument, Grand Canyon National Park, Pipe Spring National Monument.
Arkansas	2	Hot Springs National Park, Arkansas Post National Memorial.
California	5	Joshua Tree National Monument, Sequoia and Kings Canyon National Park, Muir Woods National Monument, Point Reyes National Seashore, Pinnacles National Monument.
Colorado	3	Rocky Mountain National Park, Curecanti National Recreation Area, Colorado National Monument.
District of Columbia	3	Theodore Roosevelt Island, Rock Creek Park, Frederick Douglass Home.
Florida	1	Everglades National Park.
Georgia	2	Kennesaw Mountain NBP, Chickamauga and Chattanooga National Monument Park.
Hawaii	2	City of Refuge National Historic Park, Hawaii Volcanoes National Park.
Indiana	1	Lincoln Boyhood National Memorial.
Kentucky	1	Cumberland Gap National Historic Park.
Maryland	4	Catoctin National Park, Assateague Island National Seashore, Greenbelt, Oxon Hill.
Massachusetts	2	Cape Cod National Seashore, Minute Man National Historic Park.
Minnesota	1	Pipestone National Monument.
Mississippi	1	Natchez Trace Parkway.
Missouri	3	Jefferson NEM, Wilson's Creek NBP, Ozark National Scenic Riverways.
Montana	1	Glacier National Park.
Nebraska	2	Scott's Bluff National Monument, Homestead National Monument.
Nevada	1	Lake Mead National Recreation Area.
New Jersey	1	Morristown National Historic Partk.
New Mexico	3	Bandelier National Monument, Capulin Mountain National Monument, White Sands National Monument.
New York	3	Home of F. D. Roosevelt National Historic Site, Sagamore Hill National Historic Site, Fire Island National Seashore.
North Carolina	1	Cape Hatteras National Seashore.
Oklahoma	1	Platt National Park.
Pennsylvania	3	Gettysburg National Military Park, Hopewell Village National Historic Site, Delaware Water Gap National Recreation Area.
South Carolina	2	Fort Sumter National Monument, Kings Mountain National Military Park.
Tennessee	4	Great Smoky Mountains National Park, Stone's River NB and C, Fort Donelson National Military Park, Shiloh National Military Park and C.
Texas	2	Sanford Recreation Area, Padre Island National Seashore.
Utah	2	Timpanogos Cave National Monument, Arches National Monument.
Virgin Islands	1	Virgin Islands National Park.
Virginia	7	Colonial National Historic Park, Richmond NBP, Appomattox Court House National Historic Park, Shenandoah National Park, Petersburg NB, Prince William Forest Park, Blue Ridge Parkway.
Washington	1	Olympic National Park.
West Virginia	1	Harpers Ferry National Historic Park.
Wyoming	1	Grand Teton National Park.
Puerto Rico	1	San Juan National Historic Site.

VOLUNTEERS-IN-PARKS PROGRAMS

Mrs. HANSEN. What is the total number of volunteers in the volunteers-in-parks program?

Mr. HARTZOG. The ones that we have now on are in National Capital Parks, 48, Western Region, 36, in the Southeast Region, in the Southwest, five, in our own Washington office, one. We don't have any at the moment in the Northeast, Midwest and Pacific Northwest. However, we expect to have a total on by the end of this fiscal year of 389. The total voluntary hours of service, are 2,223 as of February 1, 1971.

Mrs. HANSEN. What type of work do the volunteers perform?

Mr. HARTZOG. This is all related to visitor service. You will remember when this legislation was going through we had to make a commitment, in order to get the legislation through, that we would not use these volunteers in parks as a part of the maintenance crew in any park. All of this work is related directly to visitor services.

This, Madam Chairman, is where we get a large number of our costumed interpreters in connection with our living history program. Those are the activities in the national park system in connection with the youth programs, the summer-in-the-parks, the living history, the environmental education programs. These are the special youth programs.

YOUTH CONSERVATION CORPS

Mrs. HANSEN. Don't you also have trail building and beach clean-up programs?

Mr. HARTZOG. Right. This is in connection with the Student Conservation Corps program that we finance with the matching grant program. These are the programs that were pioneered in Olympic National Park and the student conservation organization used them. They are not strictly vounteers in the sense of this volunteers-in-parks program.

VISITOR PROTECTION IN THE PARKS

Mrs. HANSEN. Please discuss for the committee your safety program for protection of visitors to the parks.

Mr. HARTZOG. Madam Chairman, we have created a special committee composed of a representative from the Secretary's Office, our Safety Officer, a representative of the Secretary's Advisory Board, and that happens to be Dr. Melvin M. Payne, the president of the National Geographic Society, who is chairman of the special committee, a member of the council, and a representative who happens to be the Deputy Public Printer of the Government Printing Office, to review all of our information literature and public information program, to insure that it is responsive to the elementary safety issues that are confronted by a visitor when he comes to a national park.

We have developed a new set of safety standards which will be in effect this summer. We have entered into a contract for $4,000 with the National Safety Council, to have a complete and total look at our safety program to evaluate our standards and to make recommendations, and we have included in this budget six full-time safety officers, one for each region, who will be stationed at a major national

park in that region to keep them from having to do a lot of paper work. They will be in the field where they can be in contact with the operating problems involved.

VISITOR DEATHS IN 1970

Mrs. HANSEN. You had 165 visitor deaths during 1970. What were the principal causes of these deaths?

Mr. HARTZOG. Automobile accidents I believe. We have an analysis of that which I will be pleased to put in the record.

Mrs. HANSEN. Please do.

(The information follows:)

VISITOR FATALITIES—1970

During the calendar year 1970, 165 persons lost their lives in accidents in national park service areas. The following is a breakdown of these fatalities by causes:

Motor vehicle accidents	75
Drownings	50
Falls	18
Struck by lightning	3
Burns	2
Exposure	3
Struck by object	6
Asphyxiation	2
Suffocation	3
Airplane crash	3
Total	165

Motor Vehicle accidents continue to be the leading cause of visitor accidental deaths. Forty-three of the 75 motor vehicle fatalities occurred on parkways with 20 of these happening on the Natchez Trace Parkway, another 10 on the Baltimore-Washington Parkway, and 8 on the George Washington Memorial Parkway. The three parkways mentioned accounted for 38 or 50 percent of all motor vehicle fatalities experienced throughout the service during 1970.

Mrs. HANSEN. Considering all the automobile accidents you have in the national parks I don't wonder why the Bureau of Public Roads is giving you difficulties.

Mr. HARTZOG. Let me tell you why we have some of them. I will tell you exactly. The most serious ones we have are on the Natchez Trace Parkway. You and I went down the Natchez Trace Parkway. If you ever saw a primary road in your life that is it. The only thing that is different is beautifully landscaped shoulders. You can drive that parkway, which is supposed to be an historic recreation parkway, at 85 miles an hour.

Mrs. HANSEN. Who sets the speed limits on the Natchez-Trace Parkway?

Mr. HARTZOG. Madam Chairman, what point is there in setting a speed when you have got a speedway built? We set the speed, but nobody is killed at the speed limit. They are killed when they exceed the limit on the road, so that they are in violation. The thesis that I am talking about is building a road on which you can't speed. The safest road we have in the system is the Trail Ridge Road in Rocky Mountain National Park. I can't tell you the last time that they even had an accident out there, but I will guarantee that nobody goes over

the top of the Trail Ridge Road more than 25 miles an hour unless he is a permanent concessionaire employee or ranger. They just won't speed up there. They can look out there and see 4,000 feet down and when they see that they slow down.

Mrs. HANSEN. There is another road that you don't speed on and it is the Yellowstone National Park entrance road from Red Lodge.

Mr. HARTZOG. That is right exactly. My point is let's build roads on which people can't speed, instead of building speedways and then putting up speed signs. This is the difference in concept, and that is the very heart of it as to whether or not you are going to control speed by the design of the road, or whether you are going to build a speedway and then try to regulate it with signs and rangers. You were with me on the Natchez Trace Parkway for a week. You heard the story of us having rangers on that parkway all night long, one man in a car confronted with bank robbers, road blocks and everything else. It is a harrowing thought that we have people exposed to those kinds of dangers out there by themselves on that road.

Mrs. HANSEN. The Natchez-Trace always was a dangerous place.

Mr. HARTZOG. Certainly, but it wasn't from the standpoint of being killed with vehicles.

I had a member of the staff of the Mississippi delegation call me last week wanting clarification on this thing which came up when we were down there about ambulances—using it to get between Tupelo and Jackson and I told him of course we permit this. The whole argument hinges of the fact that it is the best road in Mississippi. That is the quickest way between Tupelo and Jackson. This, I think, is wrong. We had a long discussion of this with the citizens down there as well as the member of the delegation who was traveling with us that the rest of that parkway should be built like a recreational parkway that is commensurate with its historical values and with its recreation potential, and not designed simply as a speedway.

SUMMARY OF APPROPRIATIONS, REVENUE AND VISITS

Mrs. HANSEN. Please insert pages 1 through 3 of the justifications in the record at this point.

(The information follows:)

NATIONAL PARK SERVICE

SUMMARY OF APPROPRIATIONS, REVENUES, AND VISITS

Fiscal Year	Appropriations a/				Revenues		Visits
	Operating Funds	Grants for Historic Preservation	Capital Improvements	Total	General Fund	Land and Water Conservation Fund	
1962	$42,223,851	....	$67,976,000	$110,199,851	$5,841,761	....	92,160,300
1963	48,017,054	....	72,775,500	120,792,554	6,450,559	....	100,876,500
1964	51,379,829	....	61,697,000	113,076,829	7,085,877	....	107,446,700
1965	56,199,000	....	71,986,600	128,185,600	5,581,436	$1,768,524	113,703,200
1966	61,380,200	....	66,388,000	127,768,200	1,707,748	6,371,967	127,440,300
1967	67,743,300	....	55,323,300	123,066,600	1,747,071	6,544,330	135,325,600
1968	78,272,800	$300,000	49,612,000	128,184,800	1,858,361	6,996,063	145,342,200
1969	82,177,900	100,000	22,457,900	104,735,800	1,929,915	7,135,505	157,356,500
1970	99,099,970	969,000	29,189,686	129,258,656	2,187,246	6,581,443	166,900,000
1971 (Est.)	118,516,300	5,980,000	36,329,000	160,825,300	2,033,000	7,253,000	174,400,000
1972 (Est.)	129,306,000	5,980,000	56,359,000	191,645,000	2,177,000	7,613,000	183,900,000

a/ Adjusted to include supplemental appropriations and to reflect appropriation transfers.

DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

STATEMENT OF RECEIPTS

General Fund Receipts Deposited to the Credit of the United States Treasury during the Fiscal Year 1970 and Estimated for the Fiscal Years 1971 and 1972

	Actual 1970	Estimated 1971	Estimated 1972
Permits and licenses	$28,048	$30,200	$31,500
Fines, penalties, and forfeitures	3,035	3,900	4,300
Gifts and contributions	172	100	100
Rents, royalties, and other earnings	293,957	318,600	342,300
Sale of Government property and products	324,258	35,500	46,600
Business concessions	1,472,340	1,576,000	1,680,000
Fees for services	25,599	28,000	30,100
Recoveries and refunds	39,837	40,700	42,100
Totals	2,187,246	2,033,000	2,177,000

Recreation Fee Revenues Deposited to the Credit of the Land and Water Conservation Fund during the Fiscal Year 1970 and Estimated for the Fiscal Years 1971 and 1972

	Actual 1970	Estimated 1971	Estimated 1972
Annual Permit	$2,381,380	$2,103,900	$2,216,600
Other (short-term entrance, admission, guide, elevator, user fees and surplus property sales)	4,200,063	5,149,100	5,396,400
Total	6,581,443	7,253,000	7,613,000

DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

Comparative Summary of the Amount Available for 1971 with the 1972 Budget

Appropriation and Activity	Estimated Available 1971	Budget 1972	Increase or Decrease (-)
Management and Protection:			
Management of park and other areas	$55,363,100	$59,330,800	$3,967,700
Forestry and fire control	2,434,200	3,314,200	880,000
Park and recreation programs	5,674,500	4,959,000	-715,500
Subtotal	63,471,800	67,604,000	4,132,200
Maintenance and Rehabilitation of Physical Facilities:			
Roads and trails	16,928,400	18,062,000	1,133,600
Buildings, utilities, and other facilities	33,468,100	37,748,000	4,279,900
Subtotal	50,396,500	55,810,000	5,413,500
General Administrative Expenses:			
Departmental expenses	2,039,200	2,039,200	...
Regional office expenses	1,736,800	1,736,800	...
Subtotal	3,776,000	3,776,000	...
Preservation of Historic Properties:			
Historic preservation and special studies	6,852,000	8,096,000	1,244,000
Construction:			
Buildings, utilities, and other facilities	18,179,000	37,359,000	19,180,000
Acquisition of lands and water rights	500,000	500,000	...
Subtotal	18,679,000	37,859,000	19,180,000
Parkway and Road Construction (Liquidation of Contract Authority)	17,650,000	18,500,000	850,000
Total	160,825,300	191,645,000	30,819,700

RECEIPTS FROM BUSINESS CONCESSIONS

Mrs. HANSEN. You indicate an increase of only about $100,000 in receipts from business concessions from 1971 to 1972. With increased visitations and additional park areas being opened, why is it that you are not anticipating a larger increase in this connection?

Mr. HARTZOG. Madam Chairman, because most of our contracts are on percentage of the gross. In some of our parks the gross receipts simply aren't keeping up with anticipated growths in visitation and Yosemite is a good example.

Mrs. HANSEN. Why?

Mr. HARTZOG. After the episodes in Yosemite, I brought Mr. Hadley with me this afternoon since you had gotten on the subject of Yosemite this morning, and thinking you might want to explore it this afternoon. He is our Deputy Assistant Director, but last year he was our Superintendent in Yosemite.

Mrs. HANSEN. That is why I told you this morning I was concerned about government by mob rule.

Mr. HARTZOG. I am too.

Mrs. HANSEN. There are times when you should be more assertive of your feelings.

Mr. HARTZOG. Yes, ma'am. I am sure sorry I conveyed the wrong impression.

DECREASE IN VISITATION AT YOSEMITE NATIONAL PARK AFTER THE INCIDENT

Mr. HADLEY. Madam Chairman, last fall you may recall I had the pleasure to appear before you in behalf of the supplemental request for funds covering the situation in the park last summer. At that time I briefed the subcommittee on what occurred at Yosemite. The question as I understand it now is what was the general aftermath of July 4, what was the balance of the summer like.

The balance of the summer following July 4, was, of course, very, very quiet, by reason of the fact that there were many people in California, and I think elsewhere in the country, who having learned what occurred there that weekend, changed their travel plans and they cancelled Yosemite Park off their travel list. There was a drop in travel to the park for the balance of the summer. The figures are not in my head at the moment. We can supply those for the record. That fact is, however, the long term effects for last year of the Fourth of July incident were, I think, damaging to the National Park Service image at Yosemite and caused people not to come.

(The information follows:)

Travel to Yosemite was significantly affected by the events of July 4. For the period January through June, 1970, travel to the park exceeded that of the same period in 1969 by 166,433 visitors. Travel to the park declined in July 1970 after the incident of July 4; and the total number of visitors recorded during the last 6 months of the year (July through December) was 180,569 less than for the same period in 1969.

COMPARATIVE SUMMARY OF TRAVEL, BY MONTH, FOR YOSEMITE IN 1969 AND 1970

Month	Total number of visitors, 1969	Total number of visitors, 1970	Increase or decrease [1]
January	40,895	54,298	13,403
February	48,177	68,031	19,854
March	49,462	95,044	45,582
April	89,837	96,236	6,399
May	261,344	299,337	37,993
June	346,705	389,907	43,202
July	378,798	367,298	(11,500)
August	458,008	429,845	(28,163)
September	348,373	250,067	(98,306)
October	139,162	114,223	(24,939)
November	81,201	71,128	(10,073)
December	49,367	41,779	(7,588)
Total	2,291,329	2,277,193	(14,136)

[1] Figures in parentheses denote decrease.

Mrs. HANSEN. I think a similar thing has happened to the city of Washington, D.C. Wednesday and Thursday nights, as I drove home down Pennsylvania Avenue, there weren't two dozen people on the street. You could have shot a cannon any place and you wouldn't have hit anybody. This is what happens when you have this kind of fear and people say, "We are going to stay home." This could happen in the national parks if they become a focal point for unruly mobs, a haven for dope addicts, and a place where crime can be committed without adequate law enforcement. If this happens eventually what might occur is a reversal of public support for the national parks.

Mr. HARTZOG. I understand that, Madam Chairman.

Mrs. HANSEN. If this happens it will be a great loss to this Nation.

Mr. HARTZOG. That is right. This is why I tried this morning to lay before you my deep concern that we be provided with the capability and staff to deal with this problem, because I think it is the only way in which we can do it, but when you have parks that are not adequately staffed to handle these things, they are bound to get out of control. Of the seven objectives that I presented to the committee, two of those objectives go to the very deep concern that I, the Administration, and the Secretary have for adequate management of these resources and adequate service and protection to its visitors. This is the essence of it.

Mrs. HANSEN. You are going to have to create something deeper, an awareness on the part of the public that "This is my facility and I am not going to destroy it", because you know as well as I that you cannot possibly provide enough police in the United States for unrestrained destruction.

Mr. HARTZOG. I agree with you. This is why I have been advocating, with your gracious and generous support, a completely new approach to interpretation that gets us to the broader dimension of environmental education, extending it right down through our parks, so that we do communicate a broader, more significant message, not simply to the visitors who come there, but through the school systems, to the youngsters, to the future adults who come there.

Mrs. HANSEN. The American public is deeply concerned about the war, but they ought to be just as deeply concerned about what they are destroying in the way of the fabric of their nation as well as the physical existence of it.

Mr. HARTZOG. I agree.

ENVIRONMENTAL EDUCATION

Mr. GALIFIANAKIS. Excuse me, Madam Chairman. How does your proposal begin about the education?

Mr. HARTZOG. As a matter of fact, we started it with donated money from the National Park Foundation. We started it on the basis of the belief that I have and that my colleagues in the National Park Service have, and with the approval of that board of directors and our Secretary, that the National Park System, containing as it does the distilled essence of our national inheritance as well as the great landmarks of our history, is really a resource whose value far transcends the physical qualities of the property; that it can be made an educational social resource to communicate a broader concern and a broader involvement to all of our people and that it is a great teaching resource that if utilized in connection with an environmental education program that is adaptable to the school curriculum can be made to serve a higher purpose than it has been serving thus far in simply providing refereshment and recreation to the visitor who actually gets there.

In this belief, the National Park Foundation advanced funds, beginning 4 years ago, to develop the curriculum for an environmental education program. We have that curriculum developed now for six grades under a cooperative agreement with the Office of Education, and an agreement with the National Education Association. We have tested that program in about 10 or 12 States that I mentioned this morning. The State of Pennsylvania has adopted it in its curriculum of environmental education for this year.

Mr. GALIFIANAKIS. Does this encompass the concern of the chairman and all of us about the misuse of national facilities?

Mr. HARTZOG. That is right, the use and the misuse, Its objective is to try to get at the very substance of teaching people to be at home in their world, and at home with each other.

Mr. GALIFIANAKIS. Are you apprehensive about public demonstrations from this point on?

Mrs. HANSEN. Earlier we discussed public demonstrations. It is going to cost about a quarter of a million dollars to clean up after Saturday, Sunday, and the next 2 weeks' demonstrations.

Mr. HARTZOG. No, just Saturday and Sunday, and repair what has already been torn up. But my concern is as these increase and escalate, if it becomes the fashion to take government into the streets, then the destruction gets greater and greater, because it is the popular thing. It used to be the thing to go to a city council or to your legislature or any place to discuss, in the way of a town meeting, the things that were wrong and debate them, but now that isn't the case.

Mrs. HANSEN. I do want to congratulate the Park Service for what they are doing in trying to provide a background to our national

heritage and to develop recognition of what is right with our society and not what is wrong with it.

Mr. HARTZOG. I appreciate that very much, Madam Chairman. This is certainly something that we believe in very deeply. I think that we have reached the point in time where we really need to take a look at these resources in a different attitude, not simply as physical properties, even though they are land and water and buildings and structures, but the fact that they are symbols of a very proud inheritance and one which properly understood can be a means of incurring pride and understanding in the younger people of this country.

We have a gap here, and I don't like to refer to gaps, but it is really an educational gap, because we have made a rapid transformation into an urban society in which people have lost this continuity that comes from family and from the youngster knowing his grandmother, running down the street for cookies, and all of the things that contributed to stability and understanding and pride in family. They are in search of a new substitute and I believe that in looking at it with this attitude and in recognizing the tremendous social values of this national park system, that we can build an environmental ethic into the society that will prevent these things. It can't be done overnight because many of these people doing this are no longer in the school system. We have that problem, but certainly I am as concerned as you and every member of the committee. We are certainly trying to move it in that direction. That is why I answered your question earlier this morning about whether I changed my policies. I have not changed any policies. What I have tried to do, however, is to instill in our organization a new consciousness, a new awareness and motivation for implementing some of our old programs, including some new ways of implementing them.

Mrs. HANSEN. You will recall Resurrection City gave us some problems.

Mr. HARTZOG. I know. But there are still committees which I appear before where I always carry that information. I still have that with me. I figured that would come up. I have been carrying that for several years physically as well as intellectually.

I think that the question still comes in the context of looking at these areas in a different way. They were not at the Washington Monument simply because it happened to be open space. We offered them other open space that was larger than those grounds. They were there because of the symbolism of that particular piece of ground and it always requires more money to manage symbolism properly.

What I have been up against and what the committee has been up against and what we have all been up against in trying to communicate about the national park system is a look at it of so many square feet of floor space and what is the economic cost-benefit ratio.

Madam Chairman, I know this from examining my budget. They want to know what my building maintenance costs are vis-a-vis GSA or the Smithsonian.

Mrs. HANSEN. Is it true there were more visitations last year to park areas, but that the average person spent less?

Mr. HARTZOG. Yes, there is no question about that. That is a part of it, too. In other words, people are camping whereas before maybe

they stayed in a motel. The gross receipts, actual franchise fees received, and I would have to have this against projections in order to understand it properly.

The actual receipt in 1966 was $1,032,000, $1,153,000 in 1967, $1,321,000 in 1968, $1,429,000 in 1969, and $1,472,000 in 1970. I will have to get those and see how they compare projectionwise. That would seem to indicate they are going up less than $100,000 a year. You are finding spending resistance, there is no question about that.

Mrs. HANSEN. Briefly review for the committee the current status of your concessionaire operations.

Mr. HARTZOG. We have 178 concessions, and they gross about $85 million, and they return to the Treasury that figure of about $1.5 million in franchise fees. They get about $5.6 million in net profits and franchise fees, but before payment of income taxes. About one-third of our concessionaires lost money, and a considerably larger number of them are just marginal operations. They may make a little and lose a little.

Mrs. HANSEN. Is this due to the shortness of the season?

Mr. HARTZOG. That is right. Then we have a few concessionaires, such as the Fred Harvey Co. in Grand Canyon, who make adequate returns on investment. It is becoming a very hazardous operation in these short-term, high-investment concession operations. That is why we have this supplemental on the way over to you asking for money to buy out the possessory interests of the concessionaires in Yellowstone and the Everglades. I am confident that that is just a prelude to buying out the possessory interests of a number of other concessionaires.

You remember we had to buy the physical facilities of the concession in Mount Rainier a number of years ago. That plant there is now Government owned even though it is privately operated.

CURRENT CONCESSIONAIRE FRANCHISE FEES

Mrs. HANSEN. Please insert in the record a schedule of fees currently being charged by concessionaires.

Mr. HARTZOG. Yes, ma'am; individual franchise fees by contract.

(The information follows:)

Schedule of franchise fees charged to concessioners having permits:

Concessioner	*Franchise fees charged, 1970*
Acadia National Park: William Tapley	$200
Amistad National Recreation Area: Rough Canyon Marina, Inc.	100
Bandelier National Monument: L. R. Bertram	578
Bighorn Canyon National Recreation Area:	
Medicine Mountain Sports Unlimited	(1)
Norman Hoffman	100
Black Canyon of the Gunnison National Monument: The Rim House	100
Blue Ridge Parkway:	
Blue Ridge Crafts, Inc.	500
George W. Bryson, Jr.	100
Grace Laffoon	25
Homer Harris	75
Hylton's Livestock Rental and Sales, Inc.	150
Canyonlands National Park:	
Kent Frost	250
Warren G. McClatchey	100
Tag-a-long Tours, Inc.	250

See footnotes at end of table.

Concessioner	*Franchise fees charged, 1970*
Cape Cod National Seashore: Charles W. Silva	1,926
Castillo de San Marcos National Monument: J. Carver Harris	8,265
Colonial National Historical Park: Frank P. Dickinson	[2] 2,738
Coulee Dam National Recreation Area:	
Robert Lee Armistead, Jr	25
Herbert Armstrong	80
Grand Coulee Yacht Club	25
Lyle Humphrey	25
Alfred E. McCoy	5
Willard Pfaffle	25
Win M. Self	10
Curecanti National Recreation Area: The Denver Post	10
DeSoto National Memorial: DeSoto Celebration, Inc	25
Dinosaur National Monument:	
Hatch River Expeditions, Inc	25
Western River Expeditions, Inc	25
Wilkins Transportation Co	484
Fire Island National Seashore: Howard T. Rose Co., Inc	198
Fort Matanzas National Monument: S. W. Jenkins	25
George Washington Birthplace National Monument: Wakefield National Memorial Association	[3]
Glacier National Park:	
B. Ross Luding	387
The Whitefish Clinic, Inc	200
Glacier Bay National Monument: Glacier Bay Airways	[2] 318
Glen Canyon National Recreation Area: D.C. Christensen	100
Golden Spike National Historic Site: Business Enterprises Program	[3]
Grand Canyon National Park: Riordans, Inc	80
Grand Portage National Monument:	
Grand Portage Trading Post Association	50
Sivertson Brothers Fisheries	25
Grand Teton National Park:	
The American Alpine Club	100
George N. Clover	75
Exum Mountain Guide Service	530
Maurice E. Horn, Jr	50
Jackson Hole Mountain Guides, Inc	160
Jackson Hole Ski Corp	50
Arthur E. McCain	600
Kathleen Starratt	750
Teton Trail Rides	430
Great Sand Dunes National Monument: Ernest Briggs	75
Great Smoky Mountains National Park:	
Cades Cove Riding Stables, Inc	722
Floyd E. Cate	2,889
Cherokee Boys Club, Inc	25
McCarters Riding Stables, Inc	1,709
Glen R. McHan	1,676
Theodore J. Muse, Jr	50
Mell Myers, Sr	75
Smokemont Riding Stables, Inc	948
Smoky Mountain Riding Stables, Inc	986
Wolfe Dairies, Inc	25
Isle Royale National Park:	
Ward L. Grosnick	50
Isle Royale Seaplane Service	50
Sivertson Brothers Fisheries	110
Lake Mead Recreation Area: Moccasin Tours and Transportation Inc	[1]
Lehman Caves National Monument: Shirley George Robinson and wife	375
Mammoth Cave National Park: M. E. Nash and Robert McDaniel	3,263

See footnotes at end of table.

Concessioner	*Franchise fees charged, 1970*
National Capital Parks:	
Appliance Fix-It, Inc	[2] 237
Belle Haven Marina, Inc	1,047
Buzzard Point Boatyard Corp	1,020
Julius W. Fletcher	1,200
Frederick and Virginia Swain	240
Thomas C. Long	1,200
North Cascades National Park: Stanton C. Hutson	500
Olympic National Park:	
Henry A. Brown	25
Avon Miller and Hugh Simpson, Jr	60
Ozark National Scenic Riverways: Alley Spring Concession	400
Platt National Park:	
Dooly's Laundry	30
Hick's Service	70
Tribes of the Arbuckle Indian Arts & Crafts Association	5
Earl Sanders	30
Point Reyes National Seashore: Vernon Mendenhall	250
Rocky Mountain National Park: Hubert Cretton	25
Salem Maritime National Historic Site: Edward B. Rushford	657
Sequoia and Kings Canyon National Parks:	
William E. DeCarteret	430
Allen R. Simmons	265
Dick R. Wilson	115
Shadow Mountain National Recreation Area:	
Burton S. Adams	25
William W. Bell	70
Joseph Carpenter	45
The Denver Post	25
John Dillie	25
Alexander G. Duncan	35
Estes Park Trail, Inc	25
Marvin L. Fisher	70
Gala Marina, Inc	25
Glenn R. Moss	90
R. Frank Norton	180
H. J. Pohl and J. R. Steward	100
Ecil A. Scott	25
Shadow Mountain Water Shows, Inc	100
Harley Snyder	90
William K. Steuben	95
Fred L. Young	25
Shenandoah National Park: Potomac Appalachian Trail Club, Inc	5
Shiloh National Military Park: R. D. Shaw and A. B. Phillips	1,730
Sitka National Mounment: The Alaska Native Brotherhood	([3])
Theodore Roosevelt National Military Park: Alvin Tescher	[2] 313
Timpanogos Cave National Monument: Betsy Wagner	1,500
Wright Brothers National Mounment: Manteo Flying Service	20
Total franchise fees, permits	45,801
Schedule of franchise fees charged to concessioners having contracts:	
Acadia National Park: The Acadia Corp	3,951
Amistad National Recreation Area: Marine Recreation, Inc	100
Badlands National Monument: E. N. Nelson	15,868
Bandelier National Monument: Evelyn C. Frey	358
Big Bend National Park:	
National Park Concessions, Inc	8,960
Carter M. Newsome	[2] 349
Bighorn Canyon National Recreation Area: Crow Tribe of Indians of Montana	([3])

See footnotes at end of table.

Concessioner	*Franchise fees charged, 1970*
Blue Ridge Parkway:	
National Park Concessions, Inc	6,475
Northwest Trading Post	[2] 572
Pisgah Inn, Inc	[2] 3,594
Virginia Peaks of Otter	18,130
Bryce Canyon National Park:	
Utah Parks Co	([3])
Jack H. Church	[2] 130
Canyon de Chelly National Monument: Justin's	4,579
Cape Cod National Seashore:	
Edward and Anna Benz	13,296
Edward and Nancy Benz	12,261
Town of Truro	1,004
Cape Hatteras National Seashore:	
Avon Fishing Pier, Inc	457
Cape Hatteras Fishing Pier, Inc	[2] 555
Chicamacomico Enterprises, Inc	1,026
Dick and Daphne O'Neal	[2] 5,485
Carlsband Caverns National Park: Cavern Supply Co., Inc	67,196
Cedar Breaks National Monument: Utah Parks Co	100
Crater Lake National Park: Crater Lake Lodge, Inc	12,046
Death Valley National Monument: National Park Concessions, Inc.	742
Everglades National Park:	
Everglades Park Co., Inc	[2] 26,797
Sammy Hamilton, Jr	2,960
Fire Island National Seashore: Watch Hill Marina, Inc	5,142
Fort McHenry National Monument: Evelyn Hill Corp	1,240
Fort Sumter National Monument: Fort Sumter Tours, Inc	5,816
Glacier National Park:	
Glacier Park Boat Co., Inc	1,461
Glacier Park, Inc	[2] 24,467
Rocky Mountain Outfitters, Inc	491
Glacier Bay National Monument:	
Glacier Bay Lodge, Inc	[2] 2,712
Howard C. Robinson	1,220
Glen Canyon National Recreation Area:	
Bullfrog Marina, Inc	7,753
Canyon Tours, Inc	45,865
Lake Powell Ferry Service	3,135
Fort Lee Co	3,704
Grand Canyon National Park:	
Babbitt Bros. Trading Co	[2] 24,969
Jack H. Church	457
Fred Harvey, Inc	148,416
Samaritan Health Service	[2] 100
Emery C. Kolb	3,084
Utah Parks Co	([4])
Verkamp's, Inc	19,515
Grand Teton National Park:	
Louise M. Bertschy	[2] 3,003
Grand Teton Lodge Co	[2] 4,326
Leek's Lodge	1,035
Signal Mountain Lodge	[2] 6,622
Great Smoky Mountains National Park:	
Great Smoky Mountains National Park: Herrick B. Brown	627
Hawaii Volcanoes National Park: Kilauea Volcano House	18,304

See footnotes at end of table.

Concessioner	*Franchise fees charged, 1970*
Hot Springs National Park:	
Alhambra Bath House, Inc	1,654
Arlington Hotel Co., Inc	3,823
Buckstaff Bath House Co	2,291
DeSoto Hotel and Baths, Inc	719
Samuel W. Fordyce	900
Health Service, Inc	1,355
Hill Wheatley Enterprises	667
Hot Springs Mountain Observatory	1,116
Knights of Pythias	2,032
Lamar Bath House Co	1,815
Leo N. Levi Memorial Hospital	150
Libbey Memorial Physical Medicine Center	3,579
Majestic Hotel Co	1,779
Maurice Bath Co	1,116
National Baptist Bathhouse	1,779
Ozark Bath House Co	1,444
Superior Bath House, Inc	994
L. A. Vaught	1,153
Isle Royale National Park: National Park Concessions, Inc	3,168
Katmai National Monument: Wein Consolidated Airlines	[2] 900
Lake Mead National Recreation Area:	
Cottonwood Cove Corp	5,510
Echo Bay Resort, Inc	6,434
Forrest Enterprises, Inc	9,146
Lake Mead Ferry Service	1,080
Lake Mohave Resort, Inc	9,694
Las Vegas Boat Harbor	[2] 8,992
L. M. Enterprises	6,674
McCulloch Properties (lodge)	689
McCulloch Properties, (marina)	10,325
Willow Beach Resort, Inc	4,157
Glenn G. and Connie Massey	[2] 612
Temple Bar Marina, Inc	4,121
Ray Flaskamper	2,209
Lassen Volcanic National Park: Lassen National Park Co	10,417
Mammoth Cave National Park: National Park Concessions, Inc	14,431
Mesa Verde National Park:	
Emmett and Frances Koppenhafer	126
Mesa Verde Co	10,032
Mount McKinley National Park: Mount McKinley National Park Co., Inc	14,270
Mount Rainier National Park: Rainier National Park Co	44,025
Mount Rushmore National Memorial: Mountain Co., Inc	[2] 64,158
Muir Woods National Monument: John and Gloria Schlette	17,946
Natchez Trace Parkway: C. W. Gary	5,244
National Capital Parks:	
Almours Securities, Inc	[2] 33,788
Edgewater Riding Academy	[2] 2,274
District of Columbia Armory Board	100
Government Services, Inc	84,168
Landmark Services, Inc	13,719
Rock Creek Stables, Inc	2,744
S. G. Leoffler Co	64,410
Super Attractions, Inc	[2] 31,132
Olympic National Park:	
Beckers Ocean Resort, Inc	4,974
Carl and Isabel Hansen	1,148
La Push Ocean Park Inc	1,197
National Park Concessions, Inc	3,783
Oregon Caves National Monument: Oregon Caves Co	6,930
Padre Island National Seashore: Padre Island National Seashore Co	[2] 438

See footnotes at end of table.

Concessioner	*Franchise fees charged, 1970*
Petrified Forest National Park:	
Fred Harvey, Inc	16,297
Rainbow Forest Lodge, Inc	10,872
Price William Forest Park: Albert C. Enders	5,167
Rocky Mountain National Park:	
Paul and William Van Horn	2,115
Rocky Mountain Park Co	[2] 30,355
Sagamore Hill National Historic Site: Evelyn Hill, Inc	[1]
Sanford National Recreation Area: Fritch Fortress, Inc	4,286
Sequoia and Kings Canyon National Parks: Sequoia and Kings Canyon National Parks Co	14,989
Shenandoah National Park: Virginia Sky-Line Co	47,277
Statue of Liberty National Monument:	
Circle Line-Statue of Liberty Ferry, Inc	[2] 67,975
Evelyn Hill, Inc	26,476
Virgin Islands National Park: Caneel Bay Plantation, Inc	[2] 1,794
Whiskeytown National Recreation Area:	
Brandy Creek Marina Corp	[2] 736
H. I. and Dan Froseth	[1]
White Sands National Monument: T. L. and Thelma Womack	7,030
Wind Cave National Park: M. C. Gideon	2,671
Yellowstone National Park:	
Hamilton Stores, Inc	124,123
Livingston Clinic	100
Yellowstone Park Co	[2] 101,039
Yosemite National Park:	
Best's Studio, Inc	8,055
Degnan, Donohoe, Inc	7,506
Dr. Avery Sturm	[2] 3,253
Dr. Charles A. Woessner	150
Yosemite Park and Curry Co	108,592
David, Jack and Martha Vaughn	2,723
David and Jack Vaughn (El Portal)	[1]
Zion National Park:	
Jack H. Church	[2] 77
Utah Parks Co	[4]
Total franchise fees, contracts	1,667,644
Grand total franchise fees, contracts and permits	1,713,445

[1] New contract, franchise fee amount not available.
[2] 1969 franchise fee figures.
[3] No fee.
[4] No franchise fee is to be charged until the net profit exceeds all unrecovered losses suffered by the concessioner.

DECREASE IN SALE OF GOVERNMENT PROPERTY AND PROJECTS

Mrs. HANSEN. In your justifications you indicate that the sale of Government property and products in 1970 amount to $324,258. You estimate in 1971 $35,500 in sales and in 1972, $46,600. What is this decrease due to?

Mr. NORWOOD. In 1970 we had several items up for surplus sale. We don't expect to have that kind of surplus in 1971 and 1972.

Mr. HARTZOG. What do they cover?

Mr. NORWOOD. We had equipment that became surplus in 1970.

Mrs. HANSEN. Such as?

Mr. NORWOOD. Such as motor vehicles, and we were going into GSA operations all over the country. I don't remember if there was any other.

Mr. HARTZOG. There is one other thing that may have some impact. I would imagine it would be minor; that is, in connection with these living history programs. Congress last year authorized us to sell those products and reimburse the appropriations. We were running into difficulties—we shared this with you 2 or 3 years ago—over the living history farms especially, in which the pig crop and eggs, and that type of things—we were having to dispose of them under GSA regulations. They are perishable commodities and it was chaotic. Now we have a mechanism for selling them and reimbursing the appropriations.

I can give you some idea of what this was but—Mr. Dickensen, how much would that have been in your operation? You had an auction of cattle and that kind of thing.

I think he got one thousand or so dollars. This will no longer happen. We sell those products and the receipts reimburse appropriations.

Mr. DICKENSEN. Not a very significant item, Mr. Director. As I recall, our total auction income was about $800 or $900.

Mr. HARTZOG. Let's give the committee a breakdown of what the 1970 actual items were and what the 1971 are expected to be.

Mr. NORWOOD. These are special one-time items.

Mr. HARTZOG. We had quite a vehicle sale in the District of Columbia for confiscated and abandoned property.

(The information follows:)

DECREASE IN DEPOSITS TO THE TREASURY FOR SALE OF SURPLUS PROPERTY

The largest single item included in the 1970 fiscal year amount of $324,258, Sale of Government property and products, was the sale of timber in North Cascades National Park. There were two contracts issued by the U.S. Forest Service prior to the transfer of the park area to the National Park Service in the 1970 fiscal year. These contracts amounted to $290,512 which was deposited in the general fund receipts. The contracts have expired and there will be no further large scale cutting of timber.

The receipts for sale of Government property and products during fiscal 1971 are estimated at $35,500.

VANDALISM AT WASHINGTON MONUMENT GROUNDS

Mr. GALIFIANAKIS. Was the $250,000 item used in the record this morning?

Mr. HARTZOG. We didn't itemize it.

Mr. GALIFIANAKIS. What does it consist of? Does it mean pick up paper or what?

Mr. HARTZOG. It is to repair the benches around the Washington Monument. Every bench around the Washington Monument was destroyed except one.

The roofs on some of the kiosks were torn off. One of our temporary utility buildings was totally demolished and that includes the foundation. No, that is one of the pit toilets we had burned up. It is that kind of thing.

Mr. GALIFIANAKIS. Are apprehensions or arrests made relating to a particular one?

Mr. DICKENSEN. Twenty-five arrests.

Mr. GALIFIANAKIS. Related to vandalism?

Mr. DICKENSEN. Yes, sir, and breaking police lines and other illegal acts.

Mr. GALIFIANAKIS. How much restitution is there? Not very much?
Mr. DICKENSEN. I don't know.
Mr. HARTZOG. The overtime of the Park Police and trash pickup make up the balance of the estimate.
Mr. WYATT. Resodding?
Mr. HARTZOG. Some resodding is absolutely going to be necessary.

MANAGEMENT AND PROTECTION

Mrs. HANSEN. Please insert pages 4 through 102 of the justifications in the record at this point.
(The pages follow:)

Management and Protection

Appropriation 1970	$49,100,000	
Supplemental appropriation, 1970	50,000	
Second supplemental appropriation, 1970	4,456,000	
Total appropriation, 1970		$53,606,000
Transferred from other accounts (pay costs)		+377,775
Transferred to "Operating Expenses, Public Buildings Service," General Services Administration		-90,673
Total available, 1970		53,893,102
Appropriation, 1971	57,990,000	
Supplemental appropriation, 1971	2,155,000	
Pay cost supplemental	3,425,000	
Total appropriation, 1971		63,570,000
Transferred to "Operating Expenses, Public Buildings Service," General Services Administration		-98,200
Total available, 1971		63,471,800

Summary of Increases and Decreases, 1972

	Base for 1972	Increase 1972
Management of park and other areas:		
To provide a portion of the need for operations at acceptable standards of new and recently authorized areas (those placed in operation since 1/1/60)		$+985,800
Operation of new facilities (those placed in operation in the current fiscal year or proposed to be placed in operation in the budget year)	....	+47,800
New programs in parks	....	+125,000
To provide a portion of the need for operations at acceptable standards in areas operating prior to 1/1/60		+3,126,100
Nonrecurring payment to the Plymouth-Provincetown Celebration Commission	$100,000	-100,000
Savings in public relations program		-130,500

Summary of Increases and Decreases, 1972

	Base for 1972	Increase 1972	
Management of park and other areas (continued):			
Savings in paper work management		-170,000	
For payment to the Bureau of Employees' Compensation, Department of Labor	319,300	+46,500	
U.S. share of operating expenses, Roosevelt Campobello International Park	88,000	+37,000	
			3,967,700
Forestry and fire control:			
To provide estimated cost of fire suppression and rehabilitation of burned areas	100,000	+1,000,000	
Transfer the funding of tree preservation work from "Forestry and fire control" activity of "Management and Protection" appropriation to "Buildings, utilities, and other facilities" activity, "Maintenance and Rehabilitation" appropriation	120,000	-120,000	
			880,000
Park and recreation programs:			
To accelerate the master planning program necessary to support accelerated wilderness studies	1,791,700	+50,000	
To accelerate the Wilderness Act studies	313,500	+55,000	
To continue park and recreation planning assistance in the Missouri River Basin formerly funded with Bureau of Reclamation funds	....	+104,000	
Transfer of the Archeological investigations and salvage subactivity from "Park and Recreation Programs" activity, "Management and Protection" appropriation	875,000	-875,000	
Savings in public relations program		-19,500	
Nonrecurring Cherokee Strip study		-30,000	
			-715,500
Net Increase, 1972			4,132,200
Budget estimate, 1972			67,604,000

MANAGEMENT AND PROTECTION

Analysis by Activity

Activity	Fiscal Year 1970 Amount Available	Fiscal Year 1971 Total Appropriation	Pay Cost Supplemental	Transfers	Amount Available
1. Management of park and other areas	$45,866,560	$52,316,600	$3,144,700	$-98,200	$55,363,100
2. Forestry and fire control.....	3,066,005	2,347,300	86,900	--	2,434,200
3. Park and recreation programs.....	4,845,800	5,481,100	193,400		5,674,500
Unobligated balance lapsing.....	114,737	--	--	--	--
Total.....	53,893,102	60,145,000	3,425,000	-98,200	63,471,800

Activity	F.Y. 1970 Amount Available	F.Y. 1971 Amount Available	F.Y. 1972 Estimate	Increase (+) or Decrease (-) 1972 compared with 1971	Page Reference
1. Management of park and other areas	$45,866,560	$55,363,100	$59,330,800	$+3,967,700	7
2. Forestry and fire control.....	3,066,005	2,434,200	3,314,200	+880,000	80
3. Park and recreation programs.....	4,845,800	5,674,500	4,959,000	-715,500	84
Unobligated balance lapsing.....	114,737	--	--	--	
Total.....	53,893,102	63,471,800	67,604,000	+4,132,200	

1. Management of Park and Other Areas

Analysis by Subactivities

Subactivity	F.Y. 1970 Amount Available	F.Y. 1971 Amount Available	F.Y. 1972 Estimate	Increase (+) or Decrease (-) 1972 compared with 1971
(a) National parks, monuments, etc.	$44,493,681	$53,761,900	$57,646,100	+3,884,200
(b) Concessions management.....	301,522	408,800	408,800	--
(c) Informational publications.....	751,200	785,100	785,100	--
(d) Employees' compensation fund payments.....	232,157	319,300	365,800	+46,500
(e) Roosevelt Campobello International Park Commission.....	88,000	88,000	125,000	+37,000
Total.....	45,866,560	55,363,100	59,330,800	+3,967,700

1. Management of Park and Other Areas

The estimates contemplates that 281 park areas, located in 46 States, the District of Columbia, Puerto Rico, and the Virgin Islands, with a total of about 28.5 million acres in Government ownership will be administered during the 1972 fiscal year. It is estimated that there will be 183.9 million visits to the National Park System in fiscal 1972. Fulfillment of the Service's responsibility for managing these resources and meeting the needs of park visitors requires adequate staffs of uniformed personnel--rangers, naturalists, historians, guards, and guides-- as well as adequate numbers of management and administrative employees. These park management, protection and interpretive functions are financed under this subactivity.

(a) National parks, monuments, etc: Fiscal year 1971, $53,761,900; fiscal year 1972, $57,646,100; increase, $3,884,200. The increase consists of:

	Increase (+) or Decrease (-) Amount	Positions	Total Program	Total Positions	Explanation
(1)	$ +985,800	+40			To provide a portion of the need for operations at acceptable standards of new and recently authorized areas (those placed in operation since 1/1/60).
(2)	+47,800	+2	47,800	2	Operation of new facilities (those placed in operation in the current fiscal year or proposed to be placed in operation in the budget year).
(3)	+125,000	--	125,000	--	New programs in parks.
(4)	+3,126,100	+98			To provide a portion of the need for operations at acceptable standards in areas operating prior to 1/1/60.
(5)	-100,000	--	--	--	Nonrecurring payment to the Plymouth-Provincetown Celebration Commission.
(6)	-130,500	-10	347,400	18	Savings in public relations programs.
(7)	-170,000	--			Savings in paper work management.
	+3,884,200	+130			

Cost Factors Involved in Increases

(1) Forty permanent positions at an average annual rate of $9,800, $392,000; 33.0 man-years other than permanent employment at an average annual rate

of $7,500, $247,500; to provide full-year salaries of positions partially financed in current appropriation, $60,000; supplies, materials, equipment, contractual services, personnel benefits, uniform allowances and other expenses, $286,300.

(2) Two permanent positions at an average annual rate of $10,000, $20,000; 0.3 man-years other than permanent employment, $2,000; to provide full-year salaries of positions partially financed in current appropriation, $13,600; supplies, materials, equipment, personnel benefits, uniform allowances, and other expenses, $12,200.

(3) Two man-years other than permanent employment at an average annual rate of $6,800, $13,600; supplies, materials, equipment, personnel benefits, and other expenses, $11,400; contractual services, $100,000.

(4) Ninety-eight permanent positions at an average annual rate of $9,800, $960,400; 53.3 man-years other than permanent employment at an average annual rate of $7,500, $399,800; to provide full-year salaries of positions partially financed in current appropriation, $350,000; supplies, material, equipment, contractual services, personnel benefits, and other expenses, $1,415,900.

To provide a portion of the need for operations at acceptable standards of new and recently authorized areas (those placed in operation since 1/1/60)

Need for increase: This item provides basic initial staffing and funding for five new areas and a portion of the additional funds needed for areas authorized since January 1, 1960. The increase by appropriation is as follows:

Management and protection	$ 985,800
Maintenance and rehabilitation of physical facilities	791,300
Total	1,777,100

The justification for this increase in both appropriations is contained in this section on "Management and protection" with appropriation cross-referencing in the "Maintenance and rehabilitation" section of the estimate.

New areas.

Andersonville National Historic Site, Georgia

This new area was authorized by Public Law 91-465, approved October 16, 1970. The purpose of this historic site is to preserve an historic resource so as to be able to provide an understanding of the overall Prisoner-of-war story of the Civil War, to interpret the role of Prisoner-of-war camps in history, to commemorate the sacrifice of Americans who lost their lives in such camps and to preserve the monuments located within the site. Staff and fund requirements for activation and initial operation are given on the following page.

Fund Requirements

Management and protection	$ 51,000
Maintenance and rehabilitation	77,000
Total	128,000

Staffing Requirements

Positions	Management and Protection	Maintenance and Rehabilitation	Total
Park Manager (Superintendent), GS-11	1	-	1
Clerk-Stenographer, GS-4	1	-	1
Park Historian, GS-9	1	-	1
Historian, GS-7	1	-	1
Park Ranger, GS-7	1	-	1
Park Technician, IGS-4 (Seasonal)	0.3	-	0.3
Foreman II, Ungr.	-	1	1
Maintenanceman, Ungr.	-	1	1
Maintenance Worker, Ungr.	-	1	1
Laborer, Ungr.	-	4	4
Laborer, Ungr. (Seasonal)	-	0.5	0.5
Total	5.3	7.5	12.8

(12 permanent and 0.8 M.Y. seasonal)

The proposed staff of 12 permanent positions and 0.8 temporary man years is the minimum required for the first year of operation in order to provide for the management, protection, interpretation and maintenance of this historic site which contains an active national cemetery.

The historic site is comprised of approximately 495 acres of land, a caretaker's residence, information office and maintenance structure, masonry boundary walls, paved walks and roadways, military earthworks, large masonry rostrum, tombstones, innumerable monuments and masonry markers which locate the corners of the old prison structure. These facilities and the cemetery will require immediate maintenance and protection when the National Park Service takes it over from the Department of Army on July 1, 1971.

Apostle Islands National Lakeshore, Wisconsin

Apostle Islands National Lakeshore was authorized by Public Law 91-424, approved September 26, 1970.

The purpose of the Lakeshore is to conserve and develop the Islands, shoreline beaches, sandpits and other natural features which make up a significant portion of the diminishing archipelago environments of the Great Lakes region. These possess high values as examples of unspoiled areas having great natural beauty.

Fund Requirements

Management and protection	$ 99,000
Maintenance and rehabilitation	26,500
Total	125,500

Staffing Requirements

Positions	Management and Protection	Maintenance and Rehabilitation	Total
Park Manager (Superintendent), GS-12	1	-	1
Administrative Officer, GS-9	1	-	1
Secretary, GS-5	1	-	1
Park Ranger, GS-9	2	-	2
Park Ranger, GS-7	1	-	1
Fire Control Aid, IGS-3 (Seasonal)	1	-	1
Maintenanceman, Ungr.	-	1	1
Mechanic, Ungr.	-	1	1
Laborer, Ungr. (Seasonal)	-	1	1
Total	7	3	10

(8 permanent and 2 M.Y. seasonal)

The proposed staff, eight permanent positions and 2 man-years of seasonal employment is the minimum required for the first year to provide for the management, protection, maintenance and operation of the Lakeshore and the facilities thereon, and to furnish visitor services on the Islands and on approximately 10 miles of shoreline along the Peninsula.

The Lakeshore is comprised of 20 islands totalling approximately 42,000 acres. Of this area, 24,700 acres of private land will be acquired in fiscal 1972. The balance, 17,300 acres, is in public ownership and will be subject to acquisition by transfer. Facilities on the land being acquired consist of a lighthouse, six residences with attendant utility systems, approximately 10 miles of unimproved road, three piers, one picnic area and other natural features such as caves, arches, cliffs, sloughs and bays. The area is heavily forested which requires the prompt implementation of a forest and resource management and maintenance program.

Fort Point National Historic Site, California

Fort Point National Historic Site was authorized by Public Law 91-457 approved October 16, 1970.

The purpose of the Fort Point National Historic Site is to conserve and protect a priceless historical resource which is an integral part of the Presidio, one of this Nation's most important active military installations. The Fort was constructed by the Army between the years 1854 and 1861 for the purpose of guarding the entrance to San Francisco Bay. The area includes the Fort, approximately 33 acres of land and approximately 63 acres of submerged land adjacent to the fort. The proposed staff of five permanent positions and 2.3 man-year temporary positions is the minimum required for the first year to provide for management, protection, and maintenance of the historic resource and to furnish visitor services at the site.

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Fund Requirements

Management and protection.	$ 58,800
Maintenance and rehabilitation	25,000
Total	83,800

Staffing Requirements

Positions	Management and Protection	Maintenance and Rehabilitation	Total
Management Assistant, GS-12	1	-	1
Administrative Officer, GS-9	1	-	1
Historian, GS-9	1	-	1
Information-Receptionist, GS-4	1	-	1
Information-Receptionist, IGS-3 (Seasonal)	.8	-	0.8
Park Guide, IGS-4 (Seasonal)	.5	-	0.5
Maintenanceman, Ungr.	-	1	1
Laborer, Ungr. (Seasonal)	-	1	1
Total	5.3	2	7.3

(5 permanent, and 2.3 M.Y. seasonal)

Facilities on the land comprising the historic site include the main fort structure, extensive landscape plantings and walks. It is planned to restore the main fort structure and construct a parking area, interpretive exhibits and trails, administrative facilities, picnic and rest areas, and grounds improvements.

Sleeping Bear Dunes National Lakeshore, Michigan

Sleeping Bear Dunes National Lakeshore was authorized by Public Law 91-479, approved October 21, 1970.

The purpose of the National Lakeshore is to conserve the natural shoreline areas for their scenic, scientific and recreation values. The Sleeping Bear region represents an outstanding scientific exhibit. Geologically, the region unfolds the story of continental glaciation and maturation of a shoreline that is very young in geologic time. The compact grouping of glacial land forms are excellent examples of their kind that are easily observed and understood. The proposed staff of five permanent positions and 3.6 man-years temporary positions is the minimum required for the first year to provide for the management, protection, maintenance and operation of the lakeshore and the facilities located thereon and to furnish visitor services in an area comprised of 77,000 acres of land and inland water surface.

Fund Requirements

Management and protection.	$ 74,000
Maintenance and rehabilitation	15,000
Total	89,000

Staffing Requirements

Positions	Management and Protection	Maintenance and Rehabilitation	Total
Park Manager (Superintendent), GS-12	1	-	1
Administrative Officer, GS-7	1	-	1
Secretary, GS-5	1	-	1
Supervisory Park Ranger, GS-9	1	-	1
Park Naturalist, GS-9	1	-	1
Fire Control Aid, IGS-3 (Seasonal)	2	-	2
Lifeguards, IGS-4 (Seasonal)	0.6	-	0.6
Laborer, Ungr. (Seasonal)	-	1	1
Total	7.6	1	8.6

(5 permanent and 3.6 M.Y. seasonal)

In fiscal 1972, 23,471 acres of land will be acquired. Facilities on this land consist of a lighthouse, a life boat station and attendent storage buildings, three piers, 10 residences with attendent utility systems, approximately two miles of unimproved road, one campground, one picnic area and other natural features and resources such as beaches, high bluffs, morainal plateaus, mountainous sand dunes, interlobate moraines, embayments, lakes and a glacial drainage canal. The area is forested which requires the prompt implementation of a forest and resource management and maintenance program.

St. Croix National Scenic Riverway, Minnesota and Wisconsin

The St. Croix National Scenic Riverway was authorized by Public Law 90-542, approved October 2, 1968.

The St. Croix National Scenic Riverway will preserve selected portions of the St. Croix and Namekagon Rivers. The proposed staff of five positions is the minimum required for the first year to provide for management, protection and maintenance of the area.

By fiscal 1972, approximately 33,636 acres are programmed to be acquired along a 200 mile river area. This acquisition will include a minimum of 40 buildings. Those buildings purchased outright must be protected from vandalism and deterioration until sale or removal. The remainder (number unknown until purchases are consummated) will remain under a use and occupancy reservation.

Supervision of these properties for adherence to the reservation will be needed. Limited development easements will also be acquired. Staffing is necessary to patrol these easement areas to determine that regulations are adhered to. For example, garbage should be removed and there should be no commercial activities, no trailers, no unauthorized tree cutting, and no camping and picnicking in undesignated sites.

Fund Requirements

Management and protection	$ 50,200
Maintenance and rehabilitation	23,500
Total	73,700

Staffing Requirements

Positions	Management and Protection	Maintenance and Rehabilitation	Total
Superintendent, GS-11	1	-	1
Supervisory Pk Ranger, GS-9	2	-	2
Caretaker	-	1	1
Clerk-Typist, GS-4	1	-	1
Laborer (Seasonal)	-	1.1	1.1
Total	4	2.1	6.1

(5 permanent and 1.1 M.Y. seasonal)

Recently Authorized Areas.

The estimate also includes $1,277,100 to meet a portion of the requirements of authorized areas placed in operation since January 1, 1960. Amounts by appropriation follow:

Management and protection.	$ 652,800
Maintenance and rehabilitation	624,300
Total	1,277,100

When a new area becomes a part of the National Park System, the first year staffing and related funding are sufficient only to get the area started. This requires limited staffing because all lands have not been acquired and facilities, roads and trails have not been constructed. When new facilities become available, there is an attendant cost for operating these new facilities, be it a new swimming beach, boat ramp, visitor center, interpretive facility, additional roads and trails, campgrounds, picnic areas, entrance or campground stations or a new bathhouse. It is necessary, therefore, to complement the initial staff to administer the lands and new facilities, serve the visitors and provide for related management and operating needs.

Another need is to provide full year funding for positions previously budgeted, but for which only partial funding was previously provided and to provide for seasonal staffing.

There is a similar continuing need for maintenance and rehabilitation funding.

A list of areas added to the National Park System since January 1, 1960 for which additional funds are provided in this estimate follows:

Alibates Flint Quarries and Texas Panhandle Pueblo Culture National Monument, Texas

Agate Fossil Beds National Monument, Nebraska

Allegheny Portage Railroad National Historic Site, Pennsylvania

Amistad National Recreation Area, Texas

Andersonville National Historic Site, Georgia

Appalachian Trail

Apostle Islands National Lakeshore, Wisconsin

Arbuckle National Recreation Area, Oklahoma

Arkansas Post National Memorial, Arkansas

Assateague Island National Seashore, Maryland and Virginia

Bent's Old Fort National Historic Site, Colorado

Bighorn Canyon National Recreation Area, Montana and Wyoming

Biscayne National Monument, Florida

Buck Island Reef National Monument, Virgin Islands

Canyonlands National Park, Utah

Cape Cod National Seashore, Massachusetts

Cape Lookout National Seashore, North Carolina

Carl Sandburg Home National Historic Site, North Carolina

Chamizal National Memorial, Texas

City of Refuge National Historical Park, Hawaii

Curecanti National Recreation Area, Colorado

Delaware Water Gap National Recreation Area, New Jersey and Pennsylvania

Eisenhower National Historic Site, Pennsylvania

Fire Island National Seashore, New York

Florissant Fossil Beds National Monument, Colorado

Fort Bowie National Historic Site, Arizona

Fort Davis National Historic Site, Texas

Fort Larned National Historic Site, Kansas

Fort Smith National Historic Site, Arkansas

Fort Point National Historic Site, California

Fort Union Trading Post National Historic Site, Montana and North Dakota

Frederick Douglass Home, District of Columbia

George Rogers Clark National Historical Park, Indiana

Golden Spike National Historic Site, Utah

Guadalupe Mountains National Park, Texas

Hamilton Grange National Memorial, New York

Herbert Hoover National Historic Site, Iowa

Hubbell Trading Post National Historic Site, Arizona

Indiana Dunes National Lakeshore, Indiana

John Fitzgerald Kennedy National Historic Site, Massachusetts

John Muir National Historic Site, California

Lake Chelan National Recreation Area, Washington

Lincoln Boyhood National Memorial, Indiana

Lyndon B. Johnson National Historic Site, Texas

Marble Canyon National Monument, Arizona

Minute Man National Historical Park, Massachusetts

National Visitor Center, District of Columbia

Nez Perce National Historical Park, Idaho

North Cascades National Park, Washington

Ozark National Scenic Riverways, Missouri

Padre Island National Seashore, Texas

Pea Ridge National Military Park, Arkansas

Pecos National Monument, New Mexico

Pictured Rocks National Lakeshore, Michigan

Point Reyes National Seashore, California

Redwood National Park, California

Roger Williams National Memorial, Rhode Island

Ross Lake National Recreation Area, Washington

Russell Cave National Monument, Alabama

Sagamore Hill National Historic Site, New York

Saint Croix Island National Monument, Maine

Saint Croix National Scenic Riverway, Minnesota and Wisconsin

Saint-Gaudens National Historic Site, New Hampshire

Saint Thomas National Historic Site, Virgin Islands

Sanford National Recreation Area, Texas

San Juan Island National Historical Park, Washington

Saugus Iron Works National Historic Site, Massachusetts

Sleeping Bear Dunes National Lakeshore, Michigan

Theodore Roosevelt Birthplace National Historic Site, New York

Whiskeytown-Shasta-Trinity National Recreation Area, California

William Howard Taft National Historic Site, Ohio

Wilson's Creek Battlefield National Park, Mississippi

Wolf Trap Farm Park, Virginia

Operation of new facilities (those placed in operation in the current fiscal year or proposed to be placed in operation in the budget year)

Need for increase: This estimate provides an increase in the amount of $159,700 for operation of new facilities. The increase by appropriation is as follows:

Management and protection.	$ 47,800
Maintenance and rehabilitation of physical facilities.	111,900
Total	159,700

The justification for the increase in both appropriations is contained in this section on "Management and protection" with appropriate cross-referencing in the "Maintenance and rehabilitation" section.

The construction of a new facility creates a problem of protection or maintenance or both. A new building is an excellent example, particularly if it has been designed for visitor use. Once a new facility is opened to public use, the Service is obligated to maintain the structure and provide the staff to serve the visitors who make use of the facility. This is particularly true of a visitor center or museum. The following areas and facilities are involved in this proposed increase:

Area, Facility and Date to be Placed in Operation	Management and Protection	Maintenance and Rehabilitation
Jewel Cave National Monument	$17,200	$22,600
Visitor center, crafts center, parking area, sidewalks, elevator, new trail, landing and stairway (8/1/70)		
Pipestone National Monument		16,400

American Indian Craft center seven day week operation (8/1/70)		
Grand Canyon National Park		$6,500
To provide for temporary operation of new sewage disposal plant during heavy season use when extended hours of operation are necessary (8/1/70)		
Independence National Historical Park		19,400
Completion and furnishing of second floor of Independence Hall. Seven day week operation. Janitorial services needed (11/1/71)		
Completion and furnishing of old city hall. Seven day week operation, 12 hours per day. Janitorial services needed (1/1/72)		
National Capital Parks - East	$8,400	
Certain rooms of the Frederick Douglass Home will be open to public viewing and interpretation. Work to start in October 1970 (1/1/72)		
Wolf Trap Farm Park	22,200	47,000
Filene Center for the Performing Arts. Work will be completed in fiscal 1971 to place portions of the facility in operation. Services of a maintenance man and laborer required. Also includes supplies, materials and equipment rental (8/1/71)		
Total	47,800	111,900

New Programs in Parks

Need for increase: This estimate provides additional funds in the amount of $125,000 for two new park programs. The increase by appropriation follows:

Management and protection	$125,000
Maintenance and rehabilitation of physical facilities.	50,000
Total	175,000

The justification for the increase in both appropriations is contained in this section on "Management and protection" with appropriate cross-referencing in the "Maintenance and rehabilitation" section.

Bear Management, Yellowstone National Park.

The estimate includes $75,000 of which $25,000 is in "Management and protection" and $50,000 is in the "Maintenance and rehabilitation", appropriation.

Bears, both Grizzly and Black, are becoming an increasing problem for park management. As visitation increases, (and this is expected to be substantial during the Centennial Year), so does the degree of hazard increase. Yet, bears are a part of the ecology of Yellowstone. The dilemma is simply, how can park visitors enjoy the natural wonders of this National Park and at the same time be protected from its wildlife, and vice versa.

The increase will provide additional seasonal ranger personnel to scout for the presence of dangerous wildlife; to notify campers of any animal hazards in the area; to take prompt preventive action and to prepare for the transplanting of hazardous animals. Other personnel will be used to operate and manage sanitary land fills and incinerators. Additional land fill areas will be constructed and equipment and supplies needed in their operation will be purchased.

Fund Requirements

Management and protection

Seasonal Rangers (6) for four months	$17,600
Transportation costs	3,200
Supplies and materials (Drugs, traps, firearms.)	1,500
Rental of helicopters for air transport	2,700
Subtotal	25,000

Maintenance and rehabilitation of physical facilities

Services of personnel to operate and manage sanitary land fills (dumps)	8,000
Services of personnel to operate incinerators on an overtime basis. This is necessary to collect and burn refuse after the evening meal	2,600
Cost of constructing an additional sanitary land fill needed for the proper disposal of refuse	15,500
Cost of equipment rental, equipment operation, gas, oil, amortization, etc.	7,800
Supplies and materials necessary to support refuse disposal operations, including the erection of approximately 2,000 feet of fencing	16,100
Subtotal	50,000
Total	75,000

Transportation of Visitors, Yosemite National Park.

An additional amount of $100,000 is required to fund this program for the entire year in fiscal 1972.

The program was initiated by the park concessioner in July 1970 at its expense. A supplemental appropriation for $300,000 was provided in fiscal 1971 to continue the program.

As a direct consequence of increasingly heavy auto traffic, many of the characteristics and qualities that have made Yosemite Valley famous as a place of outstanding natural beauty and serenity have deteriorated. Direct action to control and regulate the private automobile jamming into the Valley is essential to avoid further degradation of the scene and impairment of the Valley environment.

The public interest was better served through prohibiting use of the private automobile in the eastern part of Yosemite Valley and offering access and movement by a free public transit system from a convenient, nearby point. Closing of several miles of road system to all but busses and cyclists has been successful from the standpoint of management and the visitor. For example, the reduction of automobile movement has reduced the pollution from the exhaust systems which mixed with the campground smoke created a smoglike condition. The success of the program has been attested to by many visitors. These paragraphs from a typical letter received, expresses well the visitor's acceptance of the program.

"I was in Yosemite Valley a few days ago for the first time in three years. The Valley has changed, in my opinion from hell to heaven during the period. I'll never forget the old Valley with the smog, roar of motorcycles, unbelievable traffic jams in Stoneman's Meadow after the firefall, and the pathetic conditions of the campgrounds.

"But this year's Yosemite seems to be approaching what a park should be. My wife and I rode a bicycle around the 'closed' section of the Valley, and it was one of the biggest thrills I've had in the parks in years.

"The air was fresh, there was no noise, people smiled and waved as we passed, and the scenery (almost forgotten in the past) was magnificient."

This estimate provides for continuing the agreement executed during fiscal 1971 for transit services with the park concessioner, whose contract provides the preferential right to furnish transportation services within the park. The Park Service statement of requirements for appropriate transportation provides that the service be frequent, that it serve all major facilities and points of interest, that it extend to a full 24 hours of operation daily, or as may be needed in accordance with demand, that the bus units be attractive, clean, quiet, and that the service be offered free to park visitors.

To provide a portion of the need for operations at acceptable standards in areas operating prior to 1/1/60

Need for increase: Standards have been developed which define acceptable levels for operating parks in the System. Based on these standards, the Park Superintendents, working with their Regional Director, determine the funding and staffing necessary for acceptable levels of operation.

This estimate includes $5,724,400 to meet a portion of these operations and maintenance needs in 207 older, established areas (those operating prior to January 1, 1960). The amount of increase for this purpose is divided between the two appropriations as follows:

Management and protection.	$3,126,100
Maintenance and rehabilitation of physical facilities.	2,598,300
Total	5,724,400

The justification for the increase is contained in this section on "Management and protection" with a cross-reference in the "Maintenance and rehabilitation" section.

A stepped-up program of law enforcement is necessary to meet problems arising from the visitation of areas in the National Park System by criminals, narcotic venders and users who have discovered a supposed sanctuary in areas throughout the System. Interference with the enjoyment and beneficial use of the parks by legitimate visitors is not uncommon; and the personal injury and property damage by intentional criminal acts are increasing.

The demonstrations and confrontations in the urban environment are now spilling over into the large natural Federal reservations. The news media has given wide publicity to the unfortunate situation at Yosemite National Park, California during the last 4th of July weekend which involved some 500 to 800 young people in a rock-throwing, bottle-throwing melee at Stoneman Meadows. Park authorities were forced to seek help from law enforcement officials in surrounding communities to restore order and protect law-abiding visitors.

Of the 174 arrests made in Yosemite Valley between July 2 and July 5, a total of 212 criminal charges were filed, of which 67 were felony charges and 145 were misdemeanors. Of these, some 37 involved narcotics violations (the largest single category of arrests); while others ranged from drunkenness (31), to assault of Federal officials and possession of explosives and dangerous weapons. Although six Park Rangers sustained minor injuries during the affair, the only serious reported injury was suffered by a sheriff at the hands of the crowd.

Protection activities also include campground patrols; boundary patrols with poaching and adverse use of government property through dumping, cutting of timber, pollution and grazing; visitor control in heavy use areas to protect vegetative area and other natural features; accident investigation and assistance to the visitor to prevent accidents; and fire presuppression. These are some of the activities for which additional funds are needed to provide the type of protection that park areas must have to preserve their resources and provide for appropriate visitor use.

Communication networks, moreover, become important at widely spread out areas such as those in Alaska, and in many of our water oriented areas and parkways whose extended length makes instant communication necessary for law enforcement activities and visitor safety.

Visitor use patterns in the parks have changed to a considerable extent over the years. With greatly improved transportation systems, more miles of high speed highways, more automobiles, more leisure time, more people traveling, and more emphasis on the out of doors, more publicity about the park areas, and more camping, the operating seasons of many areas have been extended and quite a few former seasonal parks now have active year-long programs. For example, with the advent of the snowmobile, increased skiing activity and visitor interest, areas such as Acadia, Bryce Canyon, Yellowstone, Grand Teton, Yosemite and Mount Rainier are experiencing increasing winter use with the related need to provide services for these visitors. Adequate control of over-snow vehicles must be insured to protect the visitor should he have an accident or become lost; to provide routes to keep him away from danger areas such as hot pools, avalanche areas and cliffs; and to reduce noise and other attendant pollution problems.

The Service's safety program is presently being formulated and executed by a staff consisting of a Chief Safety Officer and a Safety Management Assistant in the Washington Office, a Safety Engineer in each of the Eastern and Western Service Centers, and a safety staff in the National Capital Parks. In addi-

tion to the above staffing, there is a full-time secretary in each of the regions, with the exception of the Pacific Northwest Region which is presently being handled by the secretary in the Western Regional Office. There is an urgent need for a full-time professional safety position in each of the six regions. This position will be located in a large park in each region, one whose accident experience indicates the greatest need, and will service the entire region in safety matters. In addition, there is a need for the establishment of a secretarial position in the Pacific Northwest Regional Office for safety work.

Fund Requirements

Salary expenses	$ 99,000
Travel	18,000
Other expenses (Safety materials, supplies)	4,500
Total	121,500

Staffing Requirements

Safety Officer, GS-12	Independence National Historical Park
Safety Officer, GS-12	Great Smoky Mountains National Park
Safety Officer, GS-12	Yellowstone National Park
Safety Officer, GS-12	Grand Canyon National Park
Safety Officer, GS-12	Yosemite National Park
Safety Officer, GS-12	Olympic National Park
Safety Clerk, GS-6	Pacific Northwest Regional Office

The Service's safety program encompasses the prevention of losses, accidental injuries and damage to property and equipment, involving employees of the Service, employees of the many concessioners and construction contractors and the more than 166,900,000 people who visited the National Park Service areas during 1970. While we have been successful in reducing our losses in some of these areas, we have not been able to implement a fully effective safety program throughout the Service, especially in the areas of visitor safety, with the present limited staffing.

Experience has shown that sound preventive maintenance programs are a more economical and practical way of protecting the government investment by assuring maximum facility life. As examples:

If resources available will not permit the periodic resealing of bituminous roads, deterioration is most rapid. Water seeps through the surface, percolating down into the road base material. When this occurs, road shoulders ravel and become soft and the surface will eventually break up. Alternate freezing and thawing of the road base and surface materials will hasten the destruction of the road.

In order to assure maximum road life, the Department of Transportation now recommends road resealing with asphalt and chips on a cycle of every six to ten years. Certain State Highway Departments now reseal their roads on a three to eight year cycle, depending on the type of construction, area topography and climatic conditions. The National Park Service maintenance and rehabilitation programs are presently funded at a level that permits resealing of park roads on an average of once every 18 years. It is, therefore, apparent that the program is far below the standards set by other authorities in the field of

maintenance. The reconstruction of a road will cost in the neighborhood of $25,000 per mile which is many times the cost of resealing road surfaces.

Visitor centers and other public use buildings could be constructed a decade ago at an average cost of $14 to $28 per square foot of floor space depending on geographic location, materials and type of design. Today, this cost is more than 50 percent greater. The present shortage of resources required to mount an adequate maintenance effort continues to cause a steady buildup in the backlog of maintenance and repair work which is urgently required to at least stabilize park facilities.

Still another aspect of the maintenance program continues to deserve special attention. That is the maintenance of natural resources and the preservation of the prehistoric and historic structures, ruins and grounds. Resources such as the Pueblos of Chaco Canyon are fragile and readily damaged by the forces of nature and the acts of man. The projects described below serve to illustrate three of the varied projects for which these funds will be utilized to achieve a stated objective.

$40,000 will be used to re-point and waterproof the District of Columbia war memorial. This marble structure will suffer serious damage from spalling marble if not accomplished.

$310,000 is required to rehabilitate the equestrian figures, Arlington Memorial Bridge and the Carillon Tower, George Washington Memorial Parkway. The statues were gifts to the people of the United States by the Italian Government. The Carillon was a gift by the Netherlands Government.

$20,000 is required to establish an annual stabilization program which involves the placement of sand and setting out suitable ground cover plants at Assateague National Seashore.

Visitor use is increasing at a rate greater than the funds required to maintain and operate the physical plant. While the Service has historically refrained from turning the public away from the parks, the lack of needed facilities has sorely overloaded those now in use such as roads, picnic areas, campgrounds, and visitor centers.

In addition to the need to increase the maintenance of park facilities, the impact of visitors requires that we place added emphasis on the elimination of environmental pollution, restoration of soil and moisture, plant culture and the prevention of major alterations to the ecology.

From still another viewpoint, capital investment, the Service is behind in its maintenance funding. During fiscal 1957, the percentage ratio of the appropriation for maintenance and rehabilitation of physical facilities to the book value of fixed assets was 2.8 percent. For fiscal 1970, the ratio declined to 2.4 percent on a constant dollar basis. This is considerably under the Department of Transportation and the General Services Administration standard that annual funding of maintenance and operating activities be not less than five percent of the book value of fixed assets.

Continuing Deficiency in Park Operations Funds

The amounts provided in this estimate represent only a portion of the total needs to overcome deficiencies in park operation and maintenance funding. Even with the budget estimate for fiscal 1972 of $67,604,000 for "Management and protection" and $55,810,000 for "Maintenance and rehabilitation of physical facilities," a deficit will remain of $4.5 million in "Management and protection" and $5.7 million in "Maintenance and rehabilitation," or a total of $10.2 million.

The following table shows the makeup of this deficiency in both appropriations:

	Management and Protection	Maintenance and Rehabilitation	Total
Deficit in fiscal 1970 appropriation	$2,785,000	$9,918,000	$12,703,000
New requirements in fiscal 1970:			
New areas and recently authorized areas partially financed in past years	707,000	411,000	1,118,000
New facilities	780,000	910,000	1,690,000
Increased visitor workload	2,100,000	400,000	2,500,000
Total requirements over amount appropriated in fiscal 1970	6,372,000	11,639,000	18,011,000
Fiscal 1970 base (includes Budget transfer from D. C.)	57,393,000	44,951,000	102,344,000
Required base for 1971	63,765,000	56,590,000	120,355,000
Unanticipated new requirements in fiscal 1971:			
Transportation of visitors, Yosemite	300,000	-	300,000
South Florida Environmental Work Program	1,000,000	-	1,000,000
Wilderness and master planning	275,000	-	275,000
Pay increase costs:			
Classified	2,649,200	301,500	2,950,700
U. S. Park Police	775,800	-	775,800
Wage Board	-	1,552,000	1,552,000
Cherokee Strip Study	30,000	-	30,000
Total requirements, fiscal 1971	68,795,000	58,443,500	127,238,500
Fiscal 1971 appropriation and supplemental funds provided	63,471,800	50,396,500	113,868,300
Anticipated deficit end of fiscal 1971	5,323,200	8,047,000	13,370,200
New requirements for recently authorized areas (those placed into operation since 1/1/60.)	1,300,000	1,700,000	3,000,000

New requirements for areas operating prior to 1/1/60	1,800,000	1,200,000	3,000,000
Operation of new facilities (those placed in operation in the current fiscal year or proposed to be placed in operation in the budget year)	47,800	111,900	159,700
Continuing requirements not in the base for fiscal 1972:			
Transportation of visitors, Yosemite	100,000	-	100,000
Wilderness and master planning	105,000	-	105,000
Fiscal 1972 Appropriation Base	63,471,800	50,396,500	113,868,300
Requirements for fiscal 1972	72,147,800	61,455,400	133,603,200
Budget for fiscal 1972	67,604,000	55,810,000	123,414,000
Deficit anticipated end of fiscal 1972	4,543,800	5,645,400	10,189,200

Summary of Deficiency End of Each Year
(in millions of dollars)

Fiscal Year	M&P	M&R	Total
1970	$6.4	$11.6	$18.0
1971	5.3	8.1	13.4
1972	4.5	5.7	10.2

Examples of recent accomplishments:

Law Enforcement. Significant challenges by maverick individuals and groups, as well as criminals, of National Park Service authority and its determined intent to preserve law and order in the parks were successfully met during 1970.

(1) Two major confrontations with massed hippy type young people assembled in Yosemite National Park were resolved. The first, which took place over the Memorial Day weekend, was of a scale manageable by the normal staff of park rangers. The later demonstration attracted upwards of 800 persons to Yosemite Valley for a Fourth of July foray. Disturbance of the peace, narcotic violations, intoxication, and other violations of law and park rules and regulations were rampant. Legitimate visitors were outraged at loss of property, threats to bodily well-being, and disruption of their holiday plans. Augmentation of the local force of park rangers with 100 police personnel from nearby agencies, 19 U. S. Park Police on assignment from the National Capital Parks, and Park Rangers imported from other parks was required to quell the disturbance. Retention of the cadre of Park Police for two months contributed substantially to maintenance of the serenity of the Valley during the remainder of the summer.

(2) Several areas of the National Park System in the Badlands country escaped a potential encampment by a notorious and dangerous motorcycle gang. Local

park staffs with Park Rangers from other parks and U. S. Park Police combined to deter the threat to parks and their visitors.

(3) A maverick group of unassociated Indians intent on "reclaiming" Lassen National Park were successfully deterred by prompt and professional law enforcement action.

(4) A similar group mounted a long term demonstration in Mount Rushmore National Monument which was peacefully resolved without the sought-for national publicity. The threat to resume the demonstration which would endanger the noted sculptures remains.

Despite an active crime prevention program in the national parks, crimes ranging from petty offenses to those of a major nature continue to occur. Increased manpower, improved training, and additional resources in the past few years have resulted in a rising rate of apprehension and prosecution of violators. In one western park 354 violators have been arraigned and prosecuted in 1970 as compared with 158 in 1969; 700 court cases were processed in another area during 1970 whereas the prosecution record was 200 in the previous year. U. S. Park Police report a 47.7% increase in arrests for 1969; the 1968 increase over 1967 was 10.7%.

A major thrust in the accelerated law enforcement program to meet current and long range needs is expanded training to qualify Park Rangers in professional attitudes and techniques. Emphasis on behavioral science transcends traditional police training. Courses on narcotics and dangerous drugs were attended by many park rangers throughout the Service. One area alone has sent six park rangers to law enforcement training academies. Local in-house training has been accelerated in all areas needing increased visitor protection. Two park rangers from Olympic National Park attended a six week basic enforcement course conducted by Washington State Law Enforcement Commission. Two rangers from Mount Rainier National Park were graduated from the six week Law Enforcement Officers Training Course at Olympic College. A total of 100 United States Park Police officers were recruited and trained in the United States Park Police Academy. One hundred hours of intensive law enforcement instruction was provided to 38 park rangers at the Southeast Region Law Enforcement Workshop and a similar number at the Western Workshop early in 1970. Although representative, this list only outlines the 1970 law enforcement training engaged in by Service personnel. Many other ranger personnel completed short term courses in authorized sessions and correspondence courses on their own volition.

Strengthening of enforcement capabilities of parks selected for outstanding enforcement problems has been accomplished by adding Law Enforcement Specialists to their park ranger staffs and to staffs of Directors of Regions. The establishment of a Law Enforcement Officer in Grand Teton National Park, for example, is credited with reducing monetary damage in traffic accidents from $61,000 in 1969 to $39,000 in 1970 and in solving eight major crimes during 1970 whereas none was resolved the previous year.

Servicewide, specialized law enforcement equipment was upgraded during 1970 and additional items added to park equipment lists. Several VASCAR (radar) units were purchased and implemented. Radio systems were improved in several areas; one obsolete radio system was replaced; narcotic test kits were purchased along with many other equipment items to assist in making the law enforcement effort more effective and less hazardous to officers. Grand Teton National Park installed a LETS system (Law Enforcement Teletype System) which proved to be a highly efficient enforcement tool. Extension of this inter-agency communication system needs high priority in being extended to other parks. Riot control equipment is being purchased by parks exposed to demonstrations as funds permit.

The National Park Service has long enjoyed cooperation from the many Federal, State, and local law enforcement agencies with whom it shares mutual problems. The unrestrained cooperation the Service received throughout emergencies of 1970 has renewed and strengthened those associations. A common bond of dedicated effort to local and national enforcement problems has continued to receive the encouragement it deserves and needs.

Implementation of the Federal Magistrate Act has been realized in several districts of the United States District Courts which includes areas of the National Park System. The system, whereby U. S. District Courts and U. S. Magistrates, by local court rule, pre-set fines for the bulk of minor Federal violations and permit persons charged, (who do not contest the charges nor wish to have a court hearing) to pay their fines by mail, is providing a satisfactory means of prosecution of cases in many parks. Plans to extend the system early in 1971 are underway.

Safety. The Employee Disabling Injury Frequency Rate has continued to decline. During 1970, 161 employees suffered a disabling injury as compared to 173 such injuries during 1969. This accounted for an Employee Disabling Injury Frequency Rate of 8.5 disabling injuries per million man-hours worked during 1970, an 11% decline from the 1969 rate of 9.6.

In the visitor fatality category, we have experienced our first decline since 1964 with 164 visitor fatalities during 1970 as compared to 182 during 1969. For the first time in three years the Visitor Fatality Frequency Rate has been reduced below one per million visits. The Visitor Fatality Frequency Rate for 1970 was .97 fatalities per million visits.

Concessioner operations improved considerably during 1970. There were no concessioner employee fatalities while on-the-job during 1970 as compared to three such fatalities during 1969.

Contractor operations also improved during 1970. While four contractor employees were killed on-the-job during 1969, there were no contractor fatalities experienced during 1970.

Volunteers in Parks. The Volunteers in Parks Act, P. L. 91-357, approved July 29, 1970, authorized the program of volunteer service in the National Park System and funds to initiate the program were included in the 1971 appropriations. Funds have been made available to the field along with standards for the implementation of the program. The Volunteers in Parks Program was officially inaugurated on December 3, 1970, at Custis Lee Mansion in the National Capital Parks, where Mrs. Nixon presented certificates to the first 46 volunteers. Volunteers will serve as living history interpreters, guides, art and craft demonstrators, interpretive assistants, history, archeology, and natural science aids, and environmental study area assistants. These people are giving a great personal gift-their time - so their fellow citizens may better understand and appreciate their American heritage.

Visitor Activities. Visitor activities in the parks are rapidly changing to meet the desires of our affluent and mobile society. The rapid increase in oversnow and water use activities is a matter of concern that is being met by specialized training to meet these special needs. For example, visitor particpation in snowmobile activities increased approximately 20 percent in the Northeast Region. Forty miles of snowmobile trails are maintained at Acadia National Park, Maine which experienced the greatest increase in this type of use. Ski activities at Rocky Mountain National Park, Colorado increased by 75 percent over 1969. The development of a plan for swimming and water skiing control at the Fairholm location in Olympic National Park, Washington and a SCUBA team to assist in the administration and operation of the plan was found to be necessary to cope with the increase in visitor usage at the area.

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Campground user fees have been established this past summer for over 25,000 of the 30,000 campsites administered by the National Park Service. The fees range from $1 to $3 per site per night and are in addition to Park entrance fees. The campground fee collection function was absorbed by park staffs without additional help.

Interpretive Activities. The main purpose of the National Park Service interpretive programs has traditionally been to describe the natural, cultural, historical and archeological features of the parks. Interpretation of recreational opportunities supplemented the programs as national seashores, lakeshores and other recreational areas were added to the National Park System. To help increase visitor interest and participation, living history and cultural demonstrations have expanded to more than 70 areas. Braille trails and other facilities for the blind have been installed at several areas including Yellowstone National Park, Montrose Park (Washington, D. C.), and Petersburg National Battlefield. At Mount Rushmore National Memorial a video-tape program on a closed-circuit TV system for visitors demonstrates construction activities which are of historical significance.

The purposes of living history demonstrations are to introduce significant parts of the park story, illustrate them authentically, and convey to the visitors an appreciation of the park's theme and features. Demonstrations are used to supplement visitor center exhibits, personal contacts, audiovisual programs and publications. They provide valuable interpretive tools and added incentives for all park employees who are involved with them. Visitor participation is an important part of many demonstration programs. Visitors are encouraged to examine and use certain equipment and reproductions or artifacts, sample products (if edible or fragrant), ask questions and make comments. Their response is spontaneous and enthusiastically favorable.

A new interpretive tool is being developed at Yellowstone where tests have been conducted on the use of limited range AM radio transmitters. The purpose is to contact a larger number of visitors driving through the park. In the past, many visitors have not attended interpretive programs or, perhaps, may not have even seen or talked with a park employee, except for a brief contact at an entrance station. Now, by tuning in a certain frequency on their car radio, they can receive important messages on safety, road conditions, wildlife, park features and availability of facilities, interpretive programs and other services.

This blending of old and new methods of interpretation is becoming more and more important. To keep in step with changing times it is necessary to develop new methods of telling the park story.

The relatively recent emphasis on environmental interpretation helps to bolster the interpretive programs by stressing the interrelationships between man and his total environment and by working toward a goal of creating a better understanding of the environment. The more people who are exposed to environmental awareness and environmental action, the more people there will be to help improve and maintain desirable environmental conditions.

Environmental Interpretation is not a new program, nor is it something that has been appended to existing operations. All of the traditional interpretive methods have incorporated an environmental awareness message to some degree. It has always been the basis for all Park Service interpretive programs and the central theme to which all other park activities relate.

As an educational process, environmental interpretation stimulates people to want to cooperate with their environment, not to degrade and destroy it. Three major educational programs are included in environmental interpretation: National Environmental Education Development (NEED), National Environmental Study Area (NESA), and National Environmental Education Landmark (NEEL).

The NEED program is designed as a kindergarten through 12th grade way of teaching environmental involvement and responsibility. NEED curricula materials are continually being tested and evaluated at camps in Prince William Forest Park, Virginia; Fire Island National Seashore, New York; Whiskeytown-Shasta-Trinity National Recreation Area, California; Cumberland Gap National Historical Park, Kentucky-Tennessee-Virginia; Great Smoky Mountains National Park, Tennessee-North Carolina; and Catoctin Mountain Park, Maryland. Former Job Corps Centers are utilized at the latter three areas.

The NESA program is an outdoor classroom approach, using the same lessons as the NEED program in demonstrating to students their relationship with their total environment. Study areas have been established in 77 areas of the National Park System from Virgin Islands to Hawaii. Others are being planned and the program idea is expanding to other bureaus of the Department as well as to other government agencies, private organizations and schools. More than 85,000 students used Park Service NESA's during 1970.

In the NEEL program, outstanding NESA sites which are operated in areas other than those of the National Park System are given national recognition for their importance in conducting successful environmental education programs. In this respect, it is an extension of the National Historic and Natural Landmark programs. Selection of the sites for NEEL designation is made from a NESA catalog which is maintained by the Office of Education in the Department of Health, Education and Welfare. Eleven sites were proposed initially and accepted at the fall meeting of the National Park Service Advisory Board. Potentially, the number of NEEL's is limited only by the number of NESA's which are developed.

(b) Concessions management: Fiscal year 1971, $408,800; fiscal year 1972, $408,800; no change.

Program of work: This provides program direction of the activities of private enterprise to provide facilities and services that are necessary and appropriate for the use and enjoyment of visitors to areas administered by the National Park Service. The National Park Service, through contracts with the concessioners and in accordance with the provisions of Public Law 89-249 (79 Stat. 969), maintains supervision over the concessioners; approves concessioner rate schedules and maintains administrative review and approval over construction, and operation and maintenance of all facilities and services. Concessioners are encouraged to participate in park area master planning. Every effort is made to correct any concessioner deficiencies before the quality of service to the public is affected.

Attendance of Service personnel at university hotel and restaurant management schools will be continued. Training seminars for both Service and concessioner personnel are held twice a year, one in the eastern and one in the western part of the United States. In addition, seminars attended by Service personnel directly involved with the day-by-day operations of the concessioners will be held in each region.

In fiscal year 1972, the program contemplates the negotiation of about 38 contracts to authorize the continued operation of existing concessions.

Examples of recent accomplishments: As of the end of fiscal 1970, there

were 246 concessioners operating in 80 areas administered by the National Park Service, including National Capital Parks. Of this total, 134 were operating pursuant to concession contracts and 112 were operating pursuant to concessioners permits.

The concessions management seminar for the western part of the United States was held in November at Yosemite National Park. Nominees attending this seminar were National Park Service field personnel at the management level and concessioner operating managers. The seminar for the eastern part of the United States is scheduled to be held at Mammoth Cave National Park in March 1971.

In furtherance of the Administrations program relative to American Indians a concession contract was negotiated with the Crow Indian Tribe to develop and operate a lodge and marina complex in Big Horn Canyon Recreation Area in the State of Montana.

Franchise fees collected for fiscal year 1970 amounted to $1,472,340 as compared to $1,428,537 in fiscal year 1969; an increase of $43,803 or 3 percent.

(c) Information publications: Fiscal year 1971, $785,100; fiscal year 1972, $785,100; no change.

Program of work: The National Park Service publications program has three main objectives: (1) the extension in both units and quantities of a small but informative basic folder given to park visitors; (2) the expansion of specialized publications such as guide books, handbooks, and posters made available at a reasonable price to park visitors who want particular information beyond the initial give-away material; (3) the increase in the sale and distribution of National Park Service publications through the Government Printing Office, particularly to students for school related activities, and to vacationers prior to their actual travel.

National Park Service Minifolders

This is the basic National Park Service free folder and more than 100 parks have them including those with the largest visitation. About 15 million copies are given out annually. The small format carries a useful map as well as the essential information needed for visitors to get around a park. The size of these folders brings major economies in creative work, paper, printing, shipping and storage. One limitation is that coverage is too general and many visitors want more complete information about the area.

Sales Publications

These units range in cost from $ .10 to $1.50, and require more time and money to produce than the free folders. On the other hand, once a minimum order has been placed, usually 2,000 copies, these publications remain unchanged often from five to 10 years. The program now is emphasizing historical and natural history handbooks. These booklets, usually from 60 to 100 pages in length frequently sell 100,000 copies at a printing.

Government Printing Office Sales

The National Park Service sales effort is coordinated with the Superintendent of Documents to give maximum exposure to available National Park Service publications. For example, a recent promotion featured a map-packet explaining park resources on a national basis as well as a regional basis. Over a two-year period, more than 65,000 units have been sold at $1.50 each.

The publications programs for the current and budget years are as follows:

1971 Fiscal Year

	Number	Copies
FREE PUBLICATIONS		
Informational minifolders	108	14,650,000
Interpretive folders	117	7,360,000
General informational booklets	9	115,000
SALES PUBLICATIONS		
General informational	.2	4,000
Special area folders	11	22,000
Historical handbooks	6	12,000
Natural history handbooks	4	8,000
Posters	3	6,000
	260	22,177,000

1972 Fiscal Year

	Number	Copies
FREE PUBLICATIONS		
Information minifolders	112	15,500,000
Interpretive folders	119	7,500,000
General informational booklets	5	115,000
SALES PUBLICATIONS		
General informational	4	8,000
Special area folders	8	16,000
Historical handbooks	6	12,000
Natural history handbooks	8	16,000
Posters	3	6,000
	265	23,173,000

Examples of recent accomplishments: Fiscal 1970 was a successful year for the sale and distribution of Park Service items by the Superintendent of Documents. Three items did especially well during the year: NPS Maps, 25,000 units sold for $15,618; Historic Handbooks, 313,000 items sold for $119,394; NPS Posters, 53,411 items sold for $20,771. Total sales were 758,000 items at a gross of $326,000. GPO considers the profit factor to be about half, so about $163,000 was paid to the General Treasury from this program.

Production figures for 1970 are as follows: Minifolders - 100 units printed in a quantity of 12,535,000; Free Regular 4" x 9½" folders - 87 units printed in a quantity of 5,849,000; General Information Folders - 7 units printed in a quantity of 5,000. This program thus produced nearly 20 million pieces for free distribution to visitors of the park areas in operation.

(d) Employees' compensation fund payments: Fiscal year 1971, $319,300; fiscal year 1972, $365,800; increase, $46,500. The increase consists of:

	Increase (+) or Decrease (-) Amount	Posi-tions	Total Program	Total Posi tions	Explanation
(1)	$+46,500	--	$365,800	--	For payment to the Bureau of Employees' Compensation, Department of Labor

Need for increase: The increase represents the additional amount needed to provide the total amount of $365,800 for payment to the Bureau of Employees' Compensation, Department of Labor, based on a report to the Department of the Interior from that Agency of payments made during the past fiscal year, as required by Public Law 86-767, approved September 13, 1960.

Program of work: Beginning with fiscal 1963, amounts have been included in the Service's Budget to repay the total cost of benefits and other payments made from Employees' Compensation Fund on account of injury or death of National Park Service employees occurring after December 1, 1960.

(e) Roosevelt-Campobello International Park Commission: Fiscal year 1971, $88,000; fiscal year 1972, $125,000; increase, $37,000. The increase consists of:

	Increase (+) or Decrease (-) Amount	Positions	Total Program	Total Positions	Explanation
(1)	$+37,000	--	$125,000	--	United States share of operating expenses, Roosevelt-Campobello International Park.

Need for increase: The increase funding is needed to cover additional operating and maintenance expenses due to additions to the park of four cottages, a visitor center and a large maintenance building. Employees of the park were granted a 10% wage increase in July 1970, the cost of which is also included in this estimate.

Program of work: The Roosevelt-Campobello International Park, authorized by Public Law 88-363, approved July 7, 1964, commemorates the childhood home of Franklin D. Roosevelt on Campobello Island, New Brunswick, Canada. This International Park is administered by a joint United States-Canadian Commission which has a small staff of permanent employees to handle the year-round administrative, maintenance, custodial and related work at the park. When the park is open to the public, the staff is supplemented by temporary guards, guides and laborers as needed. Visitation to the park totaled 72,000 in calendar year 1969 and the Commission estimates that 1970 visitation will rise to 90,000 visits. The amount requested is the United States' share (50%) of the cost of operation and development for fiscal 1972.

The following statement shows the allocations by park areas, other organizational entities and certain program items of the amount available in fiscal 1971, the proposed increases and amount requested in fiscal 1972 for activities 1 and 2 for both the "Management and Protection" and "Maintenance and Rehabilitation" appropriations. Additionally, the statement lists the new permanent positions requested for 1972, the anticipated visits to each park and the acreage in Federal ownership by park area.

Park Areas and Other Entities, Program Items, Etc.		Available 1971	Increase	Estimate 1972	New Permanent Positions in the 1972 Budget: Position Title and Grade	Number	Visitor Projection Fiscal 1972 (In thousands)	Acreage
Abraham Lincoln Birthplace	PM	75,600	200	75,800			596	117
	F&FC							
	R&T	3,300	1,200	4,500				
	B&U	33,100	10,800	43,900				
	Total	112,000	12,200	124,200				
Acadia.....	PM	240,000	7,300	247,300			3,114	32,342
	F&FC	15,400		15,400				
	R&T	120,300	1,500	121,800				
	B&U	141,000	4,200	145,200				
	Total	516,700	13,000	529,700				
Agate Fossil Beds.....	PM	30,200	400	30,600			9	2,995
	F&FC	500		500				
	R&T	1,800	600	2,400				
	B&U	4,300	200	4,500				
	Total	36,800	1,200	38,000				
Alaska Cluster: Headquarters Office	PM	251,000	89,300	340,300	Pilot, GS-12	1		
	F&FC							
	R&T	15,400	500	15,900				
	B&U	15,600	2,800	18,400				
	Total	282,000	92,600	374,600				
Glacier Bay.....	PM	150,300	29,400	179,700	Biologist, GS-12	1	36	2,803,840
	F&FC	4,500		4,500				
	R&T	26,900	300	27,200				
	B&U	110,200	7,100	117,300				
	Total	291,900	36,800	328,700				

Park Areas and Other Entities, Program Items, Etc.		Available 1971	Increase	Estimate 1972	New Permanent Positions in the 1972 Budget: Position Title and Grade	Number	Visitor Projection Fiscal 1972 (In thousands)	Acreage
Alaska Cluster (Continued):	PM	59,100	24,800	83,900	Biologist, GS-12	1	18	2,792,137
Katmai.....	F&FC	4,500		4,500				
	R&T	27,300	1,200	28,500				
	B&U	54,700	2,600	57,300				
	Total	145,600	28,600	174,200				
Mount McKinley.....	PM	158,800	32,600	191,400	Biologist, GS-12	1	52	1,939,493
	F&FC	6,300		6,300				
	R&T	170,700	5,800	176,500				
	B&U	207,100	9,500	216,600				
	Total	542,900	47,900	590,800				
Sitka.....	PM	42,400	12,500	54,900	Park Technician, GS-5	1	67	54
	F&FC							
	R&T	4,100	400	4,500				
	B&U	24,500	5,400	29,900				
	Total	71,000	18,300	89,300				
Allegheny Portage Railroad	PM	81,300		81,300			69	711
and Johnstown Flood.....	F&FC	5,200		5,200				
	R&T	15,400	1,300	16,700				
	B&U	36,900	5,600	42,500				
	Total	138,800	6,900	145,700				
Amistad.....	PM	158,600	34,000	192,600	Park Ranger, GS-7	1	1,193	43,559
					Park Technician, GS-5	1		
	F&FC	1,500		1,500				
	R&T	31,900	3,800	35,700				
	B&U	30,400	20,400	50,800	Boat Operator and Repairman, Ung.	1		
	Total	222,400	58,200	280,600				

Park Areas and Other Entities, Program Items, Etc.		Available 1971	Increase	Estimate 1972	New Permanent Positions in the 1972 Budget Position Title and Grade	Number	Visitor Projection Fiscal 1972 (In thousands)	Acreage
Andersonville	PM		51,000	51,000	Park Manager (Superintendent), GS-11	1	35	495
					Park Historian, GS-9	1		
					Historian, GS-7	1		
					Park Ranger, GS-7	1		
					Clerk-Stenographer, GS-4	1		
	F&FC							
	R&T		10,500	10,500	Laborer, Ungr.	1		
	B&U		66,500	66,500	Foreman II, Ungr.	1		
					Maintenanceman, Ungr.	1		
					Maintenance Worker, Ungr.	1		
					Laborer, Ungr.	3		
	Total		128,000	128,000				
Andrew Johnson	PM	71,500	500	72,000			49	17
	F&FC							
	R&T	1,600		1,600				
	B&U	26,200	2,800	29,000				
	Total	99,300	3,300	102,600				
Apostle Islands	PM		99,000	99,000	Park Manager (Superintendent), GS-12	1	700	42,000
					Administrative Officer, GS-9	1		
					Park Ranger, GS-9	2		
					Park Ranger, GS-7	1		
					Secretary, GS-5	1		
	F&FC							
	R&T		2,000	2,000				
	B&U		24,500	24,500	Maintenanceman, Ungr.	1		
					Mechanic, Ungr.	1		
	Total		125,500	125,500				

Park Areas and Other Entities, Program Items, Etc.		Available 1971	Increase	Estimate 1972	New Permanent Positions in the 1972 Budget: Position Title and Grade	Number	Visitor Projection Fiscal 1972 (In thousands)	Acreage
Appomattox Court House ...	PM	79,700	1,100	80,800			164	937
	F&FC							
	R&T	4,900	100	5,000				
	B&U	45,600	1,200	46,800				
	Total	130,200	2,400	132,600				
Assateague Island	PM	317,300	32,000	349,300			2,143	39,630
	F&FC	7,700		7,700				
	R&T	55,000	4,500	59,500				
	B&U	131,100	2,700	133,800				
	Total	511,100	39,200	550,300				
Badlands	PM	179,400	8,900	188,300			1,428	110,020
	F&FC	8,100		8,100				
	R&T	96,700	9,400	106,100				
	B&U	66,400	9,100	75,500				
	Total	350,600	27,400	378,000				
Bandelier	PM	136,000	6,300	142,300			214	29,661
	F&FC	10,300		10,300				
	R&T	44,700	8,100	52,800				
	B&U	59,800	11,100	70,900				
	Total	250,800	25,500	276,300				
Bay Area Cluster:	PM	65,200		65,200			26	9
John Muir	F&FC							
	R&T	10,600	800	11,400				
	B&U	30,000	4,700	34,700				
	Total	105,800	5,500	111,300				

Park Areas and Other Entities, Program Items, Etc.		Available 1971	Increase	Estimate 1972	New Permanent Positions in the 1972 Budget: Position Title and Grade	Number	Visitor Projection Fiscal 1972 (In thousands)	Acreage
Bay Area Cluster (Continued):	PM	96,200	7,500	103,700	Collection Clerk, GS-4	1	752	484
Muir Woods.....	F&FC	600		600				
	R&T	15,200	2,000	17,200				
	B&U	30,800	2,100	32,900				
	Total	142,800	11,600	154,400				
Point Reyes.....	PM	245,000	37,900	282,900	Biologist, GS-12	1	1,399	60,403
					Park Technician, GS-9	1		
	F&FC	21,000		21,000				
	R&T	104,600	13,900	118,500				
	B&U	111,400	54,700	166,100	Civil Engineer, GS-11	1		
	Total	482,000	106,500	588,500				
Bent's Old Fort.....	PM	36,300	600	36,900			26	178
	F&FC	200		200				
	R&T	3,300	300	3,600				
	B&U	11,000	1,900	12,900				
	Total	50,800	2,800	53,600				
Big Bend.....	PM	336,600		336,600			201	708,221
	F&FC	23,500		23,500				
	R&T	221,100	1,900	223,000				
	B&U	231,600	19,100	250,700	Landscape Architect, GS-11	1		
	Total	812,800	21,000	833,800				
Big Hole.....	PM	25,700		25,700			39	536
	F&FC	200		200				
	R&T	8,400	900	9,300				
	B&U	7,100	100	7,200				
	Total	41,400	1,000	42,400				

Park Areas and Other Entities, Program Items, Etc.		Available 1971	Increases	Estimate 1972	New Permanent Positions in the 1972 Budget Position Title and Grade	Number	Visitor Projection Fiscal 1972 (In thousands)	Acreage
Bighorn Canyon.....	PM	259,000	50,700	309,700	Historian (Archeology) GS-12	1	186	65,636
					Indian Liaison Officer, GS-11	1		
					Staff Assistant, GS-4	1		
	F&FC	7,400		7,400				
	R&T	91,200	9,200	100,400				
	B&U	95,200	4,300	99,500				
	Total	452,800	64,200	517,000				
Biscayne.....	PM	112,700	1,200	113,900			61	95,064
	F&FC							
	R&T	11,800		11,800				
	B&U	22,000	4,600	26,600				
	Total	146,500	5,800	152,300				
Black Canyon of the Gunnison.....	PM	40,900	1,200	42,100			261	13,500
	F&FC	3,200		3,200				
	R&T	20,500	500	21,000				
	B&U	10,700	800	11,500				
	Total	75,300	2,500	77,800				
Blue Ridge.....	PM	1,075,600	31,600	1,107,200	Historian, GS-11	1	13,754	85,000
	F&FC	52,200		52,200				
	R&T	1,035,900	26,500	1,062,400				
	B&U	411,200	47,600	458,800	Landscape Architect, GS-12	1		
					Landscape Architect, GS-11	1		
	Total	2,574,900	105,700	2,680,600				
Booker T. Washington.....	PM	51,900	700	52,600				
	F&FC						21	218
	R&T	2,400		2,400				
	B&U	31,300	2,400	33,700				
	Total	85,600	3,100	88,700				

Park Areas and Other Entities, Program Items, Etc.		Available 1971	Increase	Estimate 1972	New Permanent Positions in the 1972 Budget: Position Title and Grade	Number	Visitor Projection Fiscal 1972 (In thousands)	Acreage
Boston Cluster:	PM	77,800	7,900	85,700	Clerk-Typist, GS-4	1		
Headquarters Office.....	F&FC							
	R&T							
	B&U	19,500	32,600	52,100	Architect, GS-12	1		
					Museum Curator, GS-9	1		
	Total	97,300	40,500	137,800				
Adams.....	PM	60,400		60,400			12	5
	F&FC							
	R&T	1,200	100	1,300				
	B&U	39,800	3,600	43,400				
	Total	101,400	3,700	105,100				
John Fitzgerald Kennedy...	PM	46,200		46,200			44	.1
	F&FC							
	R&T							
	B&U	19,800	600	20,400				
	Total	66,000	600	66,600				
Minute Man.....	PM	152,700	29,400	182,100	Park Technician, GS-5	1	609	733
	F&FC	600		600				
	R&T	15,100	1,100	16,200				
	B&U	91,600	27,100	118,700	Laborer, Ung.	2		
	Total	260,000	57,600	317,600				
Salem Maritime.....	PM	70,600		70,600			279	9
	F&FC							
	R&T	1,600	100	1,700				
	B&U	41,100	3,600	44,700				
	Total	113,300	3,700	117,000				
Saugus Iron Works.....	PM	41,500	12,800	54,300			22	.2
	F&FC							
	R&T	3,400	100	3,500				
	B&U	26,800	7,200	34,000				
	Total	71,700	20,100	91,800				

Park Areas and Other Entities, Program Items, Etc.		Available 1971	Increase	Estimate 1972	New Permanent Positions in the 1972 Budget: Position Title and Grade	Number	Visitor Projection Fiscal 1972 (In thousands)	Acreage
Cabrillo.....	PM	131,400	15,200	146,600	Park Technician, GS-7	1	1,424	123
	F&FC							
	R&T	15,400	600	16,000				
	B&U	64,600	5,300	69,900				
	Total	211,400	21,100	232,500				
Canyonlands, Arches, and Natural Bridges.....	PM	400,800		400,800			268	339,399
	F&FC	2,600		2,600				
	R&T	115,500	6,700	122,200				
	B&U	101,300	28,800	130,100	Civil Engineer, GS-9	1		
	Total	620,200	35,500	655,700				
Cape Cod	PM	501,400	49,400	550,800	Ecologist, GS-11	1	5,517	43,289
	F&FC	25,300		25,300				
	R&T	104,800	12,600	117,400				
	B&U	140,800	42,100	182,900	Landscape Architect, GS-12	1		
	Total	772,300	104,100	876,400				
Cape Hatteras, Fort Raleigh, and Wright Brothers	PM	500,500	14,200	514,700			1,944	290,719
	F&FC	24,100		24,100				
	R&T	152,400	14,900	167,300				
	B&U	550,500	196,900	747,400	Landscape Architect, GS-12	1		
	Total	1,227,500	226,000	1,453,500				
Cape Lookout	PM	49,700		49,700				
	F&FC							
	R&T							
	B&U							
	Total	49,700		49,700				

Park Areas and Other Entities, Program Items, Etc.		Available 1971	Increase	Estimate 1972	New Permanent Positions in the 1972 Budget Position Title and Grade	Number	Visitor Projection Fiscal 1972 (In thousands)	Acreage
Capulin Mountain.....	PM	62,400	3,800	66,200			81	775
	F&FC	400		400				
	R&T	26,000	11,300	37,300				
	B&U	8,800	500	9,300				
	Total	97,600	15,600	113,200				
Carl Sandburg Home.....	PM	94,600	1,100	95,700			108	247
	F&FC							
	R&T	7,600	100	7,700				
	B&U	24,800	500	25,300				
	Total	127,000	1,700	128,700				
Carlsbad Caverns.....	PM	529,200	67,200	596,400	Biologist, GS-13	1	730	46,753
	F&FC	6,200		6,200				
	R&T	70,100	12,800	82,900				
	B&U	202,100	40,900	243,000	Mechanical Engineer, GS-9	1		
	Total	807,600	120,900	928,500				
Castillo de San Marcos, Fort Caroline, and Fort Matanzas.....	PM	226,600	10,300	236,900	Park Technician, GS-4	1	862	447
	F&FC							
	R&T	20,100	1,900	22,000				
	B&U	85,300	8,600	93,900				
	Total	332,000	20,800	352,800				
Chamizal.....	PM	66,800	3,100	69,900			20	55
	F&FC	500		500				
	R&T	9,800	3,400	13,200				
	B&U	28,300	13,800	42,100	Maintenance Worker, Ung.	1		
	Total	105,400	20,300	125,700				
Channel Islands.....	PM	160,400	13,700	174,100			36	18,167
	F&FC							
	R&T	15,700	3,600	19,300				
	B&U	21,400	4,500	25,900				
	Total	197,500	21,800	219,300				

Park Areas and Other Entities, Program Items, Etc.		Available 1971	Increase	Estimate 1972	New Permanent Positions in the 1972 Budget Position Title and Grade	Number	Visitor Projection Fiscal 1972 (In thousands)	Acreage
Chickamauga and Chattanooga.....	PM	199,400		199,400			1,259	8,232
	F&FC							
	R&T	57,200	10,000	67,200				
	B&U	84,300	24,200	108,500				
	Total	340,900	34,200	375,100				
Christiansted and Buck Island Reef.....	PM	71,800	2,600	74,400			86	877
	F&FC							
	R&T	2,000	200	2,200				
	B&U	34,000	1,300	35,300				
	Total	107,800	4,100	111,900				
Colonial.....	PM	413,400	29,500	442,900			9,180	8,200
	F&FC	14,000		14,000				
	R&T	140,800	1,800	142,600				
	B&U	302,400	5,800	308,200				
	Total	870,600	37,100	907,700				
Colorado.....	PM	93,800	6,900	100,700			535	17,669
	F&FC	2,700		2,700				
	R&T	55,000	3,300	58,300				
	B&U	34,000	2,000	36,000				
	Total	185,500	12,200	197,700				
Coulee Dam.....	PM	255,100	34,300	289,400	Clerk-Typist, GS-4	1	706	100,059
	F&FC	13,500		13,500				
	R&T	42,300	900	43,200				
	B&U	188,500	21,300	209,800				
	Total	499,400	56,500	555,900				

Park Areas and Other Entities, Program Items, Etc.		Available 1971	Increase	Estimate 1972	New Permanent Positions in the 1972 Budget: Position Title and Grade	Number	Visitor Projection Fiscal 1972 (In thousands)	Acreage
Craters of the Moon.....	PM	104,600	5,300	109,900			218	53,545
	F&FC	600		600				
	R&T	21,300	500	21,800				
	B&U	21,400	500	21,900				
	Total	147,900	6,300	154,200				
Cumberland Gap.....	PM	207,500	1,600	209,100			274	20,176
	F&FC	10,000		10,000				
	R&T	27,800	2,900	30,700				
	B&U	92,500	18,200	110,700				
	Total	337,800	22,700	360,500				
Curecanti.....	PM	261,500	5,400	266,900			720	41,103
	F&FC	2,800		2,800				
	R&T	47,400	6,500	53,900				
	B&U	81,700	8,300	90,000				
	Total	393,400	20,200	413,600				
Custer Battlefield.....	PM	65,900	3,100	69,000			279	765
	F&FC	200		200				
	R&T	11,800	100	11,900				
	B&U	44,600	700	45,300				
	Total	122,500	3,900	126,400				
Death Valley.....	PM	338,300	31,700	370,000	Biologist, GS-12	1	622	1,900,000
	F&FC	2,100		2,100				
	R&T	246,200	14,600	260,800				
	B&U	219,500	25,500	245,000				
	Total	806,100	71,800	877,900				

Park Areas and Other Entities, Program Items, Etc.		Available 1971	Increase	Estimate 1972	New Permanent Positions in the 1972 Budget: Position Title and Grade	Number	Visitor Projection Fiscal 1972 (In thousands)	Acreage
Delaware Water Gap.....	PM	312,700	12,300	325,000			1,083	60,921
	F&FC	17,100		17,100				
	R&T	19,400	4,800	24,200				
	B&U	61,300	1,800	63,100				
	Total	410,500	18,900	429,400				
De Soto.....	PM	43,400	8,500	51,900	Administrative Clerk, GS-4	1	167	25
	F&FC							
	R&T	2,900		2,900				
	B&U	21,400	700	22,100				
	Total	67,700	9,200	76,900				
Devils Tower.....	PM	63,600	900	64,500			159	1,347
	F&FC	2,900		2,900				
	R&T	19,000	1,400	20,400				
	B&U	28,800	5,800	34,600				
	Total	114,300	8,100	122,400				
Dinosaur.....	PM	271,600	4,600	276,200			398	200,000
	F&FC	17,200		17,200				
	R&T	117,900	22,000	139,900				
	B&U	73,000	12,400	85,400				
	Total	479,700	39,000	518,700				
Edison.....	PM	229,400	11,000	240,400			59	20
	F&FC							
	R&T	10,800	400	11,200				
	B&U	121,500	5,900	127,400				
	Total	361,700	17,300	379,000				
Effigy Mounds.....	PM	62,500	1,800	64,300			140	1,468
	F&FC	600		600				
	R&T	7,000	1,900	8,900				
	B&U	27,000	2,000	29,000				
	Total	97,100	5,700	102,800				

Park Areas and Other Entities, Program Items, Etc.		Available 1971	Increase	Estimate 1972	New Permanent Positions in the 1972 Budget Position Title and Grade	Number	Visitor Projection Fiscal 1972 (In thousands)	Acreage
Eisenhower.....	PM	19,800		19,800				493
	F&FC							
	R&T	8,000	500	8,500				
	B&U	37,900	43,900	81,800	Foreman II, Ung.	1		
					Laborer, Ung.	1		
					Maintenanceman, Ung.	1		
					Maintenance Worker, Ung.	1		
	Total	65,700	44,400	110,100				
Everglades and Fort Jefferson.....	PM	911,300	153,200	1,064,500	Biologist, GS-13	1	1,336	1,424,410
					Aquatic Biologist, GS-12	1		
					Natural Resources Mgt. Coordinator, GS-12	1		
					Biologist, GS-11	1		
					Park Technician, GS-4	1		
	F&FC	96,800		96,800				
	R&T	167,600	30,100	197,700				
	B&U	345,100	86,900	432,000				
	Total	1,520,800	270,200	1,791,000				
Fire Island.....	PM	336,200	1,800	338,000			460	17,233
	F&FC	16,300		16,300				
	R&T	46,700	2,900	49,600				
	B&U	160,500	13,800	174,300				
	Total	559,700	18,500	578,200				
Florissant Fossil Beds.....	PM	41,100	5,300	46,400			55	5,992
	F&FC							
	R&T	1,200	100	1,300				
	B&U	23,300	3,400	26,700				
	Total	65,600	8,800	74,400				

Park Areas and Other Entities, Program Items, Etc.		Available 1971	Increase	Estimate 1972	New Permanent Positions in the 1972 Budget Position Title and Grade	Number	Visitor Projection Fiscal 1972 (In thousands)	Acreage
Fort Davis.....	PM	93,200	6,200	99,400			125	459
	F&FC	400		400				
	R&T	19,000	900	19,900				
	B&U	53,700	10,900	64,600	Laborer, Ung.	1		
	Total	166,300	18,000	184,300				
Fort Donelson.....	PM	81,000	1,000	82,000			1,123	600
	F&FC							
	R&T	10,800	1,000	11,800				
	B&U	57,900	6,500	64,400				
	Total	149,700	8,500	158,200				
Fort Frederica.....	PM	62,900	600	63,500			205	250
	F&FC							
	R&T	1,400		1,400				
	B&U	30,300	800	31,100				
	Total	94,600	1,400	96,000				
Fort Laramie.....	PM	137,900	29,500	167,400	Guard, GS-5	3	140	546
	F&FC	1,900		1,900				
	R&T	3,000	900	3,900				
	B&U	40,900	4,900	45,800				
	Total	183,700	35,300	219,000				
Fort Larned	PM	38,200	400	38,600			42	681
	F&FC	800		800				
	R&T	3,200	300	3,500				
	B&U	26,600	1,800	28,400				
	Total	68,800	2,500	71,300				

Park Areas and Other Entities, Program Items, Etc.		Available 1971	Increase	Estimate 1972	New Permanent Positions in the 1972 Budget: Position Title and Grade	Number	Visitor Projection Fiscal 1972 (In thousands)	Acreage
Fort McHenry	PM	122,800		122,800			601	43
	F&FC							
	R&T	9,500	600	10,100				
	B&U	89,500	3,300	92,800				
	Total	221,800	3,900	225,700				
Fort Necessity	PM	64,400	1,800	66,200			313	500
	F&FC							
	R&T	8,900	500	9,400				
	B&U	35,600	3,300	38,900				
	Total	108,900	5,600	114,500				
Fort Point	PM		58,800	58,800	Management Assistant, GS-12	1	500	96
					Administrative Officer, GS-9	1		
					Historian, GS-9	1		
					Information-Receptionist, GS-4	1		
	F&FC							
	R&T		4,000	4,000				
	B&U		21,000	21,000	Maintenanceman, Ungr.	1		
	Total		83,800	83,800				
Fort Pulaski	PM	94,500	1,100	95,600			292	5,357
	F&FC							
	R&T	6,000	100	6,100				
	B&U	70,900	1,500	72,400				
	Total	171,400	2,700	174,100				

Park Areas and Other Entities, Program Items, Etc.		Available 1971	Increase	Estimate 1972	New Permanent Positions in the 1972 Budget Position Title and Grade	Number	Visitor Projection Fiscal 1972 (In thousands)	Acreage
Fort Smith	PM	71,000	900	71,900			83	19
	F&FC							
	R&T	900		900				
	B&U	31,500	400	31,900				
	Total	103,400	1,300	104,700				
Fort Sumter	PM	105,700	700	106,400			196	34
	F&FC							
	R&T	500		500				
	B&U	46,100	2,400	48,500				
	Total	152,300	3,100	155,400				
Fort Union.....	PM	50,800	2,300	53,100			15	721
	F&FC	1,500		1,500				
	R&T	6,000	3,200	9,200				
	B&U	27,300	8,000	35,300				
	Total	85,600	13,500	99,100				
Fort Union Trading Post ..	PM	23,400	7,400	30,800			13	220
	F&FC	100		100				
	R&T	2,100		2,100				
	B&U	3,300		3,300				
	Total	28,900	7,400	36,300				
Fredericksburg Cluster:	PM	317,200	7,300	324,500			2,141	6,306
(Fredericksburg and	F&FC							
Spotsylvania, George	R&T	82,000	1,900	83,900				
Washington Birthplace,	B&U	277,700	27,900	305,600	Maintenance Supervisor, GS-11	1		
and Manassas)	Total	676,900	37,100	714,000				

Park Areas and Other Entities, Program Items, Etc.		Available 1971	Increase	Estimate 1972	New Permanent Positions in the 1972 Budget Position Title and Grade	Number	Visitor Projection Fiscal 1972 (In thousands)	Acreage
George Rogers Clark	PM	46,400		46,400			78	23
	F&FC							
	R&T	3,400	100	3,500				
	B&U	18,700	9,900	28,600	Maintenance Worker, Ungr.	1		
	Total	68,500	10,000	78,500				
George Washington Carver	PM	57,000		57,000			46	210
	F&FC	100		100				
	R&T	2,900	700	3,600				
	B&U	17,400	2,900	20,300				
	Total	77,400	3,600	81,000				
Gettysburg	PM	326,000		326,000			7,597	3,429
	F&FC							
	R&T	62,000	2,800	64,800				
	B&U	257,200	18,800	276,000				
	Total	645,200	21,600	666,800				
Gila Cliff Dwellings	PM	60,100	2,800	62,900			35	533
	F&FC	100		100				
	R&T	9,100	3,400	12,500				
	B&U	13,600	8,500	22,100				
	Total	82,900	14,700	97,600				
Glacier	PM	855,600	40,400	896,000	Biologist, GS-12	1	1,310	1,012,300
	F&FC	96,200		96,200				
	R&T	538,000	11,900	549,900				
	B&U	411,500	23,100	434,600	Landscape Architect, GS-12 (Serves Yellowstone also)	1		
	Total	1,901,300	75,400	1,976,700				

Park Areas and Other Entities, Program Items, Etc.		Available 1971	Increase	Estimate 1972	New Permanent Positions in the 1972 Budget: Position Title and Grade	Number	Visitor Projection Fiscal 1972 (In thousands)	Acreage
Glen Canyon and Rainbow Bridge	PM	435,800	50,000	485,800	Pilot, GS-11	1	1,085	1,190,160
					Park Ranger, GS-7	1		
	F&FC	4,300		4,300				
	R&T	249,900	19,300	269,200				
	B&U	276,200	37,100	313,300	Landscape Architect, GS-11	1		
					Laborer, Ungr.	1		
	Total	966,200	106,400	1,072,600				
Golden Spike	PM	101,600	9,300	110,900	Park Technician, GS-5	1	75	2,172
	F&FC	100		100				
	R&T	16,100	5,400	21,500				
	B&U	30,100	8,700	38,800				
	Total	147,900	23,400	171,300				
Grand Canyon Cluster: (Grand Canyon NM, Grand Canyon NP, and Marble Canyon).....	PM	881,300	87,500	968,800	Biologist, GS-12	1	2,467	904,250
					Safety Officer, GS-12	1		
					Biologist, GS-11	1		
					Park Ranger, GS-7	1		
					Park Technician (Boatman), GS-7	1		
	F&FC	66,500		66,500				
	R&T	286,100	43,100	329,200	Maintenance Worker, Ungr.	1		
	B&U	379,700	95,900	475,600	Landscape Architect, GS-11	1		
					Museum Curator, GS-11	1		
					Engineering Technician (Draftsman), GS-7	1		
	Total	1,613,600	226,500	1,840,100				

Park Areas and Other Entities, Program Items, Etc.		Available 1971	Increase	Estimate 1972	New Permanent Positions in the 1972 Budget Position Title and Grade	Number	Visitor Projection Fiscal 1972 (In thousands)	Acreage
Grand Canyon Cluster (Continued):								
Sunset Crater, Walnut Canyon, and Wupatki....	PM	177,000	2,700	179,700			505	40,073
	F&FC	1,500		1,500				
	R&T	66,300	6,600	72,900				
	B&U	69,400	30,900	100,300				
	Total	314,200	40,200	354,400				
Grand Portage.....	PM	88,200		88,200			91	709
	F&FC	1,100		1,100				
	R&T	6,700	100	6,800				
	B&U	24,000	3,100	27,100				
	Total	120,000	3,200	123,200				
Grand Teton.....	PM	585,900	103,200	689,100	Aquatic Biologist, GS-12	1	3,488	306,000
					Park Naturalist, GS-11	1		
					Pilot, GS-11	1		
					Biologist, GS-11	1		
	F&FC	31,100		31,100				
	R&T	380,600	20,200	400,800				
	B&U	280,400	73,600	354,000				
	Total	1,278,000	197,000	1,475,000				
Gran Quivira.....	PM	46,700	2,200	48,900			34	611
	F&FC	100		100				
	R&T	4,800	3,200	8,000				
	B&U	14,800	8,600	23,400				
	Total	66,400	14,000	80,400				
Great Lakes Field Office...	PM	75,300		75,300				
	F&FC							
	R&T							
	B&U							
	Total	75,300		75,300				

Park Areas and Other Entities, Program Items, Etc.		Available 1971	Increase	Estimate 1972	New Permanent Positions in the 1972 Budget: Position Title and Grade	Number	Visitor Projection Fiscal 1972 (In thousands)	Acreage
Great Sand Dunes.....	PM	87,400	4,900	92,300			220	36,740
	F&FC	200		200				
	R&T	19,100	1,800	20,900				
	B&U	47,500	4,300	51,800				
	Total	154,200	11,000	165,200				
Great Smoky Mountains.....	PM	871,600	25,700	897,300	Safety Officer, GS-12	1	6,900	515,000
	F&FC	142,400		142,400				
	R&T	838,600	39,700	878,300				
	B&U	567,200	63,200	630,400	Landscape Architect, GS-12	1		
					Museum Curator, GS-11	1		
	Total	2,419,800	128,600	2,548,400				
Guadalupe Mountains.....	PM	46,000	2,100	48,100			196	81,077
	F&FC	7,800		7,800				
	R&T	7,100	3,300	10,400				
	B&U	17,700	4,300	22,000				
	Total	78,600	9,700	88,300				
Guilford Courthouse.....	PM	50,200	5,400	55,600	Park Technician, GS-4	1	480	233
	F&FC							
	R&T	10,200		10,200				
	B&U	31,700		31,700				
	Total	92,100	5,400	97,500				
Hampton.....	PM						45	45
	F&FC							
	R&T	1,200		1,200				
	B&U	22,600		22,600				
	Total	23,800		23,800				

Park Areas and Other Entities, Program Items, Etc.		Available 1971	Increase	Estimate 1972	New Permanent Positions in the 1972 Budget Position Title and Grade	Number	Visitor Projection Fiscal 1972 (In thousands)	Acreage
Harpers Ferry Center:	PM	187,700	6,200	193,900			1,118	1,280
Harpers Ferry NHP.....	F&FC	1,500		1,500				
	R&T	17,800	4,200	22,000				
	B&U	215,400	11,800	227,200				
	Total	422,400	22,200	444,600				
Audiovisual Arts.....	PM	358,600		358,600				
	F&FC							
	R&T							
	B&U	265,700		265,700				
	Total	624,300		624,300				
Informational Publications.....	PM	785,100		785,100				
	F&FC							
	R&T							
	B&U							
	Total	785,100		785,100				
Museum Exhibit Production.....	PM							
	F&FC							
	R&T							
	B&U	567,500		567,500				
	Total	567,500		567,500				
Hawaii Cluster:	PM							
Headquarters Office.....	F&FC							
	R&T							
	B&U		16,100	16,100	Landscape Architect, GS-11	1		
	Total		16,100	16,100				

Park Areas and Other Entities, Program Items, Etc.		Available 1971	Increase	Estimate 1972	New Permanent Positions in the 1972 Budget: Position Title and Grade	Number	Visitor Projection Fiscal 1972 (In thousands)	Acreage
Hawaii Cluster (Continued):								
City of Refuge.....	PM	91,200	8,300	99,500	Park Aid, GS-4	1	223	181
	F&FC							
	R&T	25,700	700	26,400				
	B&U	50,400	2,600	53,000				
	Total	167,300	11,600	178,900				
Haleakala	PM	149,900	2,700	152,600			162	21,162
	F&FC	1,800		1,800				
	R&T	43,100	2,500	45,600				
	B&U	49,000	5,500	54,500				
	Total	243,800	10,700	254,500				
Hawaii Volcanoes	PM	371,400	23,800	395,200	Biologist, GS-13	1	878	210,667
	F&FC	12,600		12,600				
	R&T	122,400	1,100	123,500				
	B&U	121,400	5,400	126,800				
	Total	627,800	30,300	658,100				
Herbert Hoover.....	PM	100,000	11,700	111,700			182	148
	F&FC	1,100		1,100				
	R&T	9,700	600	10,300				
	B&U	36,100	7,100	43,200				
	Total	146,900	19,400	166,300				
Home of Franklin D. Roosevelt and Vanderbilt Mansion.....	PM	325,700		325,700			598	399
	F&FC							
	R&T	13,400	1,900	15,300				
	B&U	234,300	33,100	267,400				
	Total	573,400	35,000	608,400				

Park Areas and Other Entities, Program Items, Etc.		Available 1971	Increase	Estimate 1972	New Permanent Positions in the 1972 Budget: Position Title and Grade	Number	Visitor Projection Fiscal 1972 (In thousands)	Acreage
Homestead.....	PM	54,600	400	55,000			49	163
	F&FC	100		100				
	R&T	3,600	1,400	5,000				
	B&U	20,000	1,300	21,300				
	Total	78,300	3,100	81,400				
Hopewell Village.....	PM	111,900	1,900	113,800			166	848
	F&FC							
	R&T	6,000	300	6,300				
	B&U	63,800	5,100	68,900				
	Total	181,700	7,300	189,000				
Horseshoe Bend.....	PM	65,500	1,000	66,500			279	2,040
	F&FC							
	R&T	9,600	100	9,700				
	B&U	32,200	2,900	35,100				
	Total	107,300	4,000	111,300				
Hot Springs and Arkansas Post.....	PM	251,600	28,200	279,800	Historian, GS-7	1	1,977	1,805
					Administrative Clerk, GS-4	1		
					Park Technician, GS-4	1		
	F&FC	2,100		2,100				
	R&T	55,300	1,300	56,600				
	B&U	201,400	10,500	211,900				
	Total	510,400	40,000	550,400				

Park Areas and Other Entities, Program Items, Etc.		Available 1971	Increase	Estimate 1972	New Permanent Positions in the 1972 Budget Position Title and Grade	Number	Visitor Projection Fiscal 1972 (In thousands)	Acreage
Independence.....	PM	624,900	85,200	710,100	Safety Officer, GS-12	1	2,539	17
					Park Ranger, GS-9	1		
					Personnel Assistant, GS-9	1		
					Program Assistant, GS-9	1		
					Protection and Public Use Assistant, GS-4	2		
	F&FC							
	R&T	55,500	5,500	61,000				
	B&U	521,200	89,700	610,900	Mechanical Engineer, GS-12	1		
					Curatorial Assistant, GS-7	1		
					Museum Technician, GS-7	1		
					Janitor, Ung.	2		
	Total	1,201,600	180,400	1,382,000				
Indiana Dunes.....	PM	139,600	42,100	181,700			862	6,199
	F&FC	6,500		6,500				
	R&T	31,800	2,900	34,700				
	B&U	55,900	26,400	82,300				
	Total	233,800	71,400	305,200				
Isle Royale.....	PM	226,700	11,000	237,700			13	539,341
	F&FC	18,000		18,000				
	R&T	34,200	1,800	36,000				
	B&U	251,500	17,600	269,100				
	Total	530,400	30,400	560,800				
Jefferson National Expansion Memorial.....	PM	569,100	12,700	581,800			2,052	91
	F&FC							
	R&T	26,500	6,600	33,100				
	B&U	336,000	47,600	383,600	Mechanical Engineer, GS-12	1		
	Total	931,600	66,900	998,500				

Park Areas and Other Entities, Program Items, Etc.		Available 1971	Increase	Estimate 1972	New Permanent Positions in the 1972 Budget Position Title and Grade	Number	Visitor Projection Fiscal 1972 (In thousands)	Acreage
Jewel Cave.....	PM	53,900	17,200	71,100			102	1,275
	F&FC	1,400		1,400				
	R&T	4,200	300	4,500				
	B&U	26,800	27,300	54,100				
	Total	86,300	44,800	131,100				
Joshua Tree.....	PM	255,400	31,100	286,500			550	535,000
	F&FC	14,700		14,700				
	R&T	123,500	7,500	131,000				
	B&U	70,700	10,900	81,600				
	Total	464,300	49,500	513,800				
Kennesaw Mountain.....	PM	88,100		88,100			292	2,883
	F&FC	2,100		2,100				
	R&T	15,000	1,300	16,300				
	B&U	41,100	200	41,300				
	Total	146,300	1,500	147,800				
Kings Mountain and Cowpens.	PM	69,200	6,200	75,400	Administrative Clerk, GS-4	1	633	3,951
	F&FC							
	R&T	11,300	800	12,100				
	B&U	22,400	2,300	24,700				
	Total	102,900	9,300	112,200				
Klamath Falls Cluster: Headquarters Office.....	PM	136,500	4,900	141,400				
	F&FC							
	R&T	14,100	300	14,400				
	B&U	15,500	600	16,100				
	Total	166,100	5,800	171,900				

Park Areas and Other Entities, Program Items, Etc.		Available 1971	Increase	Estimate 1972	New Permanent Positions in the 1972 Budget Position Title and Grade	Number	Visitor Projection Fiscal 1972 (In thousands)	Acreage
Klamath Falls Cluster (Continued):								
Crater Lake.....	PM	202,900	5,200	208,100			574	160,290
	F&FC	18,200		18,200				
	R&T	231,500	7,100	238,600				
	B&U	126,500	16,500	143,000				
	Total	579,100	28,800	607,900				
Lava Beds.....	PM	130,700	600	131,300			159	46,239
	F&FC	20,000		20,000				
	R&T	72,800	4,600	77,400				
	B&U	41,600	4,100	45,700				
	Total	265,100	9,300	274,400				
Oregon Caves.....	PM	32,700	3,300	36,000			146	480
	F&FC	700		700				
	R&T	13,400	500	13,900				
	B&U	11,300	1,400	12,700				
	Total	58,100	5,200	63,300				
Lake Mead.....	PM	1,045,200	11,000	1,056,200	Park Ranger, GS-7	1	6,528	1,930,000
	F&FC	10,800		10,800				
	R&T	321,600	23,200	344,800				
	B&U	653,400	123,500	776,900	Landscape Architect, GS-11	1		
					Caretaker, Ung.	1		
	Total	2,031,000	157,700	2,188,700				
Lassen Volcanic.....	PM	341,100		341,100			457	106,600
	F&FC	32,300		32,300				
	R&T	181,100	13,200	194,300				
	B&U	154,100	18,000	172,100				
	Total	708,600	31,200	739,800				

Park Areas and Other Entities, Program Items, Etc.		Available 1971	Increase	Estimate 1972	New Permanent Positions in the 1972 Budget: Position Title and Grade	Number	Visitor Projection Fiscal 1972 (In thousands)	Acreage
Lehman Caves.....	PM	90,800		90,800			41	640
	F&FC	200		200				
	R&T	17,400	3,400	20,800				
	B&U	33,900	1,900	35,800				
	Total	142,300	5,300	147,600				
Lincoln Boyhood.....	PM	91,700	9,300	101,000	Park Technician, GS-5	1	245	200
	F&FC	600		600				
	R&T	4,000	100	4,100				
	B&U	45,700	5,100	50,800				
	Total	142,000	14,500	156,500				
Lyndon B. Johnson.....	PM	83,200	28,600	111,800			77	8
	F&FC							
	R&T	5,300	400	5,700				
	B&U	29,300	6,600	35,900				
	Total	117,800	35,600	153,400				
Mammoth Cave.....	PM	587,100	20,900	608,000	Biologist, GS-9	1	1,392	51,351
	F&FC	38,400		38,400				
	R&T	199,400	12,500	211,900				
	B&U	193,200	10,700	203,900				
	Total	1,018,100	44,100	1,062,200				
Mesa Verde, Aztec Ruins, Hovenweep, and Yucca House.....	PM	445,600	28,200	473,800			652	52,542
	F&FC	19,700		19,700				
	R&T	190,100	27,200	217,300				
	B&U	176,800	42,900	219,700	Museum Curator, GS-9	1		
					Laborer, Ung.	1		
	Total	832,200	98,300	930,500				

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Park Areas and Other Entities, Program Items, Etc.		Available 1971	Increase	Estimate 1972	New Permanent Positions in the 1972 Budget Position Title and Grade	Number	Visitor Projection Fiscal 1972 (In thousands)	Acreage
Moores Creek.....	PM	40,600	8,300	48,900	Administrative Clerk, GS-4	1	42	42
	F&FC							
	R&T	2,000	200	2,200				
	B&U	17,500	1,100	18,600				
	Total	60,100	9,600	69,700				
Morristown.....	PM	215,600		215,600			491	1,350
	F&FC							
	R&T	14,500	700	15,200				
	B&U	105,300	4,800	110,100				
	Total	335,400	5,500	340,900				
Mount Rushmore.....	PM	144,500	2,700	147,200			1,913	1,246
	F&FC	6,000		6,000				
	R&T	52,200	8,900	61,100				
	B&U	67,300	5,300	72,600				
	Total	270,000	16,900	286,900				
Natchez Trace Cluster:	PM	803,800	7,900	811,700			13,203	40,002
Natchez Trace, Brices	F&FC	85,800		85,800				
Cross Roads, and Tupelo...	R&T	576,600	33,100	609,700				
	B&U	381,100	45,600	426,700	Museum Curator, GS-11	1		
	Total	1,847,300	86,600	1,933,900				
Chalmette.....	PM	67,300		67,300			352	141
	F&FC							
	R&T	4,600	1,100	5,700				
	B&U	49,400	900	50,300				
	Total	121,300	2,000	123,300				

Park Areas and Other Entitites, Program Items, Etc.		Available 1971	Increase	Estimate 1972	New Permanent Positions in the 1972 Budget Position Title and Grade	Number	Visitor Projection Fiscal 1972 (In thousands)	Acreage
Natchez Trace Cluster (Continued):								
Shiloh.....	PM	105,800	2,700	108,500			593	3,521
	F&FC							
	R&T	35,000	2,000	37,000				
	B&U	78,500	7,500	86,000				
	Total	219,300	12,200	231,500				
Stones River.....	PM	46,400	16,700	63,100	Administrative Clerk, GS-4	1	197	351
					Park Technician, GS-4	1		
	F&FC							
	R&T	12,600	800	13,400				
	B&U	25,500	7,200	32,700				
	Total	84,500	24,700	109,200				
Vicksburg.....	PM	135,600	3,300	138,900			1,061	1,698
	F&FC							
	R&T	85,000	4,200	89,200				
	B&U	129,400	5,200	134,600				
	Total	350,000	12,700	362,700				
National Capital Parks:	PM	944,400	47,500	991,900	Biologist, GS-13	2		
Office of the General Superintendent.....	F&FC							
	R&T							
	B&U	286,300		286,300				
	Total	1,230,700	47,500	1,278,200				
Central.....	PM	831,600	34,700	866,300	Community Projects Asst., GS-9	1	15,400	1,303
					Supv. Park Technician, GS-7	1		
	F&FC							
	R&T	263,100	11,400	274,500				
	B&U	4,905,300	374,300	5,279,600	Foreman, Janitor, Ung.	1		
					Laborer, Ung.	6		
	Total	6,000,000	420,400	6,420,400				

Park Areas and Other Entities, Program Items, Etc.		Available 1971	Increase	Estimate 1972	New Permanent Positions in the 1972 Budget: Position Title and Grade	Number	Visitor Projection Fiscal 1972 (In thousands)	Acreage
National Capital Parks (Continued):								
East	PM	1,015,700	19,900	1,035,600	Park Technician, GS-7	1	1,047	4,613
					Park Technician, GS-4	1		
	F&FC							
	R&T	151,500	2,500	154,000				
	B&U	1,848,200	33,500	1,881,700				
	Total	3,015,400	55,900	3,071,300				
North	PM	272,900		272,900			3,270	3,182
	F&FC							
	R&T	198,900	2,700	201,600				
	B&U	1,769,700	50,600	1,820,300				
	Total	2,241,500	53,300	2,294,800				
Antietam and Chesapeake and Ohio Canal	PM	306,400		306,400			226	5,433
	F&FC							
	R&T	100,100	4,000	104,100				
	B&U	288,200	34,400	322,600				
	Total	694,700	38,400	733,100				
Catoctin and Baltimore-Washington Parkway	PM	206,200		206,200			1,285	8,201
	F&FC	6,100		6,100				
	R&T	208,600	1,100	209,700				
	B&U	414,200	41,800	456,000	Caretaker, Ung.	1		
	Total	835,100	42,900	878,000				
George Washington Memorial Parkway	PM	425,000	48,400	473,400	Park Technician, GS-7	1	6,859	6,058
					Park Technician, GS-5	2		
	F&FC							
	R&T	350,100	7,500	357,600				
	B&U	1,769,000	49,600	1,818,600	Laborer, Ung.	1		
	Total	2,544,100	105,500	2,649,600				

Park Areas and Other Entities, Program Items, Etc.		Available 1971	Increase	Estimate 1972	New Permanent Positions in the 1972 Budget: Position Title and Grade	Number	Visitor Projection Fiscal 1972 (In thousands)	Acreage
National Capital Parks (Continued):								
Prince William Forest Park	PM	162,200		162,200			363	17,346
	F&FC	6,100		6,100				
	R&T	55,100	1,600	56,700				
	B&U	344,800	12,600	357,400				
	Total	568,200	14,200	582,400				
Wolf Trap Farm Park.....	PM	182,600	22,200	204,800	Education Specialist, GS-12	1	479	118
	F&FC							
	R&T	1,000		1,000				
	B&U	108,700	50,800	159,500	Maintenanceman, Ung.	1		
					Laborer, Ung.	1		
	Total	292,300	73,000	365,300				
National Visitor Center..	PM	51,400		51,400				
	F&FC							
	R&T							
	B&U							
	Total	51,400		51,400				
U.S. Park Police.....	PM	7,527,700	497,900	8,025,600				
	F&FC							
	R&T							
	B&U							
	Total	7,527,700	497,900	8,025,600				
Navajo Lands Cluster:	PM	460,100	38,500	498,600	Park Ranger, GS-11	1	673	106,304
(Canyon de Chelly,	F&FC	2,300		2,300				
Chaco Canyon, El Morro,	R&T	130,300	40,900	171,200	Equipment Operator, Ung.	1		
Hubbell Trading Post,					Laborer, Ung.	1		
and Navajo)	B&U	124,700	58,100	182,800	Building Repairman, Ung.	1		
					Water Treatment Plant Operator, Ung.	1		
	Total	717,400	137,500	854,900				

Park Areas and Other Entities, Program Items, Etc.		Available 1971	Increase	Estimate 1972	New Permanent Positions in the 1972 Budget: Position Title and Grade	Number	Visitor Projection Fiscal 1972 (In thousands)	Acreage
New York City Cluster: Headquarters Office.....	PM	252,400		252,400				
	F&FC							
	R&T							
	B&U	23,600		23,600				
	Total	276,000		276,000				
Manhattan Areas: (Castle Clinton, Federal Hall, General Grant, Hamilton Grange, and Theodore Roosevelt Birthplace)	PM	196,500	34,300	230,800	Park Technician, GS-4	1	315	3
	F&FC							
	R&T							
	B&U	164,000	64,200	228,200	Janitor, Ung.	1		
	Total	360,500	98,500	459,000				
Sagamore Hill.....	PM	97,000		97,000			160	85
	F&FC	1,300		1,300				
	R&T	22,300	600	22,900				
	B&U	73,000	6,900	79,900				
	Total	193,600	7,500	201,100				
Statue of Liberty.....	PM	288,700	6,200	294,900			1,199	58
	F&FC							
	R&T	12,300	700	13,000				
	B&U	268,800	82,500	351,300	Heating and Air Conditioning Specialist, Ung.	1		
	Total	569,800	89,400	659,200				
Nez Perce.....	PM	79,500	16,900	96,400	Park Technician (Protection), GS-5	1	78	1,500
	F&FC							
	R&T	7,300	4,700	12,000				
	B&U	34,800	23,900	58,700				
	Total	121,600	45,500	167,100				

Park Areas and Other Entities, Program Items, Etc.		Available 1971	Increase	Estimate 1972	New Permanent Positions in the 1972 Budget Position Title and Grade	Number	Visitor Projection Fiscal 1972 (In thousands)	Acreage
Ocmulgee.....	PM	67,800	100	67,900			50	683
	F&FC							
	R&T	6,000	600	6,600				
	B&U	34,100	600	34,700				
	Total	107,900	1,300	109,200				
Ohio Cluster:	PM	60,000		60,000			53	68
Mound City Group.....	F&FC							
	R&T	1,400		1,400				
	B&U	15,400	2,900	18,300				
	Total	76,800	2,900	79,700				
Perry's Victory.....	PM	47,100		47,100			87	21
	F&FC							
	R&T	1,900		1,900				
	B&U	39,800	800	40,600				
	Total	88,800	800	89,600				
William Howard Taft.....	PM	40,300	18,300	58,600			14	.6
	F&FC							
	R&T		1,400	1,400				
	B&U	7,500	15,900	23,400	Maintenance Worker, Ung.	1		
	Total	47,800	35,600	83,400				
Ozark.....	PM	257,600	26,800	284,400			5,913	70,000
	F&FC	19,800		19,800				
	R&T	59,700	4,700	64,400				
	B&U	198,400	45,300	243,700	Landscape Architect, GS-12	1		
	Total	535,500	76,800	612,300				

Park Areas and Other Entities, Program Items, Etc.		Available 1971	Increase	Estimate 1972	New Permanent Positions in the 1972 Budget Position Title and Grade	Number	Visitor Projection Fiscal 1972 (In thousands)	Acreage
Padre Island.....	PM	246,900	28,900	275,800	Park Technician, GS-4	1	877	132,212
	F&FC	100		100				
	R&T	82,000	10,600	92,600	Laborer, Ung.	1		
	B&U	85,500	16,400	101,900	Sewage Plant Operator, Ung.	1		
	Total	414,500	55,900	470,400				
Pea Ridge.....	PM	80,700		80,700			150	4,279
	F&FC	100		100				
	R&T	20,600	1,600	22,200				
	B&U	31,900	800	32,700				
	Total	133,300	2,400	135,700				
Pecos.....	PM	66,200	3,100	69,300			55	341
	F&FC	400		400				
	R&T	9,200	3,300	12,500				
	B&U	25,600	22,100	47,700				
	Total	101,400	28,500	129,900				
Petersburg and Poplar Grove.....	PM	93,300	600	93,900			2,620	1,531
	F&FC	200		200				
	R&T	26,000	900	26,900				
	B&U	33,200	1,300	34,500				
	Total	152,700	2,800	155,500				
Petrified Forest.....	PM	326,800	15,600	342,400			892	94,189
	F&FC	3,500		3,500				
	R&T	84,500	11,100	95,600				
	B&U	101,800	18,400	120,200				
	Total	516,600	45,100	561,700				

Park Areas and Other Entities, Program Items, Etc.		Available 1971	Increase	Estimate 1972	New Permanent Positions in the 1972 Budget: Position Title and Grade	Number	Visitor Projection Fiscal 1972 (In thousands)	Acreage
Pictured Rocks.....	PM	90,300	24,700	115,000			500	24,465
	F&FC	6,300		6,300				
	R&T	8,700	500	9,200				
	B&U	31,500	8,700	40,200				
	Total	136,800	33,900	170,700				
Pinnacles.....	PM	118,400		118,400			157	14,498
	F&FC	4,600		4,600				
	R&T	49,800	4,400	54,200				
	B&U	49,200	8,500	57,700				
	Total	222,000	12,900	234,900				
Pipestone.....	PM	61,900	10,600	72,500			156	282
	F&FC	200		200				
	R&T	5,100	400	5,500				
	B&U	20,000	18,900	38,900	Janitor, Ung.	1		
	Total	87,200	29,900	117,100				
Platt and Arbuckle.....	PM	292,600	27,400	320,000	Park Aid (Interp.), GS-4	1	2,268	6,543
	F&FC	11,200		11,200				
	R&T	93,100	14,800	107,900				
	B&U	146,100	25,400	171,500				
	Total	543,000	67,600	610,600				
Redwood.....	PM	410,400	27,400	437,800	Biologist, GS-12	1	1,210	28,861
	F&FC	22,700		22,700				
	R&T	184,400	40,900	225,300				
	B&U	143,100	31,800	174,900				
	Total	760,600	100,100	860,700				

Park Areas and Other Entities, Program Items, Etc.		Available 1971	Increase	Estimate 1972	New Permanent Positions in the 1972 Budget: Position Title and Grade	Number	Projection Fiscal 1972 (In thousands)	Acreage
Richmond.....	PM	106,200	400	106,600			430	747
	F&FC							
	R&T	24,300	1,400	25,700				
	B&U	53,500	5,200	58,700				
	Total	184,000	7,000	191,000				
Rocky Mountain and Shadow Mountain.....	PM	896,400	35,500	931,900	Biologist, GS-11	1	2,564	277,540
	F&FC	35,700		35,700				
	R&T	402,000	21,900	423,900				
	B&U	359,200	55,100	414,300	Landscape Architect, GS-12	1		
					Mechanical Engineer, GS-11	1		
	Total	1,693,300	112,500	1,805,800				
Roger Williams.....	PM	12,900	12,700	25,600				4
	F&FC							
	R&T							
	B&U							
	Total	12,900	12,700	25,600				
Russell Cave.....	PM	45,900	1,100	47,000			23	310
	F&FC							
	R&T	5,100	100	5,200				
	B&U	10,200	100	10,300				
	Total	61,200	1,300	62,500				
Saint Croix.....	PM		50,200	50,200	Superintendent, GS-11	1	100	33,636
					Park Ranger, GS-9	2		
					Clerk-Typist, GS-4	1		
	F&FC							
	R&T		5,100	5,100				
	B&U		18,400	18,400	Caretaker, Ung.	1		
	Total		73,700	73,700				

Park Areas and Other Entities, Program Items, Etc.		Available 1971	Increase	Estimate 1972	New Permanent Positions in the 1972 Budget Position Title and Grade	Number	Visitor Projection Fiscal 1972 (In thousands)	Acreage
Saint Croix Island.....	PM	15,100	7,400	22,500			40	22
	F&FC							
	R&T	1,100		1,100				
	B&U	6,600	400	7,000				
	Total	22,800	7,800	30,600				
Saint-Gaudens.....	PM	55,200		55,200			6	83
	F&FC							
	R&T	2,700	1,800	4,500				
	B&U	26,400	5,100	31,500				
	Total	84,300	6,900	91,200				
San Juan.....	PM	198,100	16,700	214,800	Park Guide, GS-5	1	635	45
					Park Guide, GS-4	1		
	F&FC							
	R&T	3,600	900	4,500				
	B&U	103,400	3,100	106,500				
	Total	305,100	20,700	325,800				
Sanford, and Alibates Flint Quarries and Texas Panhandle Pueblo Culture	PM	248,500	24,100	272,600	Park Ranger, GS-7	1	1,511	41,190
	F&FC	400		400				
	R&T	75,400	4,200	79,600				
	B&U	113,400	10,800	124,200				
	Total	437,700	39,100	476,800				
Saratoga.....	PM	102,600		102,600			206	2,432
	F&FC							
	R&T	21,000		21,000				
	B&U	67,100	7,800	74,900				
	Total	190,700	7,800	198,500				

Park Areas and Other Entities, Program Items, Etc.		Available 1971	Increase	Estimate 1972	New Permanent Positions in the 1972 Budget Position Title and Grade	Number	Visitor Projection Fiscal 1972 (In thousands)	Acreage
Scotts Bluff	PM	68,800	500	69,300			138	2,850
	F&FC							
	R&T	7,300	1,400	8,700				
	B&U	15,700	2,000	17,700				
	Total	91,800	3,900	95,700				
Seattle Cluster: Headquarters Office.....	PM	143,600	106,200	249,800	Sociologist, GS-13	1		
					Archeologist (U. of Wash.), GS-12	1		
					Historian (U. of Wash.), GS-12	1		
					Biologist, GS-12	2		
	F&FC							
	R&T							
	B&U							
	Total	143,600	106,200	249,800				
Fort Clatsop	PM	63,000	1,400	64,400			123	125
	F&FC	100		100				
	R&T	5,900	300	6,200				
	B&U	24,200	6,200	30,400				
	Total	93,200	7,900	101,100				
Fort Vancouver	PM	73,400	4,900	78,300			168	89
	F&FC							
	R&T	4,400	1,100	5,500				
	B&U	35,700	800	36,500				
	Total	113,500	6,800	120,300				

Park Areas and Other Entities, Program Items, Etc.		Available 1971	Increase	Estimate 1972	New Permanent Positions in the 1972 Budget: Position Title and Grade	Number	Visitor Projection Fiscal 1972 (In thousands)	Acreage
Seattle Cluster (Continued):								
Mount Rainier	PM	609,000	8,600	617,600			1,866	241,992
	F&FC	29,000		29,000				
	R&T	545,600	16,700	562,300				
	B&U	473,700	53,700	527,400	Sewage Treatment Operator, Ungr.	1		
	Total	1,657,300	79,000	1,736,300				
North Cascades, Lake Chelan, and Ross Lake	PM	321,200	56,900	378,100	Biologist, GS-11	1	1,738	672,300
	F&FC	31,000		31,000				
	R&T	137,400	3,100	140,500				
	B&U	127,500	17,200	144,700				
	Total	617,100	77,200	694,300				
Olympic	PM	609,600	61,500	671,100	Safety Officer, GS-12	1	2,315	896,000
					Biologist, GS-9	1		
					Park Technician (Interp.), GS-5	1		
	F&FC	41,100		41,100				
	R&T	508,500	11,900	520,400				
	B&U	399,800	52,000	451,800	Carpenter, Ungr.	1		
					Maintenanceman, Ungr.	2		
	Total	1,559,000	125,400	1,684,400				
San Juan Island	PM	67,700	7,200	74,900			42	1,752
	F&FC							
	R&T	7,000	300	7,300				
	B&U	16,000	800	16,800				
	Total	90,700	8,300	99,000				

Park Areas and Other Entities, Program Items, Etc.		Available 1971	Increase	Estimate 1972	New Permanent Positions in the 1972 Budget Position Title and Grade	Number	Visitor Projection Fiscal 1972 (In thousands)	Acreage
Sequoia and Kings Canyon ...	PM	971,500	24,100	995,600	Biologist, GS-12	1	2,034	846,500
					Park Technician, GS-5	1		
	F&FC	157,000		157,000				
	R&T	553,600	34,800	588,400				
	B&U	473,000	64,700	537,700	Landscape Architect, GS-11	1		
					Mechanical Engineer, GS-11	1		
	Total	2,155,100	123,600	2,278,700				
Shenandoah	PM	609,500	8,600	618,100			2,593	193,533
	F&FC	56,700		56,700				
	R&T	426,500	40,400	466,900				
	B&U	291,600	30,600	322,200				
	Total	1,384,300	79,600	1,463,900				
Sleeping Bear Dunes	PM		74,000	74,000	Park Manager (Superintendent), GS-12	1	2,100	23,471
					Supervisory Park Ranger, GS-9	1		
					Park Naturalist, GS-9	1		
					Administrative Officer, GS-7	1		
					Secretary, GS-5	1		
	F&FC							
	R&T		12,000	12,000				
	B&U		3,000	3,000				
	Total		89,000	89,000				
Southeast Archeological Center.....	PM							
	F&FC							
	R&T							
	B&U	36,000		36,000				
	Total	36,000		36,000				

Park Areas and Other Entities, Program Items, Etc.		Available 1971	Increase	Estimate 1972	New Permanent Positions in the 1972 Budget: Position Title and Grade	Number	Visitor Projection Fiscal 1972 (In thousands)	Acreage
Southern Arizona Cluster: (Casa Grande Ruins, Chiricahua, Coronado, Fort Bowie, Montezuma Castle, Organ Pipe Cactus, Saguaro, Tonto, Tumacacori, and Tuzigoot)	PM	926,400	88,800	1,015,200	Park Ranger, GS-12	1	1,497	425,367
					Biologist, GS-12	1		
					Archeologist, GS-11	1		
					Personnel Officer, GS-11	1		
					Clerk-Typist, GS-4	1		
	F&FC	36,800		36,800				
	R&T	256,300	23,400	279,700	Laborer, Ung.	1		
	B&U	272.500	94,900	367,400	Landscape Architect, GS-11	1		
					Museum Curator, GS-11	1		
					Engineering Technician (Draftsman), GS-7	1		
					Clerk-Typist, GS-4	1		
	Total	1,492,000	207,100	1,699,100				
Southern Utah Cluster: (Bryce Canyon, Capitol Reef, Cedar Breaks, Pipe Spring, and Zion)...	PM	676,000	17,500	693,500	Park Technician, GS-5	1	2,142	416,202
	F&FC	16,700		16,700				
	R&T	328,300	30,500	358,800	Maintenance Worker, Ung.	1		
	B&U	318,400	57,500	375,900	Landscape Architect, GS-12	1		
					Engineering Technician, GS-7	1		
					Maintenance Worker, Ung.	1		
	Total	1,339,400	105,500	1,444,900				
Southwest Archeological Center.....	PM							
	F&FC							
	R&T	2,500		2,500				
	B&U	244,600	3,900	248,500				
	Total	247,100	3,900	251,000				
Theodore Roosevelt.....	PM	176,700	6,700	183,400			680	70,000
	F&FC	6,000		6,000				
	R&T	96,000	6,600	102,600				
	B&U	78,000	8,500	86,500				
	Total	356,700	21,800	378,500				

Park Areas and Other Entities, Program Items, Etc.		Available 1971	Increase	Estimate 1972	New Permanent Positions in the 1972 Budget Position Title and Grade	Number	Visitor Projection Fiscal 1972 (In thousands)	Acreage
Timpanogos Cave.....	PM	99,600		99,600			201	250
	F&FC	100		100				
	R&T	14,700	3,600	18,300				
	B&U	25,400	6,400	31,800				
	Total	139,800	10,000	149,800				
Virgin Islands.....	PM	291,400	42,500	333,900	Biologist, GS-11	1	120	13,500
					Park Technician, GS-4	1		
	F&FC							
	R&T	84,700	3,500	88,200				
	B&U	143,200	5,300	148,500				
	Total	519,300	51,300	570,600				
Whiskeytown-Shasta-Trinity.	PM	206,200	17,400	223,600			1,326	41,987
	F&FC	20,300		20,300				
	R&T	96,200	6,100	102,300				
	B&U	145,500	31,800	177,300				
	Total	468,200	55,300	523,500				
White Sands.....	PM	135,600	6,300	141,900			542	144,000
	F&FC	100		100				
	R&T	24,200	4,100	28,300				
	B&U	37,100	6,200	43,300				
	Total	197,000	16,600	213,600				
Whitman Mission.....	PM	80,200	12,100	92,300			120	98
	F&FC							
	R&T	6,500	300	6,800				
	B&U	25,100	3,800	28,900				
	Total	111,800	16,200	128,000				

Park Areas and Other Entities, Program Items, Etc.		Available 1971	Increase	Estimate 1972	New Permanent Positions in the 1972 Budget Position Title and Grade	Number	Visitor Projection Fiscal 1972 (In thousands)	Acreage
Wilson's Creek Battlefield.	PM	33,600	900	34,500			56	1,728
	F&FC	200		200				
	R&T	6,800	500	7,300				
	B&U	16,100	1,100	17,200				
	Total	56,700	2,500	59,200				
Wind Cave.....	PM	225,400	26,300	251,700	Wildlife Biologist, GS-12 (Serves Black Hills Areas)	1	908	28,059
	F&FC	20,500		20,500				
	R&T	52,700	9,100	61,800				
	B&U	73.100	28,100	101,200	Landscape Architect, GS-11 (Serves Black Hills Areas)	1		
	Total	371,700	63,500	435,200				
Yellowstone.....	PM	1,613,600	203,800	1,817,400	Supervisory Biologist, GS-14	1	2,322	2,221,700
					Biologist, GS-12	3		
					Safety Officer, GS-12	1		
					Biologist, GS-11	1		
					Secretary, GS-6	1		
	F&FC	137,500		137,500				
	R&T	1,397,800	26,600	1,424,400				
	B&U	1,130,700	110,500	1,241,200	Curator, GS-11	1		
					Engineering Technician, GS-9	1		
	Total	4,279,600	340,900	4,620,500				
Yosemite and Devils Postpile.....	PM	1,537,100	154,400	1,691,500	Biologist, GS-12	1	2,477	760,798
					Safety Officer, GS-12	1		
					Park Ranger, GS-9	1		
	F&FC	162,100		162,100				
	R&T	644,100	37,300	681,400				
	B&U	701,500	70,500	772,000	Landscape Architect, GS-12	1		
	Total	3,044,800	262,200	3,307,000				

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Park Areas and Other Entities, Program Items, Etc.		Available 1971	Increase	Estimate 1972	New Permanent Positions in the 1972 Budget Position Title and Grade	Number	Visitor Projection Fiscal 1972 (In thousands)	Acreage
Park Support Services:								
Southeast Region.....	PM	(61,900)						
	F&FC	(3,400)						
	R&T	(48,000)						
	B&U	(39,200)						
	Total	(152,500)						
Midwest Region.....	PM	(58,500)						
	F&FC	(6,000)						
	R&T	(64,800)						
	B&U	(46,000)	29,500	29,500	Museum Curator, GS-11	1		
					Engineering Technician, GS-9	1		
	Total	(175,300)	29,500	29,500				
Southwest Region.....	PM	(65,400)						
	F&FC							
	R&T	(98,000)	10,900	10,900	Engineering Technician, GS-7	1		
	B&U	(65,400)						
	Total	(228,800)	10,900	10,900				
Western Region.....	PM	(10,200)						
	F&FC							
	R&T	(86,400)						
	B&U	(82,700)	35,300	35,300	Civil Engineer, GS-12	1		
					Electrical Engineer, GS-11	1		
	Total	(179,300)	35,300	35,300				
Pacific Northwest Region.....	PM	(50,800)	10,400	10,400	Safety Clerk, GS-6	1		
	F&FC	(3,900)						
	R&T	(13,900)						
	B&U	(14,300)						
	Total	(82,900)	10,400	10,400				

Park Areas and Other Entities, Program Items, Etc.		Available 1971	Increase	Estimate 1972	New Permanent Positions in the 1972 Budget: Position Title and Grade	Number	Visitor Projection Fiscal 1972 (In thousands)	Acreage
Park Support Services (Continued):								
Northeast Region.....	PM	(100,000)	16,900	16,900	Protection Specialist, GS-11	1		
	F&FC							
	R&T							
	B&U	(69,300)	81,000	81,000	Engineer (Civil), GS-13	1		
					Landscape Architect, GS-13	1		
					Architect, GS-12	1		
					Museum Curator, GS-11	1		
	Total	(169,300)	97,900	97,900				
Promotion of Domestic Travel.....	PM	77,900	-77,900		Chief, Division of Travel, GS-15	-1		
					Public Information Specialist, GS-13	-1		
					State Liaison Specialist, GS-9	-1		
					Secretary (DMT), GS-7	-1		
					Writer (Printed Media), GS-5	-1		
					Clerk-Typist, GS-4	-1		
	F&FC							
	R&T							
	B&U							
	Total	77,900	-77,900					
Volunteers-in-Parks Program.....	PM	54,000		54,000				
	F&FC							
	R&T							
	B&U							
	Total	54,000		54,000				

Park Areas and Other Entities, Program Items, Etc.		Available 1971	Increase	Estimate 1972	New Permanent Positions in the 1972 Budget: Position Title and Grade	Number	Visitor Projection Fiscal 1972 (In thousands)	Acreage
Plymouth-Provincetown Celebration Commission...	PM	100,000	-100,000					
	F&FC							
	R&T							
	B&U							
	Total	100,000	-100,000					
Concessions Management.....	PM	408,800		408,800				
	F&FC							
	R&T							
	B&U							
	Total	408,800		408,800				
Employees' Compensation Fund Payments.....	PM	319,300	46,500	365,800				
	F&FC							
	R&T							
	B&U							
	Total	319,300	46,500	365,800				
Roosevelt Campobello International Park Commission.....	PM	88,000	37,000	125,000				
	F&FC							
	R&T							
	B&U							
	Total	88,000	37,000	125,000				
Forest Management.....	PM							
	F&FC	298,400		298,400				
	R&T							
	B&U							
	Total	298,400		298,400				

Park Areas and Other Entities, Program Items, Etc.		Available 1971	Increase	Estimate 1972	New Permanent Positions in the 1972 Budget: Position Title and Grade	Number	Visitor Projection Fiscal 1972 (In thousands)	Acreage
Tree Preservation.....	PM							
	F&FC	120,000	-120,000		Tree Worker, Foreman, Ung.	-1		
					Tree Worker, Ung.	-3		
	R&T							
	B&U		120,000	120,000	Tree Worker, Foreman, Ung.	1		
					Tree Worker, Ung.	3		
	Total	120,000		120,000				
Forest Fire Suppression and Rehabilitation of Burned Areas.....	PM							
	F&FC	100,000	1,000,000	1,100,000				
	R&T							
	B&U							
	Total	100,000	1,000,000	1,100,000				
TOTAL.....	PM	55,363,100	3,967,700	59,330,800				
	F&FC	2,434,200	880,000	3,314,200				
	R&T	16,928,400	1,133,600	18,062,000				
	B&U	33,468,100	4,279,900	37,748,000				
	Total	108,193,800	10,261,200	118,455,000				

2. Forestry and Fire Control

Analysis by Subactivities

Subactivity	F.Y. 1970 Amount Available	F.Y. 1971 Amount Available	F.Y. 1972 Estimate	Increase (+) or Decrease (-) 1972 compared with 1971
(a) Forest management	$ 361,680	$ 298,400	$ 298,400	--
(b) Fire protection service	1,772,352	1,915,800	1,915,800	--
(c) Tree preservation	94,887	120,000	--	$-120,000
(d) Forest fire suppression and rehabilitation of burned areas	837,086	100,000	1,100,000	+1,000,000
Total	3,066,005	2,434,200	3,314,200	+880,000

(a) Forest management: Fiscal year 1971, $298,400; fiscal year 1972, $298,400; no change.

Program of work: The forest management program of the National Park Service provides for staff direction and coordination of programs directed to the management of all vegetative resources of areas within the National Park System. Goals and purposes of resource management in the System are unique in that they recognize the concept of preservation and perpetuation of a total environment rather than the production of consumable products. Passive protection is not enough; active management is required. Activities within this program include fire protection, control of exotic insects and diseases, control of exotic and noxious plants, range and habitat management, and grazing administration. Programs for prescribed burning of certain areas to assure perpetuation of some natural environments have been instigated. Forest management also provides technical assistance and direct cooperation with other conservation agencies--State, Federal, and local--resulting in more efficient operations during fires and other emergencies, forest insect and disease control activities, research, training, development and interchange of new techniques.

Examples of recent accomplishments: Park management staffs in each region have continued work toward completion of resource management plans during fiscal 1971.

National Park Service forest management programs have included efforts to determine and control effects of human impact on Sequoia gigantea and work on the maintenance and replacement of aspen stands in Yellowstone National Park. Reduction and control of saddle stock grazing has resulted in major improvements in vegetative cover in the back-country of Sequoia-Kings Canyon National Parks.

Cooperation has continued with the Forest Service and other State and Federal agencies to introduce controlled burning as a management tool in reducing fire fuel hazards and to assist in environmental restoration. Successful results in Sequoia-Kings Canyon and in Yosemite have encouraged other agencies to develop techniques to eliminate undergrowth accumulation that poses threat of potential crown fires which could destroy irreplaceable groves.

The National Park Service has continued close liaison with the Forest Service in the White Pine Blister Rust surveys in Yellowstone and Grand Teton National Parks. Cooperative programs have been implemented with the Department of Agriculture and the State of Virginia on Gypsy Moth epidemiology in Shenandoah National Park, Prince William Forest Park, and with the Department of Agriculture and the States of New Jersey and Delaware in combating the Gypsy Moth in Morristown, New Jersey and in the Delaware Water Gap National Recreation Area.

(b) Fire protection service: Fiscal year 1971, $1,915,800; fiscal year 1972, $1,915,800; no change.

Program of work: The fire protection service program provides fire protection preparedness within each area in the System where fire, both structural and wildland, presents a continuing threat to park resources. The value of historic structures protected by the Service is inestimable. Protecting these structures from fire is further complicated by the need to retain the originality of the structure and at the same time provide a modern, up-to-date fire service.

Providing a modern wildland fire service to protect the 16 million acres of forest, grasslands, tundra, and desert shrub located within Service areas demands constant updating of plans, equipment and methods. This program

provides for the day-to-day prevention and presuppression work essential for developing and maintaining a strong fire protection organization. The program reduces the probability that major, disaster fires will occur within areas administered by the Service.

The Service programs the fire protection service in accord with the program standards developed for structural and wildland fire control.

Examples of recent accomplishments: During April 1970, the National Park Service "pioneered" fire overhead team training within the Department of the Interior. The Boise Interagency Fire Center training facilities were used. The value of team training was proven by the outstanding performance of the Midwest Region overhead team on a difficult fire at North Cascade National Park.

The replacement of obsolete fire equipment, supplies and material is a continuing necessity. Eight major fire trucks were replaced during the year and additional slip-on and trailer mounted units were acquired. Four hundred fire fighters can now be equipped from the fire cache at Glacier National Park.

At Fort Larned National Historic Site a new water system was installed to afford fire protection for historic structures.

At Theodore Roosevelt National Memorial Park, heat sensing alarm systems were installed in all residences. Five small detection and alarm systems were acquired for areas in the Southeast Region.

Ozark National Scenic Riverway is continuing its contract agreement with the Missouri Conservation Commission for the fire protection of all lands within the Riverway. It is estimated this agreement has yielded a saving of $46,000.

With the addition of a Fire Protection Specialist to the staff at Yellowstone, training and overall preparedness has been greatly improved.

Three compact fire simulators have been acquired for training purposes.

(c) Tree preservation: Fiscal year 1971, $120,000; fiscal year 1972, $-0-; decrease, $120,000.

	Increase (+) or Decrease (-)				
	Amount	Positions	Total Program	Total Positions	Explanation
(1)	$-120,000	-4			Transfer to the "Buildings, utilities, and other facilities" activity of the "Maintenance and rehabilitation of physical facilities" appropriation.

The tree preservation work is being transferred in this estimate to the "Buildings, utilities, and other facilities" activity of the "Maintenance and rehabilitation" appropriation. This subactivity has been financed for several years under the "Forestry and fire control" activity because of its relationship to forest management. The work involved is virtually all maintenance and this change will place this function in its proper place.

(d) Forest fire suppression and rehabilitation of burned areas: Fiscal year 1971, $100,000; fiscal year 1972, $1,100,000; increase, $1,000,000.

The increase consists of:

	Increase (+) or Decrease (-) Amount	Positions	Total Program	Total Positions	Explanation
(1)	$+1,000,000	--	$1,100,000	--	To provide estimated cost of fire suppression and rehabilitation.

Need for increase: Heretofore, the amount of $100,000 has been provided in the budget to cover the estimated cost of emergency forest fire suppression and rehabilitation of burned areas. These costs have been running substantially higher each year resulting in supplemental requests to cover the difference between the actual costs and the amount provided. This increase will provide a more realistic program amount and thereby eliminates the need, in normal years, for a supplemental appropriation. Funds appropriated for a particular year that are not obligated in this subactivity will be returned to the Treasury.

Program of work: These funds are used to meet forest fire suppression and emergency presuppression costs as they occur and for rehabilitation of burned areas. They are funds which may be required in addition to the regular fire protection service and other activities performed at the park areas for fire suppression and emergency presuppression. Suppression involves the actual fighting of forest fires while presuppression includes such measures as increasing protection forces during periods of critical fire danger so as to be prepared in the event of fire emergency. Major fires result in severe damage to forest areas. After an emergency has passed, clearing, reseeding and other rehabilitation work is needed to reduce danger to human life and conserve the resources. Additional amounts may be required due to costs exceeding the estimate included in this item.

Examples of recent accomplishments: A portion of the areas burned in the devasting fires of 1967 and 1969 at Glacier National Park were rehabilitated during fiscal 1970 and 1971 to date. Other rehabilitation was accomplished at Yellowstone and Yosemite National Parks.

During the first nine months of 1970 calendar a total of 672 fires were suppressed by the Service; a total of 16,973 acres was burned within the parks. This is an increase of 405% in the acres burned as compared with the 1969 calendar year situation.

The following table indicates the involvement of the Service in fire suppression for a five-year period (1965-1969 calendar years), and the 1970 (Jan 1 - Sept 30) totals:

	Total Fires	Acreage Burned Inside Parks	Suppression Cost
1965-1969 (Average per year)	571	5,781	$1,001,995
1970 (Jan 1 - Sept 30)	672	16,973	$764,921

3. Park and Recreation Programs

Analysis by Subactivities

Subactivity	F.Y. 1970 Amount Available	F.Y. 1971 Amount Available	F.Y. 1972 Estimate	Increase (+) or Decrease (-) 1972 compared with 1971
(a) Cooperative activities	$2,612,080	$2,630,900	$2,839,900	$+209,000
(b) Visitor services 1/	676,070	--	--	--
(c) Land and water resource studies	469,886	732,600	732,600	--
(d) Archeological investigations and salvage 2/	912,314	875,000	--	-875,000
(e) New area studies	175,450	436,000	386,500	-49,500
(f) South Florida environmental study	--	1,000,000	1,000,000	--
Total	4,845,800	5,674,500	4,959,000	-715,500

1/ Transferred to activity 1 in fiscal 1971.

2/ To be transferred to the "Preservation of Historic Properties" appropriation in fiscal 1972.

(a) Cooperative activities: Fiscal year 1971, $2,630,900; fiscal year 1972, $2,839,900; increase, $209,000. The increase consists of:

Increase (+) or Decrease (-) Amount	Posi-tions	Total Program	Total Posi-tions	Explanation
(1) $+50,000	+6	$1,791,700	84	To accelerate the master planning program necessary to support accelerated wilderness studies.
(2) +55,000	+3	368,500	20	To accelerate the Wilderness Act studies.
(3) +104,000	+6	104,000	6	To continue park and recreation planning assistance in the Missouri River Basin formerly funded with Bureau of Reclamation funds. (This increase represents a budget adjustment.)
+209,000	+15			

Cost Factors Involved in Increases

(1) Six permanent positions at average annual salary of $13,500, $81,000. Funds previously provided for contract work amounting to approximately $31,000 will be used for salaries in fiscal 1972.

(2) Three permanent positions at average annual salary of $13,500, $40,500; supplies, materials, travel expenses, personnel benefits, $14,500.

(3) Six permanent positions at average annual salary of $12,000, $72,000; one man-year other than permanent employment, $6,000; supplies, materials, equipment, travel expenses, personnel benefits, $26,000.

To accelerate the master planning program necessary to support accelerated wilderness studies

Need for increase: An increase of $50,000 is requested in the Landmarks and Master Planning program to continue the accelerated wilderness studies program.

The Service prepares a Master Plan for each unit of the National Park System. These plans guide the management, public use, development and administration of each park area. The Master Plans are prepared by teams of professional service planners and private consultants.

Staffing Requirements

Positions	Number
Landscape Architect, GS-13	1
Landscape Architect, GS-12	2
Landscape Architect, GS-11	3
Total	6

The Master Plan has a fundamentally significant impact on the related program of wilderness studies in that, among other things, during the master planning process the lands within each park area are classified into one of the six categories, namely:

Class I - high density recreation areas;
Class II - general outdoor recreation areas;
Class III - natural environment areas;
Class IV - outstanding natural areas;
Class V - primitive areas, including, but not limited to, those recommended for designation under the Wilderness Act;
Class VI - historic and cultural areas.

From among categories III through VI, where appropriate, lands are then analyzed for suitability for wilderness classification. (See discussion of wilderness studies). The Wilderness Act prohibits the construction of any public use facilities within the lands designated by the Congress as wilderness. It is important, therefore, that these Master Plans shall contain the existing and projected programs for public use (and developments associated therewith) and that they be completed simultaneously with the wilderness studies. Failure to do so could result in lands appropriately needed for future visitor use and developments related thereto being proposed for wilderness classification. Conversely, without a full study of future visitor needs, lands more appropriate for wilderness designation might be excluded from wilderness recommendations. Either condition would frustrate the purposes of the Wilderness Act and effective management of the park.

To accelerate the Wilderness Act studies

Need for increase: An increase of $55,000 is needed by the Service to accelerate its studies of wilderness areas to fulfill the time requirements stipulated in the Wilderness Act of September 3, 1964 (Public Law 88-577). The present rate of progress if supported with this increase will accomplish completion of necessary studies within the ten year deadline established by the Act.

The increased funding will provide for three full time wilderness coordinators and planners in the Regional Offices and Service Centers.

Staffing Requirements

Postions	Number
Wilderness Coordinator, GS-13	1
Park Planner, GS-11	2
Total	3

The wilderness program is essentially a field program. The Service Centers and Regional Offices are deeply involved at every step from field studies to public hearings and final recommendations. The program which must be carried out by these field units is extremely complex and detailed; it extends over a long time period for each area studied; and it has far-reaching effects upon all park planning and park management programs.

The wilderness review program in the Regions and the Service Centers has suffered from the lack of adequate staffing to administer the program. The additional funds will provide the needed full-time coordination of the wilderness program which is essential to keeping it on schedule.

By the end of the 1971 fiscal year, approximately 14 recommendations will have been submitted to the Congress. The increase requested will enable the Service to submit approximately 16 wilderness recommendations during the 1972 fiscal year, the number necessary to keep the program on shedule.

To continue park and recreation planning assistance in the Missouri River Basin formerly funded with Bureau of Reclamation funds

This proposed adjustment in the Interior Department budget will add $104,000 to the Federal agency and State assistance program, "park and recreation programs" activity of the "Management and protection" appropriation for work previously financed with funds transferred from the Bureau of Reclamation "Construction and rehabilitation" appropriation (Missouri River Basin).

This change in financing involves no increase in funds or staff. The justification for this recreation planning work which will be continued in the Missouri River Basin is included in the discussion of Federal agency and State assistance programs.

Program of work: The programs comprising Cooperative Activities include the following:

(1) National Park System Plan
(2) Landmarks and Master Planning
(3) Wilderness Act Implementation
(4) Federal Agency and State Assistance

National Park System Plan

The estimate provides $155,100 for continuing this program in 1972 at the same level as in fiscal 1971.

The present national environmental crisis further accents the importance of the National Park System Plan. It has a very special part to play in setting aside outstanding examples of our natural and historical heritage for public inspiration and enjoyment. It will also have increasing scientific value since it identifies many relatively undisturbed natural ecosystems.

During the past year a special study was carried out to develop the most meaningful and helpful analysis of the present National Park System and to identify gaps and inadequacies. The resulting reports, upon the recommendations of the Advisory Board on National Parks, Historic Sites, Buildings and Monuments, have been approved by the Secretary as "valuable guidelines for further evolution of the National Park System Plan and a useful framework in which to present plans and priorities to the Office of Management and Budget and Committees of the Congress for expansion of the National Park System."

The National Park System Plan is organized on the basis of themes, both history and natural history, which provide a logical and scientific basis for identifying the kinds of areas which best represent our natural and historical heritage, and hence, the areas which should be evaluated for possible inclusion in the System. Themes for the Survey and Evaluation of Natural Areas provide a logical and scientific basis for identifying the kinds of areas which best represent the natural character of the United States. They provide a framework within which the National Park System may be effectively organized to protect and exhibit superb elements of the nation's natural heritage--the best examples of our great national landscapes, riverscapes and shores and undersea environments; the processes which formed them; the life communities that grow and dwell therein.

The recent study analyzes some 33 natural history themes as they occur in one or more physiographic regions comprising our nation. It is important that studies of these regions and the themes represented in them move ahead as rapidly as possible so that recommendations for rounding out the National Park System can be made while opportunities still exist.

Natural History Theme Studies accomplished or undertaken in the last four fiscal years will make important contributions to this goal. Three regional studies involving an average of some 10 themes each are programmed to start in fiscal 1972. They reflect priorities which recognize endangered types of areas, the inroads of other resource based uses, the continuing spread of man's work, and in some cases the question of timeliness in relation to other broad ongoing governmental studies.

Landmarks and Master Planning

The estimate provides $1,884,000 for natural landmark evaluation studies and continuing master planning of existing areas in fiscal 1972, including an increase of $50,000 for master planning.

The Natural Landmark Program is directly effective in the identification and protection of significant examples of the Nation's environment since it encourages preservation of sites within all levels of ownership. Emphasis in this program is upon smaller areas which, because of their location near the centers from which their use is generated and their significance as outstanding examples of environmental types and processes, are highly important. The Natural Landmarks, therefore, represent the major program of the Service to effect preservation of natural areas outside the National Park System.

The Natural Landmark and National Environmental Education Landmark Programs parallel the Historic Landmark Program financed under the "Preservation of historic properties" appropriation. The National Environmental Education Landmark Program assists local and State governments, citizen organizations, and private individuals to identify and preserve nationally significant environmental study areas, where students and other interested persons can participate in quality environmental educational programs.

Critical problems have been attacked through the master planning process. New ideas have been put into effect. The planning is flexible enough to permit the adoption of innovative solutions even while a carefully outlined Master Plan study is under way.

Studies similar to those nearing completion at Yosemite National Park may show the way to a new era in park use. Visitation to Yosemite totaled approximately 2.3 million people in 1969 and 3 million per year are expected in the 1970s, mostly all of such visitation to be in private automobiles. A large percentage of this use occurs in Yosemite Valley. Such concentration and crowding of private automobiles particularly in the Valley is not conducive to an enjoyable park experience and continuation might damage some of the park's most important resources. As discussed at another place in this estimate, some roads in the eastern end of Yosemite Valley have been closed to automobile traffic and other roads have been designated as one-way only. The use of private automobiles is being reduced and a public transportation system is being substituted to reduce pollution of the environment. The goal is to find a means by which the environmental quality of the Valley may be improved.

The urban characteristics of small townsites are found in congested areas within parks whose rugged grandeur and scenery are awe-inspiring. Special studies have been incorporated into master planning to deal more effectively with the intensive development of the privately owned lands involved. Concessioners are also affected. Unique administrative problems are currently requiring special consideration of municipal-type situations at Wawona and Yosemite Valley in Yosemite National Park, Wilsonia in Sequoia-Kings Canyon National Parks, and Apgar in Glacier National Park. Recognizing these special circumstances, municipal planners have been retained to propose comprehensive zoning and land use programs, and to assist us in ascertaining the extent to which park and continued private use may be compatible.

Many parks in the National Park System are located in or near urban areas whose administration involves important multi-jurisdictional concerns. Colonial National Historical Park is such an area. Although preliminary working draft of the master plan has been developed, it cannot be finalized until some kind of dialogue is achieved with local citizens and local governments. The National Park Service, the State of Virginia, county and town governments, Colonial Williamsburg, the City of Williamsburg and other affected private organizations must work together to articulate what their mutual objectives are and find the most harmonious and beneficial role for each organization.

At Gettysburg National Military Park we are fortunate to have a joint planning effort underway which has been financed by Housing and Urban Development. This planning work, being undertaken by Ecologist-Planner, Ian McHarg and Associates, will hopefully help Adams County and the town of Gettysburg come to grips with their very serious land use, economic, and environmental problems. Such joint effort can produce better community relations and understanding. Suitable scenic land use controls may result which will preserve the region's most promising economic base--tourism and the national military park.

Wilderness Act Implementation

The estimate provides funds in the amount of $368,000 for Wilderness Act Studies, an increase of $55,000 in fiscal 1972.

The Wilderness Act of September 3, 1964 (Public Law 88-577), requires the Secretary of the Interior to review every roadless area of five thousand contiguous acres or more in the national parks, monuments and other units of the National Park System which were in existence on the date of the Act. Fifty-seven areas in the National Park System fall within the purview of the Act. The review is to be followed by recommendations to the President as to the suitability or non-suitability of each such area for preservation as wilderness. The President must advise the Congress within a ten-year period of his recommendations.

A prerequisite to the actual wilderness studies is a review of the legislative history and the legislation itself that applies to the park, the status of inholdings, water rights, special use permits, reservations in deeds and other encumbrances, all of which is basic information which could influence decisions on suitability of parklands for wilderness designation. Frequently, where encumbrances exist (such as life estates or public land withdrawals), negotiations with private parties and government agencies are necessary to determine the possibility of removing encumbrances on parklands otherwise suitable for wilderness recommendation.

In addition to the field studies, the Wilderness Act requires that public hearings be held to review the proposals developed by the Service. This requires the preparation, assembly, and distribution of drawings and texts, making arrangements for hearings, and replying to a large volume of correspondence. After the hearings, comments and suggestions received must be assembled, summarized and evaluated as a part of the report. This report constitutes recommendations of the Service to the Secretary of the Interior and includes a draft of suggested legislation as well as text and drawings justifying and describing the proposal. The Secretary makes his evaluation and develops recommendations on the proposals as to the suitability or unsuitability for wilderness designation to the President, who advises the Congress of his recommendations.

The wilderness plans are produced as detailed action plans upon the foundation of the Master Plans developed for each park. They begin to emerge while the Master Plans are under way, and both types of plans become interwoven. Solution of Master Plan problems helps to solidify wilderness proposals.

Following is the progress and anticipated progress in submitting final recommendations to the Congress:

Submitted through fiscal year 1970	5
Estimate fiscal year 1971	9
Estimate fiscal year 1972	16
Future years	27
Total	57

Federal Agency and State Assistance

The estimate provides a total of $432,300, which is an increase of $104,000 over that provided in this appropriation in fiscal 1971 for park and recreation planning assistance in the Missouri River Basin, previously funded by transfer from the Bureau of Reclamation. This does not represent an increase in total funds or staff available to the National Park Service.

This program consists of furnishing technical and planning assistance to other agencies and Indian Tribes in the planning, development and operation of their park and recreation areas, and includes other cooperative and interagency activities; e.g., participation in comprehensive river basin planning studies, review of water resource project reports and applications, review of state comprehensive outdoor recreation plans, and review of environmental statements required by the National Environmental Policy Act of 1969.

As a prerequisite for participation in the Land and Water Conservation Fund, the States are preparing and updating statewide outdoor recreation plans. To insure recognition of Federal programs and important natural and cultural values in these plans, the Service will maintain a close working relationship with the States through personal contact, by providing information on Service programs, and by review of the State plans.

Participation will continue in the four ongoing Interdepartmental Comprehensive River Basin Studies (Lower Mississippi, Great Lakes, Southeastern New England, and Red River of the North), and in the Bureau of Reclamation's Western United States Water Plan Study (eleven contiguous western States). The Water Resources Council indicates the possibility of three new Framework Study starts; (1) Alaska, (2) Arkansas-White-Red, and (3) South Atlantic-Gulf, and five new river basin and regional plan starts; (1) Hawaii, (2) Upper Snake, (3) Long Island Sound, (4) Platte, and (5) Maumee. The Service's

primary responsibility in these studies is the assessment of historical, archeological, natural science and aesthetic values so as to insure consideration of these values in plan formulation.

The Service will review an increasing number of reports and applications for proposed developments. The number of these which were reviewed in fiscal year 1970 were:

Corps of Engineers reports	132
Bureau of Reclamation reports	33
Soil Conservation District Watershed Plans	125
Comprehensive River Basin Studies	242
Federal Power Commission applications	47
Corps of Engineers dredge and fill applications	5,982
Coast Guard construction applications	65
State Highway applications for Federal aid	1,141
Federal Aviation Administration	7
Bureau of Outdoor Recreation (recreation reports)	7
Nuclear power plant sitings	5
United States Geological Survey (maps)	14
Housing and Urban Development(urban renewal projects, etc.)	4
Other Federal agencies (Bureau of Land Management, Bureau of Sport Fisheries and Wildlife, Bureau of Mines.)	7
Other State agencies (Oregon Water Resources Board)	1
Total	7,812

These kinds of reports and publications are reviewed for effects upon proposed areas or existing units of the National Park System, Registry of National Landmarks, environmental, aesthetic and cultural values, including those protected by the Historic Preservation Act of 1966. The review of environmental statements required by the National Environmental Policy Act of 1969 for proposed Federal developments will increase the Service's project review activity by approximately 600 reviews. Environmental statements are reviewed from the viewpoint of Service jurisdiction and expertise.

Examples of recent accomplishments:

National Park System Plan

Of particular significance to the program was completion and distribution of the reports, "National Park System Plan - Part I, History and Part II, Natural History." These developed from a special thematic analysis of the National Park System undertaken and completed in Fiscal Year 1970. They were reviewed by the Secretary's Advisory Board on National Parks, Historic Sites, Buildings and Monuments and subsequently approved by the Secretary as "valuable guidelines for further evolution of the National Park System and a useful framework within which to present plans and priorities to the Bureau of the Budget and the Committees of Congress for expansion of the National Park System."

Contracts were negotiated covering natural history themes in the Great Plains Region--the 5 ecological themes involved to be covered by Colorado State University and the 13 geological themes by the United States Geological Survey in Denver, Colorado.

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Three natural history theme study contracts were completed in fiscal 1970 and two additional ones to date in fiscal 1971. These are Limestone Caverns and Springs in the United States; Significant Inland Wetlands; Mesozoic Vertibrate Paleontological Sites; Works of Volcanism; and the Beech-Maple Forest and Maple-Basswood Region of the Eastern Deciduous Forest. Contracts for the four other portions of the latter forest type studies were also executed with Universities particularly staffed to undertake them.

During both fiscal 1970 and 1971, cooperative National Park System Planning was continued with our counterparts in Canada. Fourteen parks and other sites were identified where coordinated planning is desirable, and appropriate steps were taken to institute pertinent cooperation.

Landmarks and Master Planning

During the 1970 and 1971 fiscal years emphasis has been placed upon natural history theme studies as a method of screening natural areas and facilitating comparative landmark evaluations. Field investigations which were initiated prior to the theme study program and a few special studies, also, have been continued. Ninety-four field evaluation reports were submitted since July 1, 1969. The evaluation process was completed for 93 Sites in this period and six of these were approved by the Secretary as eligible for Natural Landmark designation. Owners applied for registration of 15 Sites, and certificates and plaques were presented to owners of 26 Sites during this time.

Three theme studies (completed since July 1, 1969) recommend a total of 198 Sites as potentially meeting natural landmarks criteria. One-hundred and seventeen of these are programmed for field evaluation in the second half of fiscal 1971.

Announcement of landmark eligibility called attention to the national significance of Sunfish Pond and Moggy Hollow in New Jersey, Madison Boulder in New Hampshire, Fall Brook Gorge in New York, Patagonia-Sonoita Creek in Arizona and Allerton Natural Area in Illinois. Registration of all but two of these has been requested by owners.

Ceremonial presentations of certificates and bronze plaques were made to two paper companies, two citizen conservation organizations, one university and several State and Federal agencies and private individuals. These strengthen Departmental rapport and cooperation in the protection of environmental values.

On August 18, 1970, the National Registry of Natural Landmarks was published in the Federal Register. The listing of current Registered Natural Landmarks and additional sites eligible for registration was preceded by an explanation of the scope and objectives of the Natural Landmark program. The publication caused several inquires to be made by private industry regarding specific location of sites, so that harm to the sites could be avoided through advance planning.

During fiscal 1970 Master Plans were completed for twenty-seven areas. In Addition there were special studies completed which related to legislative proposals for 44 existing areas, follow-up work and revision of 13 area Master Plans, and special studies completed on ten master plan-related problem areas.

Wilderness Act Implementation

Wilderness recommendations concerning five units of the National Park System previously forwarded to the Congress were:

Craters of the Moon National Monument, Idaho
Petrified Forest National Park, Arizona
Lassen Volcanic National Park, California
Pinnacles National Monument, California
Lava Beds National Monument, California

Department witnesses testified at hearings leading to the Act of October 23, 1970 (Public Law 91-504) which designated 43,243 acres within Craters of the Moon National Monument and 50,260 acres within Petrified Forest National Park as wilderness.

Final recommendations for six units of the National Park System have been formulated and placed in review within the Department in fiscal year 1970 as follows:

Arches National Monument, Utah
Capitol Reef National Monument, Utah
Cedar Breaks National Monument, Utah
Chaco Canyon National Monument, New Mexico
Chiricahua National Monument, Arizona
Isle Royale National Park, Michigan

Two additional recommendations (North Cascades and Shenandoah National Parks) were forwarded for review during the 1971 fiscal year.

So far in the 1971 fiscal year wilderness suitability hearings have been conducted for:

Great Sand Dunes National Monument, Colorado
Colorado National Monument, Colorado
Black Canyon of the Gunnison National Monument, Colorado
Theodore Roosevelt National Memorial Park, North Dakota
Mesa Verde National Park, Colorado

Federal Agency and State Assistance

Schematics for 8 campgrounds proposed on various Indian Reservations in California were prepared by the Service for use in studying the feasibility, and acquiring funds, to form a chain of incorporated campgrounds. The Service drafted a master plan for the Quinault Indian Reservation, Washington. To assist in the implementation of theZuni Pueblo Comprehensive Development Plan, the Service prepared a master plan of the Hawikuh area.

Assistance was furnished to the Bureau of Sport Fisheries and Wildlife by preparing a General Recreation Development Plan and an Interpretive Prospectus for Lake Red Bluff, California. Preconstruction recreation planning was accomplished for the Bureau of Reclamation on numerous projects including the Garrison Diversion Unit, North Dakota, and the Fryingpan - Arkansas Project, Colorado.

A General Development Plan and Interpretive Guidelines Report was prepared for the Wyoming Recreation Commission for the Glenrock Buffalo Jump Site Wayside Park and Rest Area. In order to answer the many inquiries from the private sector on campgrounds and recreational vehicle parks, a booklet was prepared to provide general information on the subject.

(b) Land and water resource studies: Fiscal year 1971, $732,600; Fiscal year 1972, $732,600; no change.

Program of work: This subactivity includes (1) direction and coordination of Servicewide land and water rights acquisition programs, (2) real property appraisals incident to proposed area studies, (3) maintenance of Washington Office land files and preparation of reports required by higher authority and (4) studies and actions to determine potential water resources of park areas and steps that must be taken in the perfection of water rights.

Changing land values throughout the country accentuate the need for accurate and up-to-date cost estimates on new area and boundary adjustment proposals to be submitted to Congress. Such estimates are based on appraisals made by this staff.

The Service's permanent land files consist of more than ten thousand assemblies of deeds and muniments of title with related maps pertaining to the 28,500,000 acres of Federal lands and waters under the administrative jurisdiction of the Service. Controversial land matters, inquiries of interested parties, and programming of land acquisitions necessitate constant reference to these muniments of title. Also comprising a part of the function is the preparation of plats for court proceedings and maps in support of budget requests, and the maintenance or real property acquisition progress maps.

Studies of water resources consist of investigations for long-range planning necessary for management of water, its uses, disposal, conservation, and its overall protection. Investigations encompass hydrologic determinations of available water, its potential for development and other uses, its chemical and biological qualities, alternative methods of developing and/or acquiring water. The studies provide for long term water measurement and monitoring programs. Investigations of water resources thus aid in better understanding of the natural systems of the park and are necessary for management and protection of the park.

Examples of recent accomplishments: Water resources studies during the 1970 fiscal year include 16 comprehensive geohydrological investigations of ground and surface water; continuation of measurement of streamflows and ground-water levels at 14 park areas, and 161 chemical analyses of water quality. In the 1971 fiscal year program, 45 water resource investigations are in progress, or are scheduled to be undertaken; 8 of these are the continuation of gaging programs begun in prior years, such as at Capitol Reef, Carlsbad Caverns, and Sequoia; 16 continue the geohydrologic studies at such places as Big Bend, Cape Hatteras, and Guadulupe; one new study was begun at Cape Cod; and 20 continue research and inventory of water rights and resources, such as at Bighorn Canyon and Rocky Mountain.

(c) Archeological investigations and salvage: Fiscal year 1971, $875,000; fiscal year 1972; -0-; decrease, $875,000.

Increase (+) or Decrease (-) Amount	Positions	Total Program	Total Positions	Explanation
(1) $-875,000	-21	--	--	Transfer of the Archeological investigations and salvage subactivity in this estimate to the "Historic preservation and special studies" activity of the "Preservation of historic properties" appropriation.

The Archeological investigations and salvage subactivity is being transferred in this estimate to the "Historic preservation and special studies" activity of the "Preservation of historic properties" appropriation. Funds previously transferred from the Bureau of Reclamation to perform archeological investigations and salvage work in the Missouri River Basin will also be included under the "Preservation of historic properties" appropriation. Thus, all external programs (those not performed in or for park areas) for archeological investigations and salvage work will be financed in the "Preservation of historic properties" appropriation.

(d) New area studies: Fiscal Year 1971, $436,000; fiscal year 1972, $386,500; decrease, $49,500.

Program of work: The National Park Service investigates, evaluates, then makes and supports recommendations relating to proposals to add new areas to the National Park System. These proposals arise through suggestions from citizens, citizen organizations, and citizen advisory groups; through systematic natural and historical theme studies conducted by the National Park Service; and, as a result of studies required by Acts of Congress (as the Wild and Scenic Rivers Act and the National Trails System Act). Much of the program activity, moreover, arises in response to inquiries and requests from individual Members of Congress and Congressional Committees concerning proposed and pending legislation. The normal sequence of events progresses from the suggestion to (1) a reconnaissance study and determination of national significance; to (2) a study suggesting various management and boundary alternatives; to (3) the preparation of a master plan for management and development which is fully supported by maps, exhibits, and quantitative data concerning costs for acquisition, development and operation of the proposed area needed to support legislative action. Approximately one-hundred eighty-two potential new areas are under various stages of review and consideration. Some seventy-five of these proposals were proposed in bills introduced in the 91st Congress. This program is essential to legislative consideration of areas which could bring quality outdoor recreational opportunities within range of millions of deprived persons who might otherwise never realize this experience; it provides data needed for legislative consideration of proposals involving natural and historical resources which in the absence of adequate recognition and protection may be lost forever.

Examples of recent accomplishments: During fiscal 1970 the National Park Service completed studies to support departmental legislative reports sent to the 91st Congress on 12 new area proposals, with reports on five additional proposals to date in 1971.

Special new area study reports completed totaled nine in fiscal 1970 and four to date in 1971. Approval of an additional eleven plans is anticipated during the remainder of 1971.

(e) South Florida environmental study: Fiscal year 1971, $1,000,000; fiscal year 1972, $1,000,000; no change.

Program of work: In September 1968, the Dade County Port Authority, started construction on a 39-square mile jetport six miles north of Everglades National Park, and on the edge of the Big Cypress Swamp. Implementing Interior's concern about effects on the park and for the welfare of the Miccosukee Indians, Interior and the Department of Transportation agreed to study the problem. The study produced "The Ecological Impact of the Big Cypress Swamp Jetport," a report prepared by an Interior team of specialists under the direction of Dr. Luna B. Leopold of the Geological Survey. This study confirmed the deterimental impact of developing a jetport at the site selected.

Accordingly, an agreement was entered into between the United States(Department of Transportation and Department of the Interior), the State of Florida, and the Dade County Port Authority, to re-evaluate the proposed project. The contract assigns to the Secretary of the Interior the responsibility to perform the following tasks: (1) Provide site criteria for locating an alternate jetport site for south Florida and apply the criteria to the site offered for evaluation; (2) Establish an environmental monitoring program for the area affected by the presence and use of the existing jetport site; (3) Undertake the planning, development, and coordination of an ecological study of the region, including its hydrology, and providing recommendations for uses of Big Cypress Swamp, which will be consistent with preserving and protecting the environment and ecosystems of Everglades National Park, the water supply of the affected communities and the marine resources of dependent estuaries.

The foregoing tasks are being accomplished as a joint effort by five bureaus in the Department (National Park Service, Geological Survey, Bureau of Sport Fisheries and Wildlife, Bureau of Outdoor Recreation, and Bureau of Indian Affairs) and two former bureaus, the Federal Water Quality Administration and the Bureau of Commercial Fisheries, now transferred to the Environmental Protection Agency and National Oceanic and Atmospheric Administration, under the direction of the Everglades-Jetport Advisory Board composed of Directors of each participating bureau and agency. The Director of the National Park Service is designated Chairman of the Everglades-Jetport Advisory Board and the National Park Service has been directed to coordinate the program.

To facilitate coordination of the work program in the field, a field office has been established in Miami, Florida. The office is headed by a special representative of the Secretary who is the Department of the Interior Coordinator, South Florida Environmental Project. The Project Coordinator together with corresponding bureau and agency representatives in the field constitute a Field Advisory Board. The field work is being carried out by the Field Advisory Board and staff of the bureaus and agencies.

1971 Fiscal Year Costs

Supplemental appropriations of $1.0 million were made available for the South Florida Environmental Project during fiscal year 1971 for the following purposes:

Purpose	Amount
Environmental monitoring program	$216,000
Planning, development, and coordination of ecological study of south Florida region, including evaluation of alternate site impact	716,000
Advisory Board Field Office, Miami, Florida	68,000
Total	1,000,000

1972 Fiscal Year Estimate

The amount requested for fiscal 1972 will be used for the following purposes:

Purpose	Amount
Environmental monitoring program	$216,200

Planning, development, and coordination of ecological study of south Florida region, including evaluation of alternate site impact	$ 704,000
Advisory Board Field Office, Miami, Florida	79,800
Total	1,000,000

Positions and Funds Required

Bureau	Permanent Positions	Amount
National Park Service	10	$ 363,000
Geological Survey	11	210,000
Environmental Protection Agency(Water Quality)	12	163,000
National Marine Fisheries Service(National Oceanic and Atmospheric Administration)	1	74,000
Bureau of Sport Fisheries and Wildlife	4	70,000
Bureau of Outdoor Recreation	4	70,000
Bureau of Indian Affairs	0	50,000
Total	42	$1,000,000

Details by Bureaus and Agencies

National Park Service

The National Park Service is the lead agency of the South Florida Environmental Work Program and the Director of the National Park Service serves as Chairman of the Everglades-Jetport Advisory Board. He is responsible for the progress and accomplishment of the work program and requisitions professional services from the participating bureaus, and agencies as needed to carry out approved work plans.

The National Park Service with the advice and support of the participating bureaus and agencies formulates the programs, budgets and maintains fund controls on all appropriated moneys approved for the study project.

The level of National Park Service participation in the study program is as follows:

Purpose	Amount
Environmental monitoring program	$ 68,200
Ecological study of south Florida region including evaluation of alternate site impact	215,000
Field Office, Miami, Florida	79,800
Total	363,000

Environmental Monitoring Program. This portion of the study involves monitoring noise, air and wildlife within the general vicinity of the existing jetport site. The noise pollution task is being accomplished in cooperation with the Office of Noise Abatement, Department of Transportation and Dade County Port Authority. Air pollution monitoring is accomplished by cooperative agreement with the National Air Pollution Control Administration, Department of Health, Education, and Welfare.

Noise monitoring is on a sampling basis, with readings taken at selected locations including points within or on the border of Everglades National Park. Field observation is supplemented by theoretical noise projections and necessary analyses. National Park Service personnel provide installation and servicing of monitoring equipment. Data reduction is provided by Department of Transportation.

The Department of Transportation is responsible for obtaining and maintaining equipment and interpreting data in terms of departure from ambient sound levels. Physiological and psychological effects on animals and humans will also be examined. Under the air quality monitoring program, NAPCA provides and services the equipment and analyzes data. Data collection is to be done under contract with a university or private contractor.

The wildlife monitoring program involves the survey by light plane within a 15-mile diameter area of the jetport for counts of large mammals, large wading birds (herons, ibis, and wood stork), water fowl and large raptores (eagles, ospreys and vultures). The counts to be taken 8-10 times per year, depending on water levels, will take note of species and numbers in various locations, as well as patterns of activity. The data will be compared with corresponding Park Service counts elsewhere in the area. Surveys of fish and wildlife in the study area will be conducted. Samples will include a list of species, relative abundance, changes in species composition, reproductive success, and general behavioral observations. Monthly dead animal counts will be made along the periphery of the airstrips, and animal strike data will be requested from airport management personnel. Fish kills will be investigated to determine cause, and the magnitude of the kill.

The fund requirements for this phase of the study for fiscal year 1972 will amount to $68,200.

Ecological Study. The National Park Service effort is directed toward specialized studies in biology, hydrology andsociology and urban impact.

The biologic study will involve the collection and analysis of information on (1) estuarine resources and problems relating primarily to Everglades National Park, Biscayne National Monument, and Fort Jefferson National Monument in collaboration with National Marine Fisheries Service, State of Florida, and other appropriate sources; (2) fresh water biological resources and problems particularly in Everglades National Park; (3) vegetation resources and problems of southern Florida and (4) rare and endangered species and other aspects of the wildlife resources of southern Florida.

The hydrologic study involves the compilation and analysis of existing hydrologic data on areas in south Florida.

The evaluation of alternate jetport sites and applying criteria to the sites offered for evaluation by the State of Florida and Dade County Port Authority will also be performed by the Service under this work program.

The funds required to accomplish the foregoing workload in fiscal year 1972 will amount to $215,000.

Everglades-Jetport Advisory Board Field Office, Miami, Florida. An office was established in Miami, Florida to facilitate coordination of the work program in the field. The office is headed by a representative of the Secretary of the Interior, entitled Department of the Interior Coordinator, South Florida Environmental Project (Project Coordinator). The Project Coordinator together with executive level representatives from each of the participating bureaus and agencies constitutes the Field Advisory Board and is the team that conducts the work in the field.

Fund requirements for fiscal year 1972 to meet operating costs will amount to $79,800.

Geological Survey

The Geological Survey's effort in the south Florida environmental work program includes two program areas - environmental monitoring, and ecological study of south Florida.

Environmental Monitoring. This monitoring program is designed to determine the present status of the environment in the vicinity of the jetport and to detect any changes which are attributable to jetport activities. The program provides for monitoring water quality, changes in biota, collection of data for air quality and noise studies (evaluation by others), ground and surface water hydraulics and hydrology, and aerial photography. The fund requirement of Geological Survey for environmental monitoring for fiscal year 1972 will amount to $72,000.

Ecological Study of South Florida. Under this program, Geological Survey will identify and describe the surface and ground water resources of south Florida including seasonal and areal distribution and the quantity and quality of the water resources. The study will consider the estuarine environment as it is affected by changes in the fresh water environment and in turn the effect of sea water encroachment on the fresh water environment. This study also includes an identification and description of the vegetative and aquatic biota as these are affected by changes in the water resources, where these data are available. The objective of the Survey's work is to provide an analysis of the existing hydrologic data for land use planning and, as appropriate, analysis of alternative approaches for resolving environmental issues. The budget estimate for fiscal year 1972 for this portion of the Survey's work is $138,000.

Water Quality Office

The Federal Water Quality Administration recently transferred from the Department of the Interior to the Environmental Protection Agency, where it became the Water Quality Office, in conjunction with the Geological Survey will provide the expertise on water quality. This agency's participation includes two program areas - environmental monitoring and ecological study of south Florida.

Environmental Monitoring. A network of 16 Water Quality Office stations will be used to monitor the effects of the jet training facilities on water quality in the general environment of the jetport. These stations are near wildlife habitats which may be affected by flight operations due to their proximity to the landing strip or their locations in the drainage system which may receive polluting substances from jetport operations. Control stations have been established upstream for comparative purposes and two remote locations downstream in Everglades National Park to detect long-range effects.

Two types of biological monitoring will also be performed. The first consists of qualitative and quantitative studies of microbenthos, vascular plants and plankton in selected locations. The second involves quantitative and qualitative sampling of invertebrates, small fishes and vegetative species in selected locations and accompanying time-lapse photography to detect pertinent environmental changes. The fund requirements of the Water Quality Office for this program for fiscal year 1972 will amount to $76,000.

Ecological Study of South Florida. The south Florida study area containing a multiplicity of critical and subcritical water quality problems due to the rapid and largely uncontrolled urban growth of recent years and increased and shifting agricultural activity. The study will evaluate available data to define these areas and to determine changes taking place. Alternatives to undesirable changes will be analyzed and measures will be outlined to reverse undesirable trends. The scope of the proposed study is:

1. Assemble and consolidate all available data on chemical, physical and biological characteristics of surface and underground water.

2. Relate known pollution sources with known water quality deficiencies.

3. Project population and/or economic growth for all significant sources of pollution to 1980, 1995 and 2020.

4. In general terms outline alternatives and their probable consequences for all problem areas affecting waters of interest to the Department of the Interior including waters affecting National Park areas, interstate waters, unique ecological areas and navigable waters.

5. Recommend actions to be taken by appropriate agencies to secure desired water quality and to assure protection of existing or achieved water quality.

The fund requirement for fiscal year 1972 for this portion of the Office's participation in the study is $87,000.

National Marine Fisheries Service

The Bureau of Commerical Fisheries, recently transferred to the National Oceanic and Atmospheric Administration, where it became the National Marine Fisheries Service, is providing expertise and is responsible for studies on the commercially important finfish and shellfish species of the south Florida area. Of considerable importance are the shrimp stocks which occupy the estuarine areas during their early growth stages. The estuaries serve as the nursery habitat and extend from the Ten Thousand Islands southward to and including Florida Bay. The estuaries depend upon the quantity and quality of freshwater runoff to maintain their suitability as nurseries. The extent of runoff needed to maintain high quality estuaries has to be established.

The life history and ecology of the shrimp have received extensive study in the past as have several of the finfish species. The NMFS effort will be directed primarily toward collecting and collating this existing information into a coherent presentation that will define the importance of the estuarine areas to the commercial fisheries industry. Concurrently, there will be a compilation of possible environmental changes or trends that affect the estuarine environment and impact the fish resources from the continued use of the jetport or other upland changes.

The fund requirement for fiscal year 1972 is $74,000.

Bureau of Sport Fisheries and Wildlife

The Bureau of Sport Fisheries and Wildlife's responsibilities under this program consist of the assembly of existing wildlife information, including data on how such information is used. The bureau will identify the kinds of land use and human activities that adversely affect wildlife resources in south Florida. This information will be evaluated together with related data compiled by other bureaus and organizations for that portion of the study concerning the identification of critical issues of alternative approaches.

The funds required for fiscal year 1972 are $70,000.

Bureau of Outdoor Recreation

The Bureau of Outdoor Recreation participates in the south Florida environmental work program in (1) inventorying recreation resources of the area currently being used for recreation purposes, those proposed for such use and those having potential for recreation use; (2) identifying present recreation use and projected use; (3) describing the impact of present and projected use on the environmental values of the area; and (4) recommending actions to assure that recreation use is compatible with other activities in the area and the preservation of significant resources.

The funds required for fiscal year 1972 are $70,000.

Bureau of Indian Affairs

The Bureau of Indian Affairs' participation in the ecological study of south Florida involves a study of the social impact that any jetport has on the lives of the Miccosukee and Seminole Indians. The sudden and involuntary intrusion of round the clock noise and pollution from jet engines as well as solid and other wastes from operation of an airport adjacent to Federal, State or private lands used by the Indian people is expected to have profound affects on their cultural, occupational and living conditions. The study will be performed by contract with a university or private group.

The funds required for fiscal year 1972 are $50,000.

Personnel Summary

	1970 actual	1971 estimate	1972 estimate
Total number of permanent positions....	3,264	3,718	3,831
Full-time equivalent of other positions	1,160	1,243	1,346
Average number of all employees.....	4,096	4,657	4,947
Average GS grade.....	8.7	8.7	8.7
Average GS salary.....	$11,486	$11,523	$11,526
Average salary of ungraded positions...	$8,386	$8,740	$9,196

DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
MANAGEMENT AND PROTECTION

Itemization of Estimate

	Actual 1970	Available 1971	Estimate 1972	Increase (+) Decrease (-)
Program and Financing:				
Total obligations	$53,778,365	$63,471,800	$67,604,000	$+4,132,200
Unobligated balance lapsing	114,737	....	....	....
Transferred to other accounts	90,673	98,200	....	-98,200
Transferred from other accounts	-377,775	....	....	....
Appropriation	53,606,000	60,145,000	67,604,000	+7,459,000
Proposed supplemental for civilian pay act increases	....	3,425,000	....	-3,425,000
Obligations by objects:				
11 Personnel compensation	$38,925,374	$45,759,800	$48,055,000	$+2,295,200
12 Personnel benefits	3,683,462	4,296,000	4,325,000	+29,000
21 Travel and transportation of persons	1,495,602	1,851,000	2,075,000	+224,000
22 Transportation of things	821,948	893,000	1,140,000	+247,000
23 Rent, communications, and utilities	1,429,250	1,565,000	1,984,000	+419,000
24 Printing and reproduction	1,049,088	1,153,000	1,456,000	+303,000
25 Other services	3,502,512	4,702,000	4,600,000	-102,000
26 Supplies and materials	1,760,052	1,952,000	2,442,000	+490,000
31 Equipment	1,009,710	1,112,000	1,402,000	+290,000
41 Grants, subsidies, and contributions	88,000	188,000	125,000	-63,000
42 Insurance claims and indemnities	13,367	....	....	....
Total obligations	53,778,365	63,471,800	67,604,000	+4,132,200

(Discussion off the record.)

ANDERSONVILLE NATIONAL HISTORIC SITE, GA.

Mrs. HANSEN. You are requesting $128,000 and 12 permanent positions for the Andersonville National Historic Site, Ga.

How much has the Department of the Army spent per year at this site?

Mr. HARTZOG. I thought you were going to ask me that, and I have that written down here. They have one superintendent and six maintenance people. Seven. That provides no interpretation and no visitor service and protection. It is simply the maintenance operation as such.

Mrs. HANSEN. You now are requesting $128,000 and 12 permanent positions.

Mr. HARTZOG. Yes, ma'am. We have 7½ man-years of maintenance, which is one-half man-year more than the Army had, and then we have five positions and 13 man-years of management and protection staff.

Mrs. HANSEN. How much did it cost the Department of the Army to maintain this facility?

Mr. HARTZOG. It would have cost them undoubtedly the same amount it costs us for the seven, $77,000 for maintenance and rehabilitation. I would imagine all of theirs would be maintenance and rehabilitation since they have no interpretation. I would say about $77,000.

APOSTLE ISLANDS NATIONAL LAKESHORE, WIS.

Mrs. HANSEN. Justify your request of $125,500, and 8 permanent positions for Apostle Islands National Lakeshore, Wis.

Mr. HARTZOG. There is a park manager, administrative officer, secretary, and 3 rangers, one fire control aide, maintenance man, mechanic, and a laborer, for a total of 10.

Mrs. HANSEN. How many acres of land do you own in this area?

Mr. HARTZOG. There is some State land involved.

Mr. STEWART. There are 1,182 acres of federally owned land and 17,501 acres of other publicly owned land. There are 24,143 acres in private ownership to be acquired.

Mr. HARTZOG. How much do you expect to acquire in 1972?

Mr. STEWART. We have to acquire the whole thing.

Mr. HARTZOG. It is a 1-year acquisition. We expect the area to be brought into being in the 1972 fiscal year.

FORT POINT NATIONAL HISTORIC SITE, CALIF.

Mrs. HANSEN. Justify your request of $83,800 and five permanent positions for Fort Point National Historic Site in California.

Mr. HARTZOG. This is the area that the Fort Point Association has been operating under contract with us that I told you about in connection with the supplemental hearings. We have provided them with $40,000 out of reserves so that they will continue to operate it for the remainder of this fiscal year and then hopefully with this budget we will be able to take over the operation July 1. This is one of those small areas, Madam Chairman, where we have five permanent positions and

2.3 man-years of seasonal employment. This is one of the small areas I described earlier this morning as being in the scope of one of our budget objectives.

Mrs. HANSEN. This area includes approximately 33 acres of land and approximately 63 acres of submerged land.

Mr. HARTZOG. At Fort Point, yes, ma'am. Most of it is the Fort there. Submerged land is out around the seawall.

SLEEPING BEAR DUNES NATIONAL LAKESHORE, MICH.

Mrs. HANSEN. You are requesting $89,000 and five permanent positions for the Sleeping Bear Dunes National Lakeshore. How much land do you own in this area?

Mr. STEWART. Ninety-eight acres are federally owned and there are 18,853 acres of other publicly owned land.

Mrs. HANSEN. Is that State owned land?

Mr. STEWART. Yes, ma'am. There is a total of 52,117 acres in private ownership. This year we would not hope to acquire all of that but have a 2-year program.

Mr. HARTZOG. We are bringing it into being on the basis of a small area with five permanent employees and 3.6 man-years of seasonal help.

Mrs. HANSEN. What do you eventually expect your visitation to be at this facility?

Mr. HARTZOG. We have that projection here somewhere.

Mr. STEWART. The projected visitation is 3,195,000 by 1975.

ST. CROIX NATIONAL SCENIC RIVERWAY, MINN., AND WIS.

Mrs. HANSEN. Justify your request of $73,700 and five permanent positions for St. Croix National Scenic Waterway in Minnesota and Wisconsin.

Mr. HARTZOG. That is five permanent and 1.1 man-years seasonal. What is the ownership, Mr. Stewart?

Mr. STEWART. There are 973 acres of federally owned land and 36,590 acres of publicly owned land. There are 30,184 acres of private ownership to be acquired.

Mr. HARTZOG. We expect to activate that in the 1972 fiscal year with a small staff.

Mrs. HANSEN. How much land do you expect to acquire during fiscal year 1972 in this area?

Mr. HARTZOG. We will have gotten all of the public ownership—and how much of the private?

Mr. STEWART. During 1972 we believe that we will acquire at least 10,510 acres.

OPERATION OF NEW FACILITIES

Mrs. HANSEN. $159,700 is requested for operation of new facilities. Is the visitor center at Jewel Cave National Monument completed?

Mr. HARTZOG. The visitor center is completed.

Mrs. HANSEN. What is involved in your request of $16,400 for the Pipestone National Monument?

Mr. HARTZOG. That is the new cultural center.

Mrs. HANSEN. Justify your request of $6,500 for the Grand Canyon National Park?

Mr. HARTZOG. That is for the operation of the sewage system that is being completed in connection with the new water system.

INDEPENDENCE NATIONAL HISTORICAL PARK, PA.

Mrs. HANSEN. What is involved in your request of $19,400 for Independence National Historical Park?

Mr. HARTZOG. We have completed and furnished the second floor of Independence Hall and completed and furnished the old city hall.

Mrs. HANSEN. Have you acquired all of the land in this area that you plan to acquire?

Mr. HARTZOG. At Independence? We have the contract, option?

Mr. STEWART. No; it has been urban acquired.

Mr. HARTZOG. It is all acquired now. We are finishing the development.

There is another proposal I should tell you about so you don't come back and say I didn't tell you everything; that is, the proposal to acquire a block between Independence National Historical Park and the old restaurant building there. It is commonly called Project F. Congressman Jimmie Byrne may have talked to you about that. That is Project F. That is not yet authorized.

Mrs. HANSEN. Has the authorization bill for this area been introduced?

Mr. HARTZOG. I don't believe it has been introduced yet.

FREDERICK DOUGLASS HOME, D.C.

Mrs. HANSEN. Justify your request of $8,400 for the Frederick Douglass Home.

Mr. HARTZOG. We will have certain of those rooms open in this fiscal year. The Bicentennial Commission talked to us about using part of it to gather particularly the black history part of the bicentennial.

WOLF TRAP FARM PARK, VA.

Mrs. HANSEN. You are requesting $69,200 for Wolf Trap Farm Park. You had a fire catastrophe of this facility just recently.

Mr. HARTZOG. It was a catastrophe. We expect to have the center finished and operating during the 1972 fiscal year.

Mrs. HANSEN. Is this facility going to be able to operate this summer?

Mr. HARTZOG. Yes, ma'am. We are going to operate this summer with no agreement yet on just how the operation will be carried on. We have made certain suggestions that have not yet been acted on favorably. They have other proposals under consideration but there will be a program this summer.

Mr. WYATT. Don't they already have some scheduled artists and performance already with dates?

Mr. HARTZOG. Yes, sir.

NATIONAL PARK SERVICE CULTURAL FACILITIES

Mrs. HANSEN. Please insert in the record a list of the cultural facilities in which the National Park Service is involved, the total costs per year, and the number of people who are paying guests.

Mr. HARTZOG. Yes, ma'am.

(The information follows:)

STATEMENT ON NATIONAL PARK SERVICE FACILITIES FOR THE PERFORMING ARTS

Facility	Fiscal 1970 operating costs (including protection)	Number of guests paying admissions to concessionaire	Number of non-paying visitors
Carter Barron	$106,300	167,000	32,900
Ford's Theatre	470,000	74,310	365,375
Sylvan Theatre	130,000	20,000	49,160
Wolf Trap Farm	141,400	(1)	
Watergate	22,900		221,450

[1] Not in operation during fiscal year 1970.

BEAR MANAGEMENT AT YELLOWSTONE NATIONAL PARK

Mrs. HANSEN. You are requesting $75,000 for bear management in Yellowstone National Park. I see you continue to have a bear problem at Yellowstone.

Mr. HARTZOG. Yes.

Mrs. HANSEN. I understand that you had a study performed on the behavioral aspects of the bears. Please give us what the results of that study have been?

Mr. HARTZOG. Following the catastrophes in Glacier 4 years ago involving those young ladies who were killed by grizzly bears, I asked Dr. Starker Leopold, the Chairman of our National Science Advisory Committee, to convene a meeting in Yellowstone, which he did during the summer before last. He invited several authorities in the country in the field of bear research and management, to tell us what else needed to be done in order to cope with this situation and hopefully avoid any such unfortunate incident in the future. This program that you gave me the money for in the 1970 budget was in the initiation of that program. Because of a technicality in the budget presentation the money was not included in the 1971 budget, and I continued to finance that program out of my reserve money in 1971 and this year, 1972, to continue that program which was recommended to me by Dr. Leopold and the Natural Science Advisory Committee. The other members of the committee are Dr. Stanley Cain of the University of Michigan, Mr. Sigurd Olsen of Ely, Minn., Dr. Charles Olmsted of the University of Chicago, and Dr. Alvin Bertrand of Louisiana State University.

They conferred with several distinguished scientists researching bears all over this country, including Alaska. This is the consensus of the committee and it is a program which they recommended that we implement.

Mrs. HANSEN. What is the essence of the study?

Mr. HARTZOG. The essence of it is how to get these grizzly bears off garbage and back into a wild state. Much of it is concerned with closing garbage dumps, incinerating our waste disposal and transplanting these bears from the human-garbage-dominated habitat to which they have been attracted, to the wildland habitats of the park. This is what we are doing, as well as some fencing so that we can prevent bears from drifting acidentally through the campground when

they move from place to place. One of the things that has come out of our study is that unfortunately we may have put a campground in the midst of prime bear habitat and if this is substantiated we may have to close that campground and move it to another location. In the meantime, we have stepped up our night ranger patrols in order to try to avoid any incident between people and bears.

TRANSPORTATION OF VISITORS AT YOSEMITE NATIONAL PARK

Mrs. HANSEN. You are requesting $400,000 for transportation of visitors in Yosemite National Park.

Mr. HARTZOG. Yes, ma'am.

Mrs. HANSEN. How many buses do you operate at Yosemite National Park and how many people use this service?

Mr. HARTZOG. We have prohibited the use of private automobiles in the east end of the valley and in the Wawona—Big Tree Grove. If you have reservations at the concessionaire facility or campground you are allowed to drive your vehicle there and park it and then you cannot drive it any longer during the stay in the valley. At the Wawona—Big Tree Grove we have a parking lot and you drive your vehicle there and take one of the trams through the grove. You gave us supplemental money of $300,000 in fiscal 1971 and we estimate the full-year cost of this to be in the vicinity of $400,000 for 1972.

What is the number of passengers?

Mr. HADLEY. We do have that but I see Mr. Quick looking for the statement we have on that.

Mr. HARTZOG. This is the total program, Madam Chairman.

Mrs. HANSEN. Please insert the statement in the record.

Mr. HARTZOG. I have a statement that I thought you might want to have on that. The total number of passengers carried was 488,000, and of this figure, 181,000 used the buses in the eastern end of the valley where the automobiles were eliminated. I have a statement here for the record.

(The information follows:)

STATEMENT ON TRANSPORTATION SERVICES—YOSEMITE VALLEY

On July 9, 1970, the National Park Service, with the cooperation of the Yosemite Park and Curry Company, inaugurated free public transportation services in Yosemite Valley. The provision of public transportation as a substitute for the use of private automobiles in the Valley is designed to curb resource abuse without limiting public use capacity, and to benefit public enjoyment through relief from traffic congestion, to promote greater leisure and relaxation and provide the opportunity for a more meaningful park experience.

The services involve three important elements:

1. Conversion of the primary road system in Yosemite Valley, comprising nearly 20 miles of roadway, from two-way to one-way travel; and closure of 3.51 miles of roadway in the easterly portion of the valley to private automobile travel.

2. Point-to-point, or shuttle bus services connecting the major public use and concession facilities in the valley.

3. Transportation service in the easterly portion of the valley along the portion of roadway closed to private vehicular travel offering sightseeing and ready access to the Happy Isles and Mirror Lake areas and important high sierra trailhead locations.

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This innovation, new in national park management, has proven highly successful. During the period, July 9 through September 7, the shuttle service was offered 24 hours daily. At peak periods during the day a maximum of six buses were required to be in use.

Public use of the services was substantial. For the 61 days of operation between July 9 and September 7, an average of 8,000 visitors daily availed themselves of the service. The total number of passengers carried was 488,000. Of this figure, 181,000 used the buses in the eastern-end of the valley where automobiles were eliminated. With the number of visitors who used the bus service and using the factor of 3.5 in determining the average number of passenger per vehicle, we can say that approximately 214,000 vehicles were idled during visits to the park by passengers riding the bus rather than using private vehicles. The buses accumulated a total of 1,800 miles per day during this period.

From September 8 until mid-October reduced visitation required only 3 buses to be operated daily on a schedule beginning at 6:45 a.m. through 10:00 p.m. On weekends the buses were operated until midnight. From mid-October to the present, 2 buses have been operating daily beginning at 6:45 a.m. and continuing until 8:00 p.m. with additional buses used as the demands increase on weekends and during holiday periods. During the period from September 8 to the present, approximately 261,000 passengers have availed themselves of this free bus service.

The success of the new program may be measured in terms of the 3.51 miles of road closed to private automobile travel. On the roadway freed of automobile use, visitors now walk, bicycle and ride horseback in an atmosphere that is free of the automobile congestion and the associated tensions and frustrations. Because of the free shuttle bus service, it was possible to eliminate from use 4 acres of paved parking area involving two parking areas accommodating 182–203 automobiles, respectively, in the easterly portion of Yosemite Valley. Our present plans are to eliminate these parking areas and restore the sites to natural conditions.

Accident frequency was lower in the valley after the new program was initiated. In 1969, a total of 56.36 accidents per 100,000 vehicles were recorded in the valley. In 1970, a total of 42.73 accidents per 100,000 occurred.

TRANSPORTATION OF VISITORS AT OTHER PARKS

Mrs. HANSEN. How many other park areas do you contemplate allowing only limited automobile traffic and providing a free public transit system?

Mr. HARTZOG. Madam Chairman, no more at the moment, although in my legislative committee oversight hearings the other morning I suggested to the chairman of the subcommittee, the distinguished gentleman from North Carolina, Mr. Taylor, that I thought we were face to face with this issue perhaps in the handling of peak traffic at Great Smoky Mountains across that one mountain road. I don't have any plans to implement such a program immediately however. I think the day is not too far distant when we have to prohibit the cars on U.S. 441 and on the Clingmans Dome road and provide some kind of transportation, tram service perhaps, during the period from 9:30 in the morning to 3:30 or 4 o'clock in the afternoon, to handle the traffic. We are exploring other means of expediting the traffic management in Yellowstone, including perhaps making some of that roadway one way instead of having it two-way head-on traffic.

ROAD MAINTENANCE AT RED LODGE, YELLOWSTONE NATIONAL PARK

Mrs. HANSEN. Have you satisfied the concern some people had in the Red Lodge area about the maintenance of that road?

Mr. HARTZOG. Primarily, as I understand it, their concern is that they want it open earlier and kept open later. We don't have that kind of program very high in our order of priorities.

Mrs. HANSEN. Please insert in the record the visitation load in Yellowstone National Park at the Red Lodge area entrance at the end of the park season.

Mr. HARTZOG. Yes, ma'am, together with the estimated costs for increasing the period of time of plowing snow?

Mrs. HANSEN. Also insert in the record the number of snowmobiles that use this area.

VISITATION AND SNOW REMOVAL, BEARTOOTH HIGHWAY (RED LODGE AREA)

A total of 28,891 vehicles were recorded as entering the Northeast entrance of Yellowstone National Park during 1970 fiscal year. During October, 79 vehicles were recorded. Normally the Beartooth Highway (Red Lodge area) is open late May until mid-October. In 1970, the highway was opened on May 29 and closed on October 17.

Approximately $20,000 is programed for snow removal to open the road in the spring. During this past season, the highway was closed seven times due to snowstorms for a total of 13 days. This additional emergency snow removal cost $7,000.

Weather conditions throughout much of the highway are so severe that even in normal snow years we believe that the road might be kept open only an additional 2 weeks. This extra time could be obtained with more equipment and manpower which is also needed for the operational period when the road is open.

A capital investment of $281,000 has been projected for the period stated above for snow removal and maintenance needs with $66,000 as a recurring item. Equipment must now be moved from other areas of the park to accomplish this activity at present.

During the winter of 1965–66, the first season that records of snowmobile use were kept in Yellowstone, approximately 25 machines were recorded. In the winter of 1969–70, a total of 8,206 machines were registered. Last winter, 11,614 snowmobiles were operated in Yellowstone.

PROBLEMS RELATING TO SNOWMOBILE USE

Mrs. HANSEN. Are the snowmobiles causing any damage?

Mr. HARTZOG. We cannot attribute any damage to them. As a matter of fact, as I told the Legislative Oversight Committee when he got into this, we have had very good success with those groups disciplining themselves. Certainly they pose an additional management burden on us in that if they are trapped in isolation that thing does not stop. You have to have a patrol constantly on the road to make sure that somebody does not freeze to death. We had a great tragedy out there at Yellowstone, in which we lost Mr. Galusha, distinguished President of the Federal Reserve Bank in Minneapolis, in connection with one of these over-the-snow expeditions. We have had to put two permanent rangers at Old Faithful to handle the crowd of snowmobiles there in the wintertime. Generally the snowmobile users coming to the park have been very cooperative in confining themselves to the designated roadways.

SONIC BOOM DAMAGE

As I said to the committee. the most serious problem we have is in connection with the U.S. Air Force and its sonic booms. You probably

saw the article in the Scripps-Howard newspapers. A young fellow wrote an article which is very factual and which we had photographs to back up the destruction that they are creating over these areas with their sonic booms. We are unable to get any cooperation, significant or otherwise, out of the Air Force.

Mr. YATES. What kind of destruction?

Mr. HARTZOG. They blasted the face off of canyons with sonic booms, destroyed prehistoric ruins in a sonic boom at Yellowstone and Teton There is never a quiet moment in either of those parks.

Mr. YATES. Out of which Air Force base?

Mr. HARTZOG. They go so high and so fast we cannot identify the craft. They fly below sea level in Death Valley National Monument, come over the ridges, and dive toward the earth and then when they get below sea level, which is 100 to 150 feet off the ground, they pull up and go out. I was there last summer when one of these people came over the top and it is a terrifying experience for the visitor because the road goes through the valley.

Mrs. HANSEN. Why can't you receive any cooperation from the Air Force?

Mr. HARTZOG. Madam Chairman, you just simply can't. You get no meaningful response whatsoever to correspondence and protests with them. We have been protesting about this since 1966 and nothing has happened yet. You talk about your public opinion—we have said this publicly and every other way, including spreading it on the Congressional Record, and the public is not one bit concerned about it apparently because nothing has happened. It is truly devastating. I think it is disgraceful that our military carries on in this way. Nevertheless they do.

Mr. YATES. Madam Chairman, would it be in order to request the correspondence with the Air Force so that we can take it up with George Mahon?

Mr. HANSEN. Yes.

Mr. YATES. Can we get the correspondence to show how the Air Force pays no attention?

Mr. HARTZOG. I will send the photographs. I have stacks of sonic boom photographs higher than this table.

Mrs. HANSEN. Please send the correspondences to the committee.

Mr. HARTZOG. Madam Chairman, I would have to deliver them in a truck to you.

Mrs. HANSEN. Send us a sample of the correspondence.

Mr. YATES. Send the truckful and we will have them delivered to Mr. Mahon.

Mr. HARTZOG. I will send the photographs of the destruction attendant on that.

NEW SAFETY OFFICERS POSITIONS

Mrs. HANSEN. Justify your requested increase of $5,724,000 for operation of parks established prior to 1960.

Mr. HARTZOG. Madam Chairman, a part of it is for staffing for new safety officers, $121,500.

Mrs. HANSEN. Where are these safety officers located?

Mr. HARTZOG. There would be one for each region but stationed in a major park in that region, working out of there for all the areas in

the region. One at Independence, one at Great Smoky Mountains, one at Yellowstone, one at Grand Canyon, one at Yosemite, and one at Olympic. We propose a safety clerk for the Pacific Northwest Regional Office. Your remember in 1965, the committee gave me five safety clerks. In the meantime we have added this additional regional office, and we need one safety clerk for Mr. Rutter. This will be the person in the regional office to maintain these statistical reports and safety records.

SONIC BOOM DAMAGE

Mr. YATES. Madam Chairman, one more question to supplement the previous question on the damage caused by the Air Force sonic boom for the national parks.

Have you ever computed the amount of monetary damage inflicted?

Mr. HARTZOG. No, sir; we have not. What is a 3- or 4,000-year prehistoric ruins worth? It just disintegrated under the sonic boom. What is the face of a cliff in Mesa Verde worth? It is shattered off and now is at the bottom of the canyon.

Mr. YATES. Do you have a list of these damages?

Mr. HARTZOG. Yes, sir. I have photographs of much of it. This is what I will deliver to you, a list and the photographs. I think it would really be kind of facetious of me to deliver all these sonic boom reports because they are literally in the thousands. The volume of it would simply inundate you.

Mr. YATES. Do each of the sonic boom passes cause damage?

Mr. HARTZOG. Not every one; no, sir. They simply violate the quietness and the solitude which people go to a park to experience. They claim to have moved them. But it strikes me as unique you don't find the same pattern over San Francisco and Los Angeles that you find over Glacier, Yellowstone, Grand Teton, and over the line of parks through Colorado, Arizona, and New Mexico. If they don't have that as their channel, then I am struck by the way it is coordinated.

Mr. YATES. How many parks have been violated in this way?

Mr. HARTZOG. The whole chain of intermountain parks and historical areas that is over that less-populated area.

Mrs. HANSEN. Are the planes from Air Force bases?

Mr. HARTZOG. We think, and this is pure speculation, that all of those Air Force bases that have those supersonic flights are in California. We are confident that this disturbance in Death Valley is coming out of the Air Force base in California because this is where the fighter planes are.

Mrs. HANSEN. In the Northwest, whenever the Air Force is going to fly a supersonic aircraft, they put a notice in all the local newspapers about 2 weeks in advance of the route and what area will be affected.

Mr. GALIFIANAKIS. Madam Chairman, in sending us the information and pictures, could Mr. Hartzog give us his estimation in terms of volume?

Mr. HARTZOG. I will give you the numbers. How about that, instead of sending you other things? In trying to get some handle on this thing, when we first started, the Air Force said, "It is not happening. You are imagining things," in effect. Then we required our people to

report each sonic boom. When I was in Yellowstone the Superintendent said, "I have all these things. What do you want me to do with them?" That is when he took me to the back office and showed me stack upon stack of these reports. I can give the number.

Mr. GALIFIANAKIS. Plus your evaluation as you indicated previously, that this is irreparable damage and injury.

Mr. HARTZOG. Certainly it is.

Mr. GALIFIANAKIS. On which you cannot put a price?

Mr. HARTZOG. Yes, sir.

ARCHEOLOGICAL INVESTIGATIONS AND SALVAGE

Mrs. HANSEN. The U.S. Army Corps of Engineers' dams have been destroying many Indian artifacts.

Mr. YATES. Where?

Mrs. HANSEN. This has been occurring on the Columbia River for years. They don't wait until the archeologists have completed their work to start the construction of the dams. I must admit that your archeologists have been awfully slow.

Mr. HARTZOG. I must confess the money has been awfully meager. The roadbuilders tell us that one of the reasons is that they don't have authority to set aside any part of the construction money to do the needed archaeological work. There is a bill to have that statute changed so that they can do it, and I am waiting anxiously and breathlessly to see whether it will pass and how much they will set aside for this needful archaeology. They have taken the posture that I can come to the committee and get all the money that is needed, and it just isn't so.

With this change in statute they can give us a part of this construction money to do it, just as pipeline companies do when they build a pipeline.

Hopefully the situation may improve some. I agree it has been pretty sad. There are lots of archaeology schools who are happy to do this work if we had the money to give to them to do it.

Mrs. HANSEN. I am sure the University of Washington would be happy to participate.

Mr. HARTZOG. And Washington State and the University of Arizona and New Mexico and others. Nevada and all the rest of them will be very happy to participate. They told me over and over they would be if they could just have the money. They cannot afford to do it with the budget that they have. The construction agencies ought to, in my judgment, take care of this archaeological salvage, just as they take care of the engineering plans or any other aspect of a public works project.

OPERATIONS AT PARKS ESTABLISHED PRIOR TO 1960

Mrs. HANSEN. You have requested an increase of $5,724,400 for operations of parks established prior to 1960. We have discussed the $112,500 you are requesting for new safety officers. What else is involved in this request?

Mr. HARTZOG. I have it, Madam Chairman. Beginning on page 33 is a complete breakout of it. Madam Chairman, do you really want all of this in the record? It's 47 pages.

Mrs. HANSEN. I know. But I want an overall review of the increases you are requesting for each activity and the number of new employees you propose to hire.

Mr. HARTZOG. All right. We propose with the airport that was authorized for Alaska to employ a GS–12 pilot. At Glacier Bay, to establish the complex of professional expertise to meet the second objective in this budget, and that is to provide the staff in the field with the professional help that is needed for making management decisions. A biologist at Glacier Bay, GS–12, and one at Katmai, the largest area in the national park system, and one about which we know the least, the Valley of Ten Thousand Smokes.

A park technician, GS–5, for Sitka. At Andrew Johnson, an increase of $3,300 for miscellaneous operating expenses, supplies, and materials.

Appomatox Court House, $2,400 for the same purpose.

Badlands National Monument, $27,400 for the same purpose. Bandelier, $25,500 for the same purpose, supplies, materials and miscellaneous operating expenses. The Big Bend National Park has a landscape architect, GS–11. Blue Ridge has a historian, GS–11, a landscape architect, GS–12, and a landscape architect GS–11.

At the headquarters for the cluster of areas in the Boston group, a clerk-typist, GS–4, an architect, GS–12, and a museum curator, GS–9. At Minute Man, a GS–5, park technician and a laborer. At Cabrillo, a park technician, grade 7. At Canyonlands, Arches, and National Bridges, is a civil engineer, GS–9. At Cape Cod an ecologist, grade 11, and a landscape architect, grade 12. Cape Hatteras, Fort Raleigh and Wright Brothers, a landscape architect, grade 12.

Carlsbad Caverns, a mechanical engineer, GS–9, and a biologist, GS–13. This is that complex elevator system we have had at Carlsbad and we simply must have a mechanical engineer to run that complex. At Castillo, a park technician, GS–4.

Coulee Dam in the State of Washington, a clerk-typist, GS–4; Death Valley, a biologist, GS–12; De Soto, an administrative clerk, GS–4. This is in order to bring that complement to five permanent positions.

EISENHOWER NATIONAL HISTORIC SITE

Eisenhower Site, which is really Gettysburg, Madam Chairman, but is shown here as Eisenhower. It's Gettysburg as well, A foreman II, a laborer, a maintenanceman, and maintenanceworker.

Mrs. HANSEN. Have you acquired all the acreage you intend to acquire at the Eisenhower National Historic Site?

Mr. HARTZOG. No.

Mrs. HANSEN. How many more acres do you have to acquire?

Mr. HARTZOG. Madam Chairman, we have been in the process of developing a master plan for Gettysburg. We have it developed. I have a commitment as soon as my schedule will permit, and the County Commissioner's, to get together with them and review the master plan, following which we are going to ask the Congress to establish a firm boundary for Gettysburg and also for the Eisenhower National Historic Site.

We need to acquire some additional land in connection with the Eisenhower National Historic Site in order to protect the overview of the Eisenhower home and the immediate area between it and Gettysburg from adverse development, as well as some additional acquisition inside Gettysburg National Military Park.

Mrs. HANSEN. How much of your park land at the Everglades National Park is being destroyed because of the fire in that area?

Mr. HARTZOG. None yet. All the fires in the Everglades are still north of the park. Before this fire season started, our Superintendent —and I thought it was a master stroke in management—set about implementing very actively a managed burn program at Everglades. He judiciously has burned in areas which thus far we have been able to escape the fire jumping into the park. It's immediately north of the park and it is pretty devastating. I was down there 3 weeks ago before the Easter recess. It's very serious.

We have had three of four small fires in the park, but they were unrelated to the general big burn that is going on the outside. Thus far we have been able to prevent it jumping into the park. If it gets in the park it's going to be really devastating. It's extremely dry.

Mr. YATES. I was in Miami a few days ago. It's just a question of how long it would be before the fire crossed over into the Everglades. They are praying for rain down there. It's really very bad.

Mr. HARTZOG. It really is.

Mrs. HANSEN. In all of your outdoor facilities you have to contend with the elements.

Mr. HARTZOG. Right. At that Everglades complex we were asking——

Mr. YATES. Excuse me a minute. I understand there was an Indian rainmaker who went to Wichita Falls and brought rain.

Mrs. HANSEN. He knew the thunder clouds were just a half-a-day away.

Mr. HARTZOG. At the Everglades, an aquatic biologist, GS–12, a national resources management coordinator, a GS–12, a biologist, GS–11, a park technician, GS–4, and a biologist, GS–13.

At Fort Davis, laborer. At Fort Laramie, a guard, GS–5.

At the Fredericksburg Cluster, in which we have Fredericksburg and Spotsylvania. George Washington Birthplace and Manassas, a maintenance supervisor, GS–11.

At Glacier, a biologist, GS–12, and a landscape architect, GS–12. We would split this landscape architect's time between Glacier and Yellowstone. In other words, we don't need one for each of those Parks.

At Glen Canyon and Rainbow Bridge, a pilot, GS–11, for the plane that was authorized there last year, and a park ranger, GS–7, as well as a landscape architect, GS–11, and a laborer.

At Grand Canyon Cluster, which includes the park and the Monument and Marble Canyon, a biologist, GS–12, a safety officer, GS–12, a biologist, GS–11, a park ranger, GS–7, and a park technician (boatman), GS–7.

Madam Chairman, the traffic on that river has increased to the point that it's necessary for us to have a permanent boat patrol during the height of the river flowing that goes on at Grand Canyon. We need to implement that staff with a park technician and boatman, as well as a maintenance worker, landscape architect GS–11, a museum curator, GS–11, and an engineering technician (draftsman), GS–7.

At Grand Teton, a park naturalist, GS–11; a pilot, GS–11, for the plane that was authorized there last year; a biologist, GS–11, and an aquatic biologist, GS–12.

At Great Smoky Mountains, a safety officer, GS–12, which I mentioned earlier, a landscape architect, GS–12, and a museum curator, GS–11. At Guilford Courthouse, a park technician, GS–4; at Hawaii Cluster, a landscape architect, GS–11; a park aide, GS–4, in the City of Refuge where we are trying to implement a living history program. This is an area fabulously rich in Hawaiian culture, and this is one of the main areas of interpretation. We desperately need to implement and increase that program.

A biologist, GS–13, for Hawaii Volcanoes. At Hot Springs and Arkansas post, a historian, GS–7, an administrative clerk, GS–4, and a park technician, GS–4. At Independence would be one of the safety officers we mentioned, GS–12. At Independence, a park ranger, GS–9, a personnel assistant, GS–9, a program assistant, GS–9, a protection and public use assistant, GS–4, a mechanical engineer, GS–12, curatorial assistant, GS–7, a museum technician, GS–7, and a janitor.

Madam Chairman, I mentioned in this committee before that one of the most seriously understaffed regional operations we have in the system is the Northeast and again the Southwest where we have a number of these very precious and small archaeological sites.

Jefferson National Expansion Memorial, a mechanical engineer, GS–12. Kings Mountain and Cowpens, an administrative clerk, GS–4. This is to meet the criterion of a minimum staffing for these small areas.

Lake Mead, a GS–7 park ranger, a landscape architect, GS–11, and a caretaker.

At Lincoln Boyhood, a park technician, GS–5. At Mammoth Cave, a biologist, GS–9. At Mesa Verde and Yucca House, a museum curator, GS–9 and a laborer. At Moores Creek, an administrative clerk, GS–4, to bring that staffing up to standard of five permanent positions. Natchez Trace Cluster, a museum curator, GS–11. That is to handle the historical artifacts and museum program which we saw when we were down there.

Mrs. HANSEN. I hope you will acquire the items in that private museum.

Mr. HARTZOG. At Stones River, an administrative clerk, GS–4, and a park technician, GS–4. In the National Capital Parks, a biologist, GS–13.

Mrs. HANSEN. Why do you plan to add a biologist in the National Capital Parks?

Mr. HARTZOG. Madam Chairman, we have very rich natural resources in the metropolitan area at Prince William, Catoctin, Rock Creek Park, Roosevelt Island, under the administration of the Na- National Capital Parks here. In fact, one of the most popular features is the Nature Center in Rock Creek Park which has equal billing with many of the historical programs we have in the Nation's Capital.

A community project assistant, GS–9, and a supervisory park technichian, GS–7, a janitor for maintenance and laborer in the central National Capital Parks.

Two park technicians in east National Capital Parks. A caretaker at Catoctin. Two part technicians and a laborer on the George Wash-

ington Memorial Parkway; an education specialist, GS–12, at Wolf Trap Farm Park in connection with the childrens' programs we will conduct there as a part of our parks-for-all-seasons and environmental education programs as well as the cultural programs to be sponsored there. Also a maintenance man and a laborer for Wolf Trap Farm.

The Navajo lands cluster is where we have tried to cluster those areas on the Navajo Reservation in order to strengthen our program in cooperation with the Indians. We have a park ranger, GS–11, equipment operator, laborer, a building repairman and a water treatment plant operator.

In the New York City cluster where we have clustered the seven areas we operate in the immediate environs of New York City. Madam Chairman, I hope during the 1972 fiscal year to further strengthen the cluster in New York by putting all parks in the State of New York under the direction of a State manager for the State of New York. I think we can better provide for the resources management as well as the visitor services program there.

We would have a park technician, GS–4, a janitor, heating and air-conditioning specialist, and a park technician. For William Howard Taft, a maintenance worker. Ozark, a landscape architect, GS–12.

Mrs. HANSEN. How many visitors do you have at Padre Island per year?

Mr. HARTZOG. For fiscal year 1972, 877,000 is estimated. Last year it was 787.000.

Rocky Mountain National Park and Shadow Mountain, a biologist, GS–11, a landscape architect, GS–12, and a mechanical engineer, GS–11.

San Juan, two park guides. The Seattle cluster—and this is not the regional office, Madam Chairman, but this is a cluster that serves Fort Clatsop and Fort Vancouver.

Mrs. HANSEN. Fort Clatsop is going to be startled to find it is in the Seattle cluster.

Mr. HARTZOG. I realize that. But you asked me to read them. I knew if I don't spread them on the record I will be caught sooner or later anyway. A sociologist, GS–13, an archeologist, GS–12, a historian, GS–12, and a biologist, GS–12. This is part of our research center operation at the University of Washington.

A sewage treatment plant operator for Mt. Rainier. A biologist, GS–11 for North Cascades, Lake Chelan and Ross Lake. At Olympic, a safety officer, GS–12, biologist, GS–9, and a park technician, GS–5, with a carpenter and maintenance man.

At Sequoia and Kings Canyon, a biologist, GS–12, a landscape architect, GS–11, a park technician, GS–5, a mechanical engineer, GS–11. The southern Arizona cluster, which is under the leadership of Mr. Kowski, our regional director. We are trying to consolidate a number of these small national monuments. We are asking for a park ranger, GS–12, a biologist, GS–12, an archeologist, GS–11, a personnel officer, GS–11, a clerk-typist, GS–4, a laborer, a landscape architect, GS–11, museum curator, GS–11, engineering technician, GS–7, and a clerk-typist, GS–4.

Southern Utah group in which we are proposing to cluster all of those areas in the southern half of Utah—and there again I should

mention ultimately we will probably cluster all of the areas in Utah under one central direction out of Salt Lake City because we think that there are some advantages to be gotten from that. For the time being it would be a park technician, GS–5, maintenance worker, landscape architect, GS–12, an engineering technician, GS–7, and a maintenance worker. Virgin Islands, a biologist, GS–11, a park technician, GS–4. At Wind Cave, a wildlife biologist, GS–12, who would serve all of the Black Hills areas, and a landscape architect, GS–11, in the same category.

At Yellowstone, a supervisory biologist, GS–14, a biologist, GS–12, a safety officer, GS–12, a biologist, GS–11, a secretary, GS–6, a curator, GS–11, and an engineering technician, GS–9.

Yosemite and Devils Postpile, a biologist, GS–12, a safety officer, GS–12, which we mentioned earlier, a park ranger, GS–9, and a landscape architect, GS–12.

Now also as I mentioned earlier that we are proposing to strengthen the park support group in these regional offices. To do that, we would have a museum curator, GS–11, and an engineering technician, GS–9, in the Midwest region, an engineering technician, GS–7, in the Southwest region, an electrical engineer and civil engineer in the Western region, and a safety clerk for the Pacific Northwest. In the Northeast region a visitor protection specialist, GS–11, an engineer, GS–13, a landscape architect, GS–13, an architect, GS–12 and a museum curator, GS–11.

PROMOTION OF DOMESTIC TRAVEL

We propose nothing in here for the promotion of domestic travel.

Mrs. HANSEN. Why?

Mr. HARTZOG. Madam Chairman, the program has been reduced to the point where it was minimally effective. In the meantime we reached an agreement with the Department of Commerce whereby we would transfer this activity to the Department of Commerce. So I decided to let the Department of Commerce, when the transfer was effected, to seek the funds in 1972 for the continuance.

Mrs. HANSEN. The reason I asked is that the Navajo Indians, I believe, have written and asked about continuance of the travel program.

Mr. HARTZOG. I don't understand what relationship it would have necessarily to them, except, of course, as part of our thrust. We had been trying to promote travel.

Mrs. HANSEN. Increased domestic travel would bring more visitors to the reservations.

Mr. HARTZOG. We have an agreement with the Department of Commerce that this is an activity that should be consolidated with the U.S. Travel Service. We are in the process now of transferring that activity to the Department of Commerce.

CONCESSIONS MANAGEMENT

Mrs. HANSEN. Justify your request of $408,800 for concessions management.

Mr. HARTZOG. That is the current level, Madam Chairman. There is no increase proposed in that program for 1972.

Mrs. HANSEN. I know. How long has it been since this program activity has been audited?

Mr. HARTZOG. They have been auditing us off and on. I don't know when they last made one overall. They have some people in our regional offices now, haven't they?

Mr. NORWOOD. Yes, and they are looking into the concession contracts.

ROOSEVELT CAMPOBELLO INTERNATIONAL PARK COMMISSION

Mrs. HANSEN. Will you please explain the increase of $37,000 for the U.S. share of operating expenses, Roosevelt Campobello International Park?

Mr. HARTZOG. Madam Chairman, this is the program that is operated jointly between the United States and Canada, managing the home of former President Franklin D. Roosevelt. We include in our budget the U.S. portion of the Commission. This increase is for salary costs and increase in staffing that has been approved by the Commission. This is one-half the total budget for the operation of Roosevelt Campobello, the other half being met by the Canadian Government.

TREE PRESERVATION PROGRAM

Mrs. HANSEN. Why are you decreasing your tree preservation program by $120,000?

Mr. HARTZOG. Because I transferred that money because I believe the management of these trees is more appropriately a part of the management of all of our natural and cultural resources, which is a proper charge against our maintenance operation.

FORESTRY AND FIRE CONTROL

Mrs. HANSEN. $298,400 is requested for Forest Management, which is the same level of funding as last fiscal year. How extensive is your forest management activity and how effective is it?

Mr. HARTZOG. To a considerable extent now, Madam Chairman, we have instituted on the basis of scientific investigation a controlled burn program in the Everglades National Park, for example.

Also in Sequoia National Park where we are clearing the undersoil and burning the rubbish left in order to provide against a cataclysmic hot fire that might destroy Sequoia. We are doing the same thing in Yosemite National Park. We are actively moving with the money you have provided us for the restoration of the areas that have been burned in the past.

Mrs. HANSEN. What happens when you have a confrontation with the people who demand no burning because of the atmospheric pollution?

Mr. HARTZOG. We haven't had such a confrontation, Madam Chairman.

Mrs. HANSEN. No, but you will.

Mr. HARTZOG. If I do, it would be a question of having to make a decision between equally earnest scientific information, and I will continue to burn it, I suppose. Because I don't know any other way to get rid of it. If they find some other way, if I have the money, then

we will do it that way. But in the meantime, we certainly have to manage some of these resources or we are going to lose them.

Mrs. HANSEN. I understand. I think there is probably a bill in every legislature in the United States on burning. The lack of controlled burning will be reflected in an increase in fire activity.

Mr. HARTZOG. It really will.

Mrs. HANSEN. $1,915,800 is requested for fire protection. What variety of fire protection services do you have that need maintenance?

Mr. HARTZOG. Madam Chairman, this $1 million was included in the budget. Normally this is carried at $100,000, which is a token item in our budget because this is the item that we use for presuppression, suppression, and restoration work associated with wild fires in the national park system. In order to minimize the likelihood of the need for a supplemental, the million dollars was included this year, which has been about the historic average that we have asked for in supplementals. We will use it for exactly the same purpose, namely, presuppression, training, fire lookouts, for suppression work associated with wild fires and for reforestation relating to wild fires that have occurred in the past and may occur in the future.

Mrs. HANSEN. $1,000,000 is requested for forest fire suppression and rehabilitation of burned areas. Isn't this a new policy? Usually you have waited until the fires had occurred and then requested funds in a supplemental. Why are you changing this policy?

Mr. HARTZOG. To try to avoid the need for a supplemental, if we can.

Mrs. HANSEN. I am glad to see that you are requesting rehabilitation funds at the same time you request suppression funds.

Mr. HARTZOG. I have been insisting that they do that, Madam Chairman, because I think it is imperative that we get these environments restored as rapidly as possible.

Mrs. HANSEN. I notice in your justifications that in 1970 (Jan. 1–Sept. 30) your total fires were 672. Acreage burned inside parks 16,973 and suppression costs were $764,921. This compares with the average per year in 1965–1969 of 571 total fires, 5,781 acreage burned inside parks and suppression costs of $1,001,995. In other words, your cost has gone down even though the number of acres burned has increased. Is that correct?

Mr. HARTZOG. That has been true this year, yes, Madam Chairman.

Mrs. HANSEN. Why?

Mr. HARTZOG. It's only part of the year. But still the acreage is different. I suppose because there have been larger fires. Is that right?

Mr. NORWOOD. That $764,000 represents 9 months of experience so far.

Mr. HARTZOG. We have had more fires and more acreage and less money. Whether it's for the same period or not, we had only 571 fires. I think really the answer may be that this is a historic 5-year average versus an experience for 1 year. I don't really think they are very comparable, myself. I don't know why it's presented in that form.

Mrs. HANSEN. How many of your fires have been man made?

Mr. HARTZOG. How many of them are man made, Larry?

Mr. HADLEY. I don't have that. I can supply it.

Mr. NORWOOD. We do not have the breakdown between natural and man made but we will supply it for the record.

(The information follows:)

During the 1970 calendar year there were 739 fires; 399 were man caused and 340 were caused by nature.

FIRE COSTS, 1961–70

Mrs. HANSEN. Please insert in the record the cost by year for the past 10 fiscal years of your forest fire suppression and rehabilitation costs.

(The information follows:)

Fire cost for the 10-year period fiscal years 1961–70

Fiscal year:	
1961	$1,291,196
1962	928,393
1963	405,096
1964	227,601
1965	301,050
1966	408,629
1967	352,191
1968	3,122,135
1969	791,106
1970	837,086
Total	8,664,483

Mrs. HANSEN. What is the basis for your $1 million estimate for forest fire suppression and rehabilitation?

Mr. HARTZOG. That is a historical average. As you see, the cost last year was $1,009,193.

MANAGEMENT AND PROTECTION FUNDS IN RESERVE

Mrs. HANSEN. How much of your management and protection funds are in reserve?

Mr. HARTZOG. None is in reserve.

POLLUTION ABATEMENT

Mrs. HANSEN. Is there any sizable amount of pollution in your park areas?

Mr. HARTZOG. Yes, Madam Chairman; there is. We have $17,300,000 for construction for pollution abatement. That will not take care of it. As a matter of fact, we will need slightly more than that in the 1973 fiscal year in order to make the target date and correct the problem.

Mrs. HANSEN. If you will recall, this committee appropriated funds for pollution abatement projects a few years ago that were placed in reserve.

Mr. HARTZOG. Yes. I remember what you were referring to.

Mrs. HANSEN. Why haven't you requested more funds in previous years for this activity instead of requesting such a large amount this year?

Mr. HARTZOG. I wouldn't be able to answer that, Madam Chairman.

Mrs. HANSEN. Who would?

Mr. HARTZOG. I am not sure there is an answer to that, because I don't think that really surfaced as a consideration in putting the projects in reserve at that time.

Mrs. HANSEN. It seems it would have been more orderly to request larger amounts in previous years.

If this had been done this problem wouldn't be as persistent and you wouldn't have to request as much as you are requesting this year.

Mr. HARTZOG. That is right.

TIDAL BASIN CLEANUP

Mrs. HANSEN. How do you keep the tidal basin clean?

Mr. DICKENSON. We take care of the tidal basin. A boat has a ramp that lets down for easier managing. It also has a winch on it. However, all of that debris which is in the Potomac River outside that which comes into the tidal basin is handled by the Corps of Engineers. What we are doing is inside the tidal basin.

Mr. WYATT. George, your $17-plus million this time for pollution abatement over that next year, will that pretty well catch you up as far as the backlog is concerned?

Mr. HARTZOG. The things that have been identified are directly relevant to the President's Executive order to stop all operations that pollute waters. It does not correct all of the problems that we have with respect to the proper treatment of sewage effluent in terms of the total park operation. It gets only at the emergency conditions in the President's Executive order.

Mr. WYATT. Then I assume that as your new authorized park and recreational areas are developed, that you will need additional pollution control money and also some of the longer range pollution control problems that are not at the critical stage right now.

Mr. HARTZOG. Yes, sir. Those we will ask you for in connection with a construction project. In other words, we won't accept a halfway measure. We will go ahead and do it the way it ought to be done.

Mr. WYATT. But this takes care of the worst of the crisis type of pollution?

Mr. HARTZOG. Yes, sir. It does not, for example, eliminate all the sewage tanks in the system.

And then in a few years, with the rate the States are going, we will have to eliminate them. But at the moment the effluent is not escaping into any recognizable body of water and therefore doesn't come within the strict interpretation of the President's Executive order.

NEW PARK AREAS

Mrs. HANSEN. I have received a letter from Congressman Sikes.

He mentions there are funds in the fiscal year 1972 budget for land acquisition but none for operations of the Gulf Islands National Seashore. Is that correct?

Mr. HARTZOG. That is correct.

Mrs. HANSEN. How much will it cost you to operate this facility in fiscal year 1972?

Mr. HARTZOG. We have a program, Madam Chairman, in which we need $257,000, and eight permanent positions, six in management and protection and two in maintenance and rehabilitation for a total of $257,000. We have other areas that are in that same category, also.

Mrs. HANSEN. Such as?

Mr. HARTZOG. The Chesapeake and Ohio Canal, $160,000. For the Chesapeake and Ohio Canal I am proposed a staff of nine and for the Voyageurs National Park, I am proposing $66,000 and a staff of three.

Mrs. HANSEN. Why do you need $160,000 for the Chesapeake and Ohio Canal?

Mr. HARTZOG. That area has more than tripled in size, from 5,250 acres to 15,000 more. So that we now have a total of 20,250 acres and a land acquisition program proposed to be underway in 1972.

Mrs. HANSEN. What do you propose to accomplish with the $117,000 you are requesting for maintenance and rehabilitation at the Chesapeake and Ohio Canal?

Mr. HARTZOG. This is part of the need to upgrade the maintenance on the trails and along those sections of the canal that will be made available for public use. You notice that we are only asking you for three more park rangers. But we are asking you for 10 man-years under maintenance and rehabilitation, because with the increase in usage of the Chesapeake and Ohio Canal this is in very bad shape.

Mr. WILES. I don't believe the Office of Management and Budget has had a chance to consider this yet.

Mr. NORWOOD. They have not.

Mr. WILES. These are under consideration in the Department now. They have not been sent to the Office of Management and Budget yet.

Mr. HARTZOG. Am I supposed to take my statement back?

Mr. WILES. It's too late now.

Mr. HARTZOG. That was the question you asked me, wasn't it, what I proposed?

Mrs. HANSEN. Yes.

NORTH CASCADES NATIONAL PARK

Mrs. HANSEN. There was an article in the Washington Post relative to the development of North Cascades National Park lands for the generation of more electric power for urban areas along the coast of the State of Washington. May we have your comments in this connection?

Mr. HARTZOG. I am sorry, but I didn't see that. It must have been when I was out of town.

Mrs. HANSEN. I will hand you the article.

Mr. HARTZOG. Thank you. This is from some folks who would not like to see the level in Ross Lake raised. I said to them that I made a deal as a part of the consideration of the North Cascades National Park legislation that the Ross Lake Dam was to be raised. That is why the Congress left that area as a national recreation area, to accommodate the increased recreational use there as a result of raising the level of the lake. So far as I was concerned, the matter was raised adjudicato.

Mrs. HANSEN. Will that settle this matter?

Mr. HARTZOG. That may not settle it, but at least that is what I said.

Mrs. HANSEN. Senator Case wants to protect the view at Mount Vernon.

Mr. HARTZOG. Yes, he does.

Mrs. HANSEN. Please give us your comments in this regard.

Mr. HARTZOG. Madam Chairman, we have pending before this subcommittee and the Senate Appropriations Subcommittee as well as the Interior and Insular Affiairs Committees of the House and the Senate, a proposal to acquire a scenic easement on the Marshall Hall property for a million and a half dollars.

Mrs. HANSEN. It it true that five trees a week are being cut on the Marshall Hall property?

Mr. HARTZOG. Yes. There is some feeling on the part of some people that scenic easement in that area is not adequate and it should be purchased in fee. Senator Case has introduced legislation to that effect.

I have not acted on this scenic easement pending the views of the committees.

Mrs. HANSEN. Is the National Park Service responsible for the red tape that the newspaper says is holding up this project?

Mr. HARTZOG. Apparently, yes, Madam Chairman. Either I am, or the committees of the Congress are, because it's pending for oversight hearing. The authorizing committee has held an oversight hearing. The red tape that is really involved, Madam Chairman, is a review of a citizen suit to have the zoning in this case reversed. The case was originally set down for hearing on April 6. It has now been postponed until July. I advised the authorizing committees, and they were in agreement with it, that we should do nothing to accept the scenic easement even if they concur, and the other subcommittees concur, until we get a decision in that court case. Because if the court rules the zoning is invalid, then the scenic easement is not worth $1½ million, and we will need to renegotiate. So we are not going to do anything until the court acts.

The red tape amounts to awaiting a decision of the court in this matter.

Mrs. HANSEN. Don't you think that cutting of those five trees per week is an act of arrogance?

Mr. HARTZOG. I don't know whether arrogance is the right word. I think it's improvident, to say the least. I so advised Mr. Goldstein that I thought it was, because I have a personal abhorrence of a process which basically threatens the people with whom you are trying to do business. I just don't believe in that system. I don't know whether you call it arrogance or whether you call it improvidence, or whether you call it indifference or just plain orneriness.

Mrs. HANSEN. If the trees are continued to be cut you won't have any scenic easement to purchase.

Mr. HARTZOG. That is what I have tried to explain to him. Some people you can't tell very much.

Mrs. HANSEN. How much will it cost to purchase the Marshall area?

Mr. HARTZOG. Madam Chairman, we think it would be pretty substantial. We have our own estimate on it and the Department of Justice is having an independent appraisal made of the property. I would be reluctant to speculate on what the value might be, in light of the fact that we will have the appraised figure from Justice by June 1. Then I can give you the appraised value.

OXON COVE

Mrs. HANSEN. Is the National Park Service doing any land filling at Oxon Cove in Maryland?

Mr. HARTZOG. No, Madam Chairman. The District of Columbia has some out there.

Mrs. HANSEN. But you have given them permission to fill?

Mr. HARTZOG. We have given them permission to fill; yes.

Mrs. HANSEN. I thought they were going to recycle the trash rather than bury it?

Mr. HARTZOG. I think they are. Madam Chairman. I believe that issue now has been resolved to the satisfaction of everybody concerned.

Mr. DICKENSON. An amicable agreement was reached.

MASTER PLANNING PROGRAM FOR WILDERNESS AREAS

Mrs. HANSEN. Justify your requested increase of $50,000 and six positions to accelerate the master planning program for the wilderness studies.

Mr. HARTZOG. Madam Chairman, that involves adding six additional people for master plan work related to the wilderness studies program so that we can maintain the schedule for Wilderness Act implementation.

Mrs. HANSEN. What do the master plans involve?

Mr. HARTZOG. They involve basically a determination of what are you going to do with this resource. How is it to be used and how is it to be developed? The Wilderness Act says that once lands are put in the wilderness preservation system that there can be no development in the sense of visitor accommodations unless the Congress in effect decides that they should be there or takes the area out of wilderness.

So in order to make an intelligent evaluation of what needs to be recommended for wilderness, you must in advance make a determination on how this area is to be used and what are the needs of the visitors for development. This is why it is imperative that you make a master plan before you make your wilderness plan, because a part of that master plan involves an analysis of use and the responses to be made to that and an analysis of the land and the classification of the land in response to the proposed development and use plan.

Mrs. HANSEN. How many acres of wilderness area have you completed and how many remain to be completed?

Mr. HARTZOG. We have complete five which have been sent to the Congress. I have six more that are in the process of review in the executive branch now which, when that review is finished, will be sent to the Congress. I am on scheule. I have a schedule of these. We have 57 areas that must be reviewed within the meaning of the Wilderness

Act. Of these, 10 will be sent to the Department in the 1971 fiscal year, 20 in the 1972 fiscal year, four in 1973, and 12 in 1974.

Mrs. HANSEN. What is the acreage you have completed and how much remains to be completed?

Mr. HARTZOG. Yes, we will supply that.

(The information follows:)

WILDERNESS STUDIES

STATEMENT SHOWING ACREAGE OF PARK AREAS FOR WHICH WILDERNESS STUDIES ARE COMPLETE AND NUMBER REMAINING TO BE STUDIED

Wilderness review has been completed for 14 areas of the national park system, and the acreage recommended for or already designated as wilderness in these areas totals 1,656,208 acres. Review of one of the 14 areas resulted in a negative suitability finding.

The 43 national parks and monuments remaining to be studied for wilderness comprise a grand total of 24,613,202 gross acres. Roadless areas of 5,000 contiguous acres or more within each of these units of the national park system are being studied for their wilderness potential.

WILDERNESS STUDIES

Mrs. HANSEN. Justify your requested increase of $55,000 to accelerate the Wilderness Act studies.

Mr. HARTZOG. That is the same thing. It would involve three additional people. Overall we are talking about nine people in these programs.

NATIONAL PARK SYSTEM PLAN

Mrs. HANSEN. $155,000 is requested for continuing the national park system plan. What does this planning involve?

Mr. HARTZOG. Madam Chairman, this is the preparation of a plan of what the national park system ought to look like. I sent those national park system plans in two volumes to the subcommittee. I am sorry I don't have any more for you here this morning but I will be sure and bring them in the morning. In those we have identified the themes of history and natural history. We have gone through the system and identified those themes in which there is no representation in the national park system.

What we need and what we will be using this money for is to go back into the natural themes and bring up the theme studies to completion so that we will know what areas exist in a particular theme that have National significance.

The fallout of these theme studies is just like in our historic sites survey, which are the sites that have national significance that are deserving of recognition, with natural landmark status. Also out of this program we will be financing the identification of National environment educational landmarks. That program will work a little bit differently. We won't have to make any theme studies there because under our cooperative agreement with the Office of Education, the Office of Education maintains an environmental study area catalog. By agreement between the Director of the Office of Education and me, we will appoint a professional review committee to analyze all of those environmental study areas and from among those identify those that have national significance in teaching a program of en-

vironmental education. Those we will give the same landmark recognition to as we have with our natural and historic landmarks.

In that connection, the Advisory Board has already identified 11 environmental education landmarks and recommended them to the Secretary for approval. They are pending there now.

Mrs. HANSEN. Please give the committee a couple of examples of environmental education landmarks.

Mr. HARTZOG. Shaker Heights City Park, in Ohio, is one of them. There are two or three of them in the Audubon study areas as part of the Audubon educational program which are examples. I will bring you the list of the 11 in the morning.

Mrs. HANSEN. Please insert the list in the record.

Mr. HARTZOG. I wouldn't do that in advance of him making a press release on it. I am just giving it to the committee for its information.

Mrs. HANSEN. Please do.

Mr. HARTZOG. And I am pleased to advise you as long as it's in the context of all of my other commitments.

LANDMARKS AND MASTER PLANNING

Mrs. HANSEN. $1,884,000 is requested for natural landmark evaluation studies and continuing master planning of existing areas. May we have your comments in this regard?

Mr. HARTZOG. This, Madam Chairman, is for the on-going master planning program and for the administration of the natural area and environmental landmark programs.

Mrs. HANSEN. I see a picture in your justifications of the C. & O. Canal. What are you doing in this connection?

Mr. HARTZOG. We have to have the master plan updated on the C. & O. Canal. We probably don't even own it yet.

Mrs. HANSEN. Do you have any more comments on your natural landmarks program?

Mr. HARTZOG. No, Madam Chairman, except to say that we have been making some very good progress as a result of the money in this national park system item and in master planning in getting these accomplished.

Mrs. HANSEN. I see where someone in Portland was going to sue because people were driving her crazy trying to visit her house.

Mr. HARTZOG. Thank the Lord I didn't have anything to do with that. That was the Government who did that.

WILDERNESS ACT IMPLEMENTATION

Mrs. HANSEN. $55,000 increase is requested for Wilderness Act implementation.

Mr. HARTZOG. We covered that already.

Mrs. HANSEN. Why do you list your various program activities in your justifications more than once?

Mr. HARTZOG. That is the structure of this thing. I don't understand it, either. But they put it in three or four times. This budget is put together in such a way it seems to have a propensity for accelerating questions as though I am asking for it two or three times. If I had it within my power, this structure would have been changed a long time ago.

ASSISTANCE TO INDIANS

Mrs. HANSEN. Mr. Reifel and Mr. Boatner of the National Park Service have been visiting southwestern Indian reservations. They are interested in the level of funding for fiscal year 1972 to aid the Indians in planning for recreation centers and the training of Indians for reservation recreation activities. We discussed this briefly this morning and you mentioned you aren't requesting any funds for this activity in fiscal year 1972.

Mr. HARTZOG. That is what I told you this morning, and it's the same thing this afternoon. At least I am consistent.

Mrs. HANSEN. I can't understand why you aren't funding this program?

Mr. HARTZOG. I explained to you this morning this was taken out at OMB.

Mrs. HANSEN. I was highly amused by one of your statements in your justifications that you were going to develop some information in which to present plans and priorities to the Office of Management and Budget. I thought that was a highly intriguing item.

Mr. HARTZOG. Obviously we write too much sometimes. That is a quote, though.

Mrs. HANSEN. An increase of $104,000 is requested for park and recreation planning assistance in the Missouri River Basin. This was previously funded by the Bureau of Reclamation. Why is there a change in the funding pattern?

Mr. HARTZOG. Frank?

Mr. WILES. This was a result of the report of the Public Works Appropriations Committee last year, that all of the agencies in Interior receiving funds for the Missouri River Basin project put it in their own budget beginning in 1972.

ARCHEOLOGICAL INVESTIGATIONS AND SALVAGE

Mrs. HANSEN. I notice your archeological investigations and salvage program has been transferred.

Mr. HARTZOG. It was transferred to Historic Preservation appropriation.

Mrs. HANSEN. I have received a letter from you on the subject of the Ozette project. How much is in the fiscal year 1972 budget for the Ozette project?

Mr. HARTZOG. Nothing.

Mrs. HANSEN. How much is required to fund this project this year?

Mr. HARTZOG. I believe it's $120,000.

Mrs. HANSEN. You said in your letter that "our current fiscal year 1972 budget ceiling did not allow for the inclusion of the Ozette project. As you remember, however, you asked me to ask Drs. Greengo and Daugherty to prepare a 5-year prospectus for all the needed archeological work in the Northwest. We received an excellent report." It's so good that no funds are in the budget for this project.

Mr. HARTZOG. It came too late.

Mrs. HANSEN. You indicate in your letter that a total amount of $569,300 is needed for fiscal year 1972.

Mr. HARTZOG. Of which $181,500 is in this budget.

Mrs. HANSEN. So the additional need is $387,800. You say in your letter that this $387,000 includes $120,000 for the Ozette project. What else is included in this $387,000?

Mr. HARTZOG. For the rest of the items that they had in that project. In other words, we have in-the-park work in their proposal $115,800 for Vancouver and San Juan. We have $66,500 in there for out-of-park work. I have an analysis of that report of what they really have in their proposal which would greatly simplify this for you. It goes through the 5 fiscal years.

Mrs. HANSEN. What are you going to accomplish in this connection at the Whitman Reservation?

Mr. HARTZOG. We are going to complete our archeological surveys over there so we might develop the data necessary for restoration.

Mrs. HANSEN. I hope the restoration proceeds more rapidly than the restoration at Vancouver.

Mr. HARTZOG. We do, too. We don't think we will have an airport over there to worry about. I am sure we can accelerate it.

Mrs. HANSEN. What is involved in the special program at the University of Washington?

Mr. HARTZOG. That is to have a staff member at the university as a part of this research center. Of course, we need some representation on that faculty.

Mrs. HANSEN. I doubt that this will help this project proceed very rapidly considering the summer vacations.

Mr. HARTZOG. They are going to have to meet a contract requirement with me in order to do business.

SOUTH FLORIDA ENVIRONMENTAL STUDY

Mrs. HANSEN. $1 million is requested for the south Florida environmental study. In the justifications you list the amounts provided for each Department of the Interior agency involved in this study. In the first supplemental request for fiscal year 1971 I raised the question as to why the various agencies couldn't do this work within their available funds. You apparently plan to continue to reimburse the various agencies, is that correct?

Mr. HARTZOG. To give each of them reimbursement for their share. Madam Chairman, the work is of such a nature and it is of such an urgency that it simply cannot be accomplished within their present programs as an absorption item. It is just too great an amount of work in magnitude for this.

(Discussion off the record.)

Mr. HARTZOG. This is a desperately needed item if the Federal Government is to live up to its obligations under its compact with the State of Florida and the Dade County Port Authority.

Mrs. HANSEN. What do you expect to accomplish in this study and where is the airport going to be located?

Mr. HARTZOG. The first we are going to do is this: We have finished the land use report on the Big Cypress. I transmitted that on behalf of the Everglades-Jetport Advisory Board to the Secretary Friday night. I expect that he will probably be making some announcement releasing it very shortly. We are continuing the environmental moni-

toring program on water quality, noise, and atmospheric conditions. We need to finish the ecological study by the seven participating scientific agencies. Under the terms of the jetport pact, the Dade County Port Authority has responsibility to locate a new jetport site. They have a site selection study underway to accomplish this.

Mrs. HANSEN. Why isn't the Environmental Protection Agency providing funds for this study?

Mr. HARTZOG. Madam Chairman, they are putting in some of their money in addition to this.

Mrs. HANSEN. How much are they providing?

Mr. HARTZOG. I don't know how much it is because it is going, you see, to the State and to the local government. None of this is going into this as a Federal contribution. Their money is going into the State and to the local government work. This is a partnership arrangement, Madam Chairman. These are the funds that are needed to support the Federal side of that partnership. This is not a unilateral action on behalf of the Federal Government alone. It is in partnership with the State of Florida, and the Dade County Port Authority. These Federal agencies that have matching money are in turn giving some of their Federal money to the States and local governments so that they can participate..

Mrs. HANSEN. Please insert in the record what EPA is providing. I will be surprised if it is close to $1,000,000.

(The information follows:)

FEDERAL AND STATE FINANCING OF ENVIRONMENTAL WORK IN SOUTH FLORIDA

TABLE 1.—FUNDING PROVIDED FOR THE SOUTH FLORIDA ENVIRONMENTAL WORK PROGRAM IN FISCAL 1971

Agency	Amount	
	Federal	State or local
Department of the Interior:		
National Park Service	$256,400	
Geological Survey	244,200	
Environmental Protection Agency (Water Quality)	193,600	
National Marine Fisheries Agency (National Oceanic and Atmospheric Administration)	85,800	
Bureau of Sport Fisheries and Wildlife	82,500	
Bureau of Outdoor Recreation	82,500	
Bureau of Indian Affairs	55,000	
Subtotal (amount in National Park Service supplemental appropriation for 1971)	1,000,000	
Environmental Protection Agency:		
Water Quality Administration	10,000	
National Air Pollution Control Administration	65,000	
Department of Transportation:		
Federal Aviation Agency	431,900	
Departmental Noise Monitoring Unit	18,000	
State of Florida		$156,000
Dade County		298,000
Subtotal (other agencies, State and county)	524,900	454,000
Total	1,524,900	454,000

TABLE 2.—FUNDING AVAILABLE IN 1971 FOR CONTINUING ECOLOGICAL PROGRAMS THAT COMMENCED PRIOR TO THE AUTHORIZATION OF THE SOUTH FLORIDA ENVIRONMENTAL WORK PROGRAM

Agency	Amount	
	Federal	State or local
Environmental Protection Agency: Grants to the State of Florida	$416,300	
Department of Housing and Urban Development	50,000	
Dade County Port Authority		$150,000
State of Florida		658,000
National Oceanic and Atmospheric Administration	77,500	
Grants by Gelogical Survey for Federal-State programs with matching amounts by cooperators:		
Central and southern Florida flood control district	87,500	87,500
Palm Beach County	40,000	40,000
Dade County	35,000	35,000
Florida Department of Natural Resources	31,500	31,500
Broward County	25,000	25,000
Broward County Pollution Control Authority	20,000	20,000
Collier County	19,000	19,000
Cities of Miami and Miami Beach	17,500	17,500
Fort Lauderdale	15,000	15,000
Lee County	15,000	15,000
Fort Myer	2,500	2,500
City of Hollywood	15,000	15,000
City of Hallandale	5,000	5,000
City of Pompano Beach	1,500	1,500
City of Boca Raton	1,000	1,000
Florida Department of Transportation	500	500
Total (continuing programs)	874,800	1,139,000
Grand total (tables 1 and 2)	2,399,700	1,593,000

Mr. HARTZOG. I doubt if it is. The Department of Transportation is also putting money in. I will try to get those figures for you as well, the Federal money that is going in to State and local government matching as well as the direct Federal Government appropriation.

(Discussion off the record.)

MAINTENANCE AND REHABILITATION

Mrs. HANSEN. Please insert pages 103 through 111 of the justifications in the record at this point.

(The pages follow:)

Maintenance and Rehabilitation of Physical Facilities

Appropriation, 1970	$40,000,000	
Supplemental appropriation, 1970	50,000	
Second supplemental appropriation, 1970	1,346,000	
Total appropriation, 1970		$41,396,000
Transferred to other accounts (pay costs)		-278,757
Total available, 1970		41,117,243
Appropriation, 1971	48,543,000	
Pay cost supplemental	301,500	
Wage rate supplemental	1,552,000	
Total appropriation, 1971		50,396,500

Summary of Increases and Decreases, 1972

	Base for 1972	Increase, 1972	
Roads and trails	$16,928,400		
Wage rate increases		$ +660,000	
To provide a portion of the need for operations at acceptable standards of new and recently authorized areas (those placed in operation since 1/1/60)		+164,500	
To provide a portion of the need for operation at acceptable standards in areas operating prior to 1/1/60		+309,100	+1,133,600
Buildings, utilities, and other facilities	33,468,100		
Wage rate increases		+1,340,000	
To provide a portion of the need for operations at acceptable standards of new and recently authorized areas (those placed in operation since 1/1/60)		+626,800	
Operation of new facilities (those placed in operation in the current fiscal year or proposed to be placed in operation in the budget year)		+111,900	
New programs in parks		+50,000	

NATIONAL PARK SERVICE

Maintenance and Rehabilitation of Physical Facilities

Summary of Increases and Decreases, 1972

	Base for 1972	Increase, 1972	
Buildings, utilities, and other facilities (continued)			
To provide a portion of the need for operations at acceptable standards in areas operating prior to 1/1/60		+2,289,200	
Transfer the funding of tree preservation work from "Forestry and fire control" activity, of "Management and protection" appropriation to "Buildings, utilities, and other facilities" activity, "Maintenance and rehabilitation" appropriation	--	+120,000	
Savings in paper work management		-258,000	+4,279,900
Net increases, 1972			5,413,500
Budget estimate, 1972			55,810,000

MAINTENANCE AND REHABILITATION OF PHYSICAL FACILITIES

Analysis by Activity

	Fiscal Year 1970	Fiscal Year 1971				
	Amount Available	Total Appropriation	Classified Pay Supplemental	Wage Rate Pay Supplemental	Transfers	Amount Available
1. Roads and trails	$15,052,582	$16,357,700	$76,000	$494,700	--	$16,928,400
2. Buildings, utilities, and other facilities	26,015,411	32,185,300	225,500	1,057,300	--	33,468,100
Unobligated balance lapsing	49,250	--	--	--	--	--
Total	41,117,243	48,543,000	301,500	1,552,000	--	50,396,500

Activity	F.Y. 1970 Amount Available	F.Y. 1971 Amount Available	F.Y. 1972 Estimate	Increase (+) or Decrease (-) 1972 compared with 1971	Page Reference
1. Roads and trails	$15,052,582	$16,928,400	$18,062,000	$+1,133,600	106
2. Buildings, utilities, and other facilities	26,015,411	33,468,100	37,748,000	+4,279,900	106
Unobligated balance lapsing	49,250	--	--	--	
Total	41,117,243	50,396,500	55,810,000	+5,413,500	

Explanation of Maintenance and Rehabilitation of Physical Facilities Programs

Roads and Trails. The Roads and trails program includes all work required for the efficient maintenance of roads, parkways, airport landing strips, and trails to enhance visitor enjoyment, prevent deterioration, and protect the Government's investment, using the latest techniques and methods. Maintenance plans, programs, and estimates are prepared by engineers and maintenance personnel.

Buildings, Utilities, and Other Facilities. The Buildings, utilities, and other facilities program includes all work required for efficient maintenance and operation of physical facilities in the parks, other than roads and trails. These facilities include buildings, structures, memorials, prehistoric ruins, historic structures, artifacts of historic and prehistoric importance, utilities, campgrounds and campsites, picnic facilities and grounds developments. The program also provides for the preservation, care, and maintenance of natural, historical, and archeological features of the parks, including soil and moisture conservation work. Many of the tasks are routine and recurring, yet many are complex operations involving highly technical work, such as the operation of water and sewage systems, heating and air-conditioning systems in buildings, and the preservation of priceless paintings and furnishings.

1. Roads and trails: Fiscal year 1971, $16,928,400; fiscal year 1972, $18,062,000; increase, $1,133,600.

2. Buildings, utilities and other facilities: Fiscal year 1971, $33,468,100; fiscal year 1972, $37,748,000; increase $4,279,900. The increase consists of:

	Increase (+) or Decrease (-)				
	Amount	Positions	Total Program	Total Positions	Explanation
(1)	$+2,000,000	--			Wage rate increases.
(2)	+791,300	+27			To provide a portion of the need for operations at acceptable standards of new and recently authorized areas (those placed in operation since 1/1/60).
(3)	+111,900	+5	$111,900	5	Operation of new facilities (those placed in operation in the current fiscal year or proposed to be placed in operation in the budget year).
(4)	+50,000	--	50,000	--	New programs in parks.
(5)	+2,598,300	+73			To provide a portion of the need for operations at acceptable standards in areas operating prior to 1/1/60.

(6)	+120,000	+4	120,000	4	Transfer the funding of tree preservation work from "Forestry and fire control" activity, "Management and protection" appropriation to "Buildings, utilities, and other facilities" activity "Maintenance and rehabilitation" appropriation.
(7)	-258,000	--			Savings in paper work management.
	+5,413,500	+109			

Cost Factors Involved in Increases

(2) Twenty-seven permanent positions at an average annual rate of $10,200, $275,400; 24.2 man-years other than permanent employment at an average annual rate of $7,600, $183,900; to provide full-year salaries of positions partially financed in current appropriation, $70,000; supplies, materials, equipment, contractual services, personnel benefits, uniform allowances and other expenses, $262,000.

(3) Five permanent positions at an average annual rate of $8,000, $40,000; 4.1 man-years other than permanent employment at an average annual rate of $6,500, $26,700; to provide full-year salaries of positions partially financed in current appropriation, $15,000; supplies, materials, equipment, contractual services, personnel benefits, uniform allowances, and other expenses, $30,200.

(4) One man-year other than permanent employment at average annual rate of $6,500, $6,500; to provide full-year salaries of positions partially financed in current appropriations, $14,000; supplies, materials equipment, personnel benefits, and other expenses, $29,500.

(5) Seventy-three permanent positions at an average annual rate of $10,200, $744,600; 70.2 man-years other than permanent employment at an average annual rate of $7,600, $533,500; to provide full-year salaries of positions partially financed in current appropriations, $350,000; supplies, materials, equipment, contractual services, personnel benefits, uniform allowances, and other expenses, $970,200.

(6) Four permanent positions at an average annual rate of $7,000, $28,000; 0.5 man-years other than permanent employment, $2,500; contractual services, $80,000; supplies, materials, equipment, personnel benefits, travel and other expenses, $9,500.

Wage Rate Increases

Roads and trails	$ 660,000
Buildings, utilities, and other facilities	1,340,000
Total.	2,000,000

Need for increase: The requested increase of $2 million is needed to cover the part year costs in fiscal 1972 of wage rate increases made pursuant to surveys conducted in fiscal 1971. The fiscal 1972 requirement is the difference between the amount included in the appropriation base (proposed supplemental estimate for fiscal 1971) and the full-year requirement in fiscal 1972 for wage rate increases already in effect and expected to be approved through the end of 1971.

Most of the Service's wage rate schedules are based directly on those of other agencies (such as Department of Defense, U. S. Forest Service, Veterans Administration, etc.). Public Law 85-872 requires that National Park Service schedules be made effective no later than the first day of the first pay period beginning on or after the 20th day following receipt of the other agencies' schedules. In most locations, such schedules are issued once each year. However, occasionally they are issued more often to reflect significant wage increases in the private employment sector.

The increases requested are also needed to cover the higher wage rates resulting from continuing conversion to the new Coordinated Federal Wage System. It is expected that all schedules received after December 1970 will be under the CFWS. In addition to the continuing cost increases resulting from converting to the required three step plan, this system also requires the application of specific job standards, which will bring about further upgrading in practically all cases.

The proposed increase is necessary to provide for continuing park operations and maintenance at the 1971 fiscal year program level and does not provide for strengthening the program. If the requested increase is not provided, the program deficiencies outlined elsewhere in this estimate will be increased. It is essential that the additional funds be provided to cover this built-in cost of operating park areas.

This estimate of wage rate increases does not include any funds to cover implementation of Public Law 90-560 (The Monroney Bill) approved October 12, 1968, which provides for additional increases for surveys conducted since October 1968. This legislation, when implemented by the Civil Service Commission, provides for retroactive payments based on revised schedules. The cost of this can not yet be determined.

The following items of increase are companion items to the ones justified under the "Management and protection" appropriation. The justification for "Management and protection" deals with both "Management and protection" and "Maintenance and rehabilitation of physical facilities" requirements and is not restated here.

Item	Roads and trails	Buildings, utilities, and other facilities	Total
To provide a portion of the need for operations at acceptable standards of new and recently authorized areas (those placed in operation since 1/1/60).	$164,500	$626,800	$791,300
Operation of new facilities (those placed in operation in the current year or proposed to be placed in operation in	--	111,900	111,900

the budget year).

New programs in parks.	--	50,000	50,000
To provide a portion of the need for operations at acceptable standards in areas operating prior to 1/1/60.	$309,100	2,289,200	2,598,300

Transfer the funding of tree preservation work from "Forestry and fire control" activity, "Management and protection" appropriation to "Buildings, utilities, and other facilities" activity, "Maintenance and rehabilitation" appropriation.

This proposed adjustment will transfer $120,000 from the "Forestry and fire control" activity of the "Management and protection" appropriation to the "Buildings, utilities, and other facilities" activity of the "Maintenance and rehabilitation" appropriation. The tree preservation work involves the maintenance and preservation of individual trees and orchards, specimen trees and rare and endangered species.

It further includes the application of accepted arboricultural practices, such as transplanting, pruning, bracing, and insect disease control. Another feature of the program is the removal of hazardous wood from areas of concentrated visitor use. The work is primarily a maintenance function, and consistent with other types of maintenance, should be funded under the "Maintenance and rehabilitation of physical facilities" appropriation.

Program of work: The "Maintenance and rehabilitation of physical facilities" programs include (1) the routine recurring work necessary to keep National Park Service physical facilities (roads, trails, buildings, utilities, etc.) in such condition that they may be utilized for their intended purpose at their original design capacity, (2) the replacement of parts, overhaul, or reprocessing of materials due to wear or deterioration to restore the facilities to substantially their original condition, (3) care, preservation, and maintenance of natural, historical and archeological features of the parks, and (4) the efficient operation of physical facilities.

In many significant respects, the management of a national park is like the management of a small city. Each has permanent residents--and transients--needing roads; schools; water, sewerage, and sanitation systems; offices; homes; recreation facilities; police and fire departments; hospitals; hotels and churches.

The maintenance programs, for the most part, are executed by Service employees assigned to those activities. However, in some instances where it is feasible and advantageous to the Government to do so, maintenance work is performed by contract.

Examples of recent accomplishments: During the year, stepped up efforts were made in the abatement of pollution. Several additional employees were assigned duties in coping with water quality, air and sound pollution and solid waste disposal problems. Water quality standards that are more rigid than State standards are being established for 6 areas in the Midwest. Another area is testing a new self-contained sewage treatment plant that is compact and self-contained. The unit contributes significantly to pollution

control.

Sanitary conditions were improved by the elimination of open burning, the construction and operation of sanitary land fills, the use of bearproof refuse cans and the use of garbage can liners. Seven sewage systems were modernized.

Approximately 162 buildings were repainted, 298 were demolished, having served their purpose or being beyond economical repair and 32 were rehabilitated and restored; 300 campsites were renovated; several utility systems were improved and more than 12 miles of power lines were placed underground.

Over 103 miles of road were resurfaced and 169 miles were resealed. Several miles of trails destroyed by storm damage were resurfaced, thus removing hazards to park visitors. In a number of parks, altered and improved trail design were accomplished for the benefit of the handicapped by changing the steepness of grades and building ramps. In one area, the scope of future maintenance was reduced by removing 200 signs, 9,000 guide and barrier posts, 150 rock barriers, 19,800 lineal feet of guard rail and 6 miles of snow fencing.

In connection with Safety, economies were realized from use of farm type and crawler type tractors which are now equipped with protective "roll over" frames and seat belts. Many parks throughout the Service reported no lost time accidents during the year.

At Ozark National Scenic Riverway 4,500 seedlings were planted by employees of the Office of Economic Opportunity. A trailer mounted tree-spade was acquired for Regional use in the Midwest Region and during the first four months of use, 648 trees were planted in six parks.

Within the National Capital Parks 220,000 trees are cared for within landscaped areas. Constant vigilance and treatment of trees infected with Dutch elm disease has produced a reduction of new infections.

Personnel Summary

	1970 actual	1971 estimate	1972 estimate
Total number of permanent positions.....	2,304	2,821	2,930
Full-time equivalent of other positions..	1,334	1,545	1,645
Average number of all employees.....	3,259	4,084	4,400
Average GS grade.....	8.7	8.7	8.7
Average GS salary.....	$11,486	$11,523	$11,526
Average salary of ungraded positions.....	$8,386	$8,740	$9,196

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DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
MAINTENANCE AND REHABILITATION OF PHYSICAL FACILITIES

Itemization of Estimate

	Actual 1970	Available 1971	Estimate 1972	Increase (+) Decrease (-)
Program and Financing:				
Total obligations	$41,067,993	$50,396,500	$55,810,000	$+5,413,500
Unobligated balance lapsing	49,250	....	....	....
Transferred to other accounts	278,757	....	....	....
Appropriation	41,396,000	48,543,000	55,810,000	+7,267,000
Proposed supplemental for wage-board increases	....	1,552,000	....	-1,552,000
Proposed supplemental for civilian pay act increases	....	301,500	....	-301,500
Obligations by Objects:				
11 Personnel compensation	$25,599,521	$33,958,500	$37,717,000	$+3,758,500
12 Personnel benefits	2,069,001	2,754,000	3,019,000	+265,000
21 Travel and transportation of persons	372,705	380,000	428,000	+48,000
22 Transportation of things	699,744	714,000	790,000	+76,000
23 Rent, communications, and utilities	2,395,906	2,448,000	2,691,000	+243,000
24 Printing and reproduction	16,777	17,000	22,000	+5,000
25 Other services	3,157,250	3,225,000	3,561,000	+336,000
26 Supplies and materials	5,071,066	5,181,000	5,690,000	+509,000
31 Equipment	1,682,415	1,719,000	1,892,000	+173,000
42 Insurance claims and idemnities	3,608	....	....	....
Total obligations	41,067,993	50,396,500	55,810,000	+5,413,500

MAINTENANCE STANDARDS

Mrs. HANSEN. Have you developed any standard guides on unit maintenance costs?

Mr. HARTZOG. We are in the process of doing that, Madam Chairman. What we have done thus far is this. We have developed standards for acceptable maintenance of all of our physical facilities as well as for our resources. We have developed staffing standards that are related to the implementation of those standards. In other words, how many personnel would it take to maintain a mile of road at the prescribed standard.

We are now gathering data, through our accounting system, to cost these out on individual unit basis, taking into account the staffing standard and measurement system. I have a paper on this, and I will be glad to supply it for the record. It is quite lengthy, but it explains the whole background of what it is, and examples of how it would be used and this kind of thing.

(The information follows:)

STAFFING ANALYSIS AND MEASUREMENT SYSTEM

In past appearances before this committee I have reported on efforts to improve the management of our national parks. As you know, we have long been committed to determining ways of providing the taxpayer an increasing return for the dollars he has invested in the national parks. One of the more promising results of our management studies has occurred in the area of manpower resources allocation. In my opinion, we have achieved a real breakthrough with promising payoff possibilities in a new management tool we call SAMS, which is an acronym for a system for analysis and measurement of staffing.

Basically, SAMS guides management in determining the adequacy of the staff to accomplish work at acceptable standards of operation. I should like to emphasize that the system is only a guide or tool to assist management and is not a substitute for management judgment.

The system is based on a few simple concepts:

1. Certain major work elements are common to most areas administered by the Service.

2. These common work elements can be identified and measured.

3. Manpower needed to accomplish these work elements can be estimated on the basis of staffing standards for each element.

4. Parks with similar work requirements can be compared, significant differences in staffing flagged, and judgments made by managers on whether these differences are acceptable.

SAMS does not measure every small facet of work such as those details usually included in engineering, job standards, or motion and time studies. The cost of such detailed programs would be enormous; the benefits questionable. Therefore, only the larger management units, those parks with 15 or more man-years expended annually on management and protection or on maintenance and rehabilitation, are covered by the System. Even so, this covers eight out of 10 of all park personnel and accounts for 80 percent of total park appropriations. Parks included in its coverage record more than three-fourths of the annual visits to all areas administered by the Service.

An essential element in SAMS is the staffing standard. This is an expression of time in man-hours required to perform a given task at an acceptable level of quality. For example, a standard for building maintenance might be that one man-hour is required to mop 1,000 square feet of floor. One of the advantages of our staffing system is its flexibility: that is, we can use standards from other Federal agencies, State governments, or private industry. In developing SAMS, for example, we used GSA standards for building maintenance and Virginia department of highway standards for road maintenance.

The system, which we are now starting to use, is designed primarily to assist the members of our Washington office staff and regional staffs in reaching de-

cisions on park staffing. I want to emphasize again that it is only a tool and cannot replace the seasoned judgment of experienced park administrators. For this reason the operations evaluations teams in our regional offices will be chiefly responsible for the use of SAMS data at the field level. The Washington office staff will be responsible for the continuing maintenance, refinement, and expansion of the system on a servicewide basis. We are in the process of briefing the regional staffs on the use of this system; two have already begun to use the data in their park evaluations.

As you know, we have also been developing program performance standards. Basically, these standards establish criteria for superintendents and directors of regions as to what is considered to be an acceptable quality level for various facets of a park's operation. Thus, program standards identify the components of work, and the frequency and quality level at which these components should be accomplished to achieve an acceptable level of operation. The staffing system will assist in determining the kinds and numbers of people required to do the work identified in the program standards.

INCREASE IN MAINTENANCE COSTS

Mrs. HANSEN. How much have maintenance costs increased in the last 5 years? What is the percent?

Mr. HARTZOG. Our wage rates alone have been greatly accelerated as a result of this centralized wage survey. I would have to supply those exact percentages for the record, but the wage rates alone have been substantial. Of course, the cost of materials and supplies have also accelerated.

Mrs. HANSEN. Please insert the information in the record.

(The information follows:)

INCREASE IN THE COST OF LABOR FROM 1965 TO 1970

Wage rate increases based on annual rate surveys account for a major portion of the increased maintenance cost of the Service. A comparative analysis was made using the wage rate in effect on June 30, 1965, and June 30, 1970. A comparison of the wage scale for the two dates shows an increase in the cost of labor of almost 35 percent.

REHABILITATION OF FACILITIES

Mrs. HANSEN. What is your general policy with regard to rehabilitation of facilities? What percentage of the original or current market value costs do you use as a limitation of rehabilitation or repairs?

Mr. HARTZOG. We don't use any percentage, Madam Chairman. Our policy is spelled out in our administrative policies, which are to maintain the facility in as nearly its original condition as possible, to serve the purpose for which it was originally built. That means if you have to replace a roof, that you replace the roof. For many years we followed a policy that said you wouldn't spend more than $2,500 of maintenance money on a facility. Then when the job got beyond that, you would bring it back to the committee as a construction project. With the rate that our construction money was going, this is one of the reasons we are in such foul shape on our maintenance now.

Many, many projects were just allowed to deteriorate to the point where the facility was totally destroyed, so I abolished that about 3 or 4 years ago, and said maintenance is maintenance, and as long as you don't try to take a sow's ear to make a silk purse out of it, it is maintenance, regardless of what it costs you to maintain it.

Mrs. HANSEN. Are there any maintenance and rehabilitation funds in the reserve?

Mr. HARTZOG. No.

GENERAL ADMINISTRATIVE EXPENSE

Mrs. HANSEN. Please insert pages 112 through 116 of the justifications in the record.

(The pages follow:)

DEPARTMENT OF THE INTERIOR

NATIONAL PARK SERVICE

General Administrative Expenses

Appropriation, 1970	$3,317,000	
Second supplemental appropriation, 1970	263,000	
Transferred to other accounts	-208,775	
Total appropriation, 1970		$3,371,225
Appropriation, 1971	3,580,000	
Pay cost supplemental	196,000	
Total appropriation, 1971		3,776,000
Budget estimate, 1972		3,776,000

Personnel Summary

	1970 actual	1971 estimate	1972 estimate
Total number of permanent positions	216	216	216
Full-time equivalent of other positions	9	10	10
Average number of all employees	191	202	202
Average GS grade	8.7	8.7	8.7
Average GS salary	$11,486	$11,523	$11,526

GENERAL ADMINISTRATIVE EXPENSES

Analysis by Activity

Activity	Fiscal Year 1970 Amount Available	Fiscal Year 1971 Total Appropriation	Pay Cost Supplemental	Transfers	Amount Available
1. Departmental expenses	$1,752,643	$1,932,200	$107,000	--	$2,039,200
2. Regional office expenses	1,604,890	1,647,800	89,000	--	1,736,800
Unobligated balance lapsing	13,692	--	--	--	--
Total	3,371,225	3,580,000	196,000	--	3,776,000

Activity	F.Y. 1970 Amount Available	F.Y. 1971 Amount Available	F.Y. 1972 Estimate	Increase (+) or Decrease (-) 1972 compared with 1971	Page Reference
1. Departmental expenses	$1,752,643	$2,039,200	$2,039,200	--	114
2. Regional office expenses	1,604,890	1,736,800	1,736,800	--	114
Unobligated balance lapsing	13,692	--	--	--	
Total	3,371,225	3,776,000	3,776,000	--	

1. Departmental expenses: Fiscal year 1971, $2,039,200; fiscal year 1972, $2,039,200; no change.

Program of work: Executive direction and certain administrative functions of the Washington Office are financed under this activity. The functions are general in nature and include (1) formulation of policy, (2) prescribing of systems and procedures, (3) legislative, information, program planning and coordination, management analysis, financial management, personnel management, manpower development, property management, and records management functions, and (4) the overall executive direction and coordination of the various programs of the Service. The objective is to discharge the administrative and executive direction functions in the most effective, efficient, and economical manner, and to facilitate the prosecution of all of the Service's diversified programs to the maximum extent possible.

2. Regional office expenses: Fiscal year 1971, $1,736,800; fiscal year 1972, $1,736,800; no change.

Program of work: Executive direction, certain administrative functions, public affairs and program coordination and planning functions in six regional offices and National Capital Parks in support of all Service programs are financed under this activity.

Examples of recent accomplishments: There have been a number of accomplishments in the area of administrative management. Previously, performance standards were promulgated for park operations. Performance standards are now being developed covering all Service programs. An automated personal property information system to prepare property accounting reports centrally and reduce the paperwork burden in the field has been implemented. Also a study has been initiated to develop an automated system for obtaining and processing information on real property within the Service. This system will be related to the land acquisition information system which became operational last year, but will include all types of real property.

The difficult problems of implementing within the Service the Departmental Integrated Personnel/Payroll system have been overcome and the system is now working well. Phased implementation throughout the Service is continuing and the expected benefits from centralized report preparation and more accurate personnel and labor cost accounting are being realized. The design and development of a new, computer-based, Servicewide programing and financial management system was accelerated during the year. Implementation of this system, projected for one region by July 1, 1971, will provide major benefits both in improved information for managing the organization and in potential dollar savings and reduced workload on field personnel.

Organizational changes have been made in the Washington Office to strengthen program direction. The Office of Personnel was reassigned, reporting to the Director, which permits greater attention to be given to an important resource of the Service - its employees. The Office of Program Standards and Evaluation, also reporting to the Director, was charged with the preparation of performance standards and insuring that Service components comply with prescribed standards. The operations evaluations staffs established a year ago in the Regional Offices have been active with the result that the management appraisal program has become more effective. More parks have been evaluated, the evaluations have improved and the reports have been more timely.

DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
GENERAL ADMINISTRATIVE EXPENSES

Itemization of Estimate

	Actual 1970	Available 1971	Estimate 1972	Increase (+) Decrease (-)
Program and Financing:				
Total obligations	$3,357,533	$3,776,000	$3,776,000	...
Unobligated balance lapsing	13,692	...	...	...
Transferred to other accounts	208,775	...	...	...
Appropriation	3,580,000	3,580,000	3,776,000	+196,000
Proposed supplemental for civilian pay act increases	...	196,000	...	-196,000
Obligations by Objects:				
11 Personnel compensation	$2,677,760	$2,910,000	$2,910,000	...
12 Personnel benefits	230,004	250,000	250,000	...
21 Travel and transportation of persons	196,857	270,000	270,000	...
22 Transportation of things	26,614	36,000	36,000	...
23 Rent, communications, and utilities	45,011	62,000	62,000	...
24 Printing and reproduction	40,669	56,000	56,000	...
25 Other services	55,890	77,000	77,000	...
26 Supplies and materials	52,522	71,000	71,000	...
31 Equipment	32,206	44,000	44,000	...
Total obligations	3,357,533	3,776,000	3,776,000	...

ADMINISTRATIVE EXPENSES 1970–72

Mrs. HANSEN. Please insert in the record a tabulation indicating your total administrative expenses for fiscal years 1970, 1971, and 1972. This should include your regular administrative expense appropriation plus those administrative expenses allocated to program operations. The allocation of administrative expenses to program operation should be broken down by program.

Mr. HARTZOG. By program or appropriation?

Mrs. HANSEN. By program.

Mr. HARTZOG. I will have to do something different.

(The information follows:)

NATIONAL PARK SERVICE

Total Executive Direction and Administrative Service Functions for the Washington and Regional Offices, Fiscal Years 1970, 1971, and 1972

	Fiscal Year 1970 Actual	Fiscal Year 1971 Estimate 1/	Fiscal Year 1972 Estimate
General Administrative Expenses (Direct Appropriation)			
Departmental	$1,752,643	$2,039,200	$2,039,200
Regional Offices	1,604,890	1,736,800	1,736,800
Total, General Administrative Expenses Appropriation	3,357,533	3,776,000	3,776,000
Costs distributed during 1970 FY and estimated amounts to be distributed for 1971 and 1972 FY's to the following appropriations for administrative service functions (Facilitating Services)			
Appropriation			
Management and Protection	1,832,410	3,039,200	3,300,700
Maintenance and Rehabilitation of Physical Facilities	1,634,659	2,574,400	2,790,500
Preservation of Historic Properties	22,638	145,800	189,300
Construction	423,960	404,000	943,900
Parkway and Road Construction (LCA)	1,400,406	298,900	390,400
Transfer funds	546,213	1,746,500	1,259,900
Total, Facilitating Services	5,860,286	8,208,800	8,874,700
Grand Total	9,217,819	11,984,800	12,650,700

1/ Includes estimated pay increase costs effective December 1969.

PERCENTAGE OF ADMINISTRATIVE EXPENSES TO OVERALL OPERATING COSTS

Mrs. HANSEN. What percentage of your overall operating costs consist of overhead and administrative expenses?

Mr. HARTZOG. Of my budget as a whole, 9 percent goes for overhead cost. I have prescribed a varying scale of percentages, however, for each of the appropriations that differ from 19 percent for M. & P., 15 percent for M. & R. to one-half of 1 percent, for example on parkway and road construction money that we transfer to the Bureau of Public Roads.

For example, we charge 1¾ percent, I think it is, on the land acquisition funds, and on the matching grants-in-aid which is the same percentage that the Bureau of Outdoor Recreation uses in their assessment; I charge 5 percent on forest protection and utilization funds transferred to us from Forest Service, 2 percent on the transfers from Bureau of Reclamation, 2.5 percent on parkway and road construction except that which is transferred to BPR. On that which is transferred to BPR, one-half of 1 percent. On buildings and utilities construction, 2.5 percent, on acquisition of water rights, 2 percent, on all other programs of historic preservation except matching grants-in-aid, 4 percent. Overall the total is 9 percent. That is on the average.

Mrs. HANSEN. The overhead and administrative expenses vary depending on the program activity?

Mr. HARTZOG. That is right.

Mrs. HANSEN. What are the percentages of overhead and administrative expense in some of your other program activities?

Mr. HARTZOG. It is 19 percent on M. & P., and 15 percent on M. & R. On construction it is 2.5 percent on projects that we handle in parkway and road construction, and that portion transferred to BPR, it is one-half of 1 percent. On historic preservation matching grants-in-aid, it is 1.75 percent, on all other items in historic preservation it is 4 percent. For land acquisition it is for us 1.75 percent. Isn't that the total budget? Of that total 9 percent we have allocated for contingency reserves 2.3 percent, to cover employee transfers, lump sum leave payments and emergencies not otherwise covered, such as unusual amounts of snow plowing—plowing that you have to do in some areas in the wintertime.

For facilitating services, it is 3.3 percent for the financing of administrative operations. For the financing of general park program related supervisory and advisory functions in the regional, service center, and Washington offices it is 3.4 percent, for a total overall of 9 percent.

TOTAL OPERATING COSTS OF WASHINGTON AND REGIONAL OFFICES

Mrs. HANSEN. Please insert in the record for fiscal years 1970, 1971, and 1972 by office the total operating costs of your Washington headquarters office, and the various regional offices. This tabulation should be broken down by individual office.

(The information follows:)

OPERATING COSTS OF WASHINGTON HEADQUARTERS OFFICE AND REGIONAL OFFICES

	Fiscal year—		
	1970	1971	1972
Washington office [1]	$7,719,500	$9,681,400	$10,109,700
Regional offices:			
Southeast	1,166,100	1,102,600	1,178,300
Midwest	981,100	957,700	1,032,300
Southwest	1,018,800	1,074,500	1,149,400
Western	611,800	610,400	671,000
Pacific Northwest	573,500	516,700	577,500
Northeast	992,900	1,133,800	1,208,200
Subtotal, regional offices	5,344,200	5,395,700	5,816,700
Total	13,063,700	15,077,100	15,926,400

[1] Includes servicewide expenses for postage, FTS, data processing, and employee training.

Preservation of Historic Properties

Mrs. Hansen. Please insert pages 117 through 134 of the justifications in the record at this point.

(The pages follow:)

DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

Preservation of Historic Properties

Appropriation, 1971		$6,801,000
Unobligated balance from prior years		75,658
Pay cost supplemental		51,000
Total available for obligation		6,927,658
Decreases:		
Maintenance of the national register and administration of grants-in-aid program	$15,209	
Advisory council on historic preservation support	805	
Historic sites survey	53,143	
Historic American buildings survey	6,501	75,658
Subtotal		6,852,000
Increases:		
To provide for computer processing of data for the National Register	35,000	
To provide additional support to Advisory Council on Historic Preservation	20,000	
Transfer of the Archeological investigations and salvage subactivity from "Park and recreation programs" activity, "Management and protection" appropriation	875,000	
To continue the archeological investigations and salvage work in the Missouri River Basin formerly funded with Bureau of Reclamation funds	314,000	1,244,000
Total available for obligation		8,096,000
Less: Unobligated balance from F.Y. 1971		....
Budget Estimate, 1972		8,096,000

Preservation of Historic Properties

Analysis by Activities

Activity	Amount Available 1971	Fiscal Year 1972 Estimated Total Available	Fiscal Year 1972 Unobligated Balance from 1971	Fiscal Year 1972 Budget Estimate	Total available 1972 compared to total available 1971	Page ref.
1. Historic preservation and special studies	$6,927,658	$8,096,000	--	$8,096,000	$+1,168,342	119

Analysis by Subactivities

Subactivity	Amount Available 1971	Fiscal Year 1972 Estimated Total Available	Fiscal Year 1972 Unobligated Balance from 1971	Fiscal Year 1972 Budget Estimate	Total available 1972 compared to total available 1971
(a) Grants-in-aid	$5,980,000	$5,980,000	--	$5,980,000	--
(b) Maintenance of the national register and administration of grants-in-aid program	214,509	234,300	--	234,300	$+19,791
(c) Advisory council on historic preservation support	107,205	126,400	--	126,400	+19,195
(d) Historic sites survey	273,643	220,500	--	220,500	-53,143
(e) Historic American buildings survey	232,001	225,500	--	225,500	-6,501
(f) Historic American engineering record	120,300	120,300	--	120,300	--
(g) Archeological investigations and salvage	--	1,189,000	--	1,189,000	+1,189,000
Total	6,927,658	8,096,000	--	8,096,000	+1,168,342

PRESERVATION OF HISTORIC PROPERTIES

The Secretary of the Interior, through the National Park Service, administers a broad coordinated program of historic preservation. It is aimed at the recognition of our historic heritage, its meaning and value to us today. It fosters the retention and use of the viable physical elements surviving from our past, their restoration and rehabilitation for a productive future, their place in overall plans. It includes the recovery and perpetuation of useful knowledge concerning man in his environment and the quality of the man-made environment. It serves as a valid instrument in the shaping of the future. Its results contribute to improvement of the environment through continuity, diversity, and those important intangibles of feeling and association.

This program is directed for the public benefit, beyond the confines of the National Park System, to all the territory of the United States. It is conducted in cooperation with other Federal agencies, the States, and a host of professional organizations, public and private preservation bodies, and institutions of learning. It has generated and continues to stimulate a combined endeavor increasingly greater than the Federal contribution alone. Representing the central effort of the Federal Government in this broad cultural activity, the program consists of the following components:

(a) Grants-in-aid.

(b) Maintenance of the National Register and administration of grants-in-aid program.

(c) Advisory Council on Historic Preservation support.

(d) Historic Sites Survey.

(e) Historic American Buildings Survey.

(f) Historic American Engineering Record.

(g) Archeological investigations and salvage.

(a) Grants-in-aid: Fiscal year 1971, $5,980,000; fiscal year 1972, $5,980,000; no change.

Program of work: Matching grants-in-aid assist the States in historic preservation and encourage the private sector through assistance to the National Trust for Historic Preservation. They support the formulation of statewide historic preservation plans consonant with other statewide planning. They assist the States in identifying historic properties eligible for the protection of the National Register. They assist the States in the purchase and restoration of registered properties. These activities promote vastly improved protection for an important element of the environment as swift change transforms rural and urban areas.

The record of the grants-in-aid program to the States and National Trust follows:

1967	1968	1969	1970	1971	1972 Proposed
0	$300,000	$100,000	$969,000	$5,980,000	$5,980,000

The grants-in-aid program is conducted under authority of the National Historic Preservation Act of 1966 (80 Stat. 915) as amended, which authorizes grants-in-aid of $7 million in 1971, $10 million in 1972, and $15 million in 1973.

The $5,980,000 requested for 1972 will be applied against matching funds estimated at $26,988,394. It is estimated that 45 States will request at least $4,000,000 for assistance in preparing or revising state historic preservation plans, of which surveys are an integral part. For acquisition and development projects, it is estimated that States will need $21,238,394, including $14,485,234 for approximately 300 unfunded 1971 applications and $6,753,160 for 205 historic properties in fiscal 1972 as projected in state preservation plans. It is estimated that $1.75 million will be needed for the National Trust.

A State historic preservation plan is a public document projecting within the national context the development of a State's historic patrimony. It describes a program possessing social, cultural, and environmental significance. It presents a balanced approach geographically, recognizing the needs of a State's regions, and it programs the acquisition and development of historic properties within a State. Current State historic planning, according to reports, has invigorated overall State planning. Its importance and magnitude are shown by the fact that New York estimates it has over 30,000 historic properties; South Carolina over 6,000; Michigan over 3,000; California over 5,000; Virginia over 5,000; Washington between 1,500-2,000; Nevada over 700; and Pennsylvania over 9,000.

Surveys are a central element of historic planning. A survey identifies, locates, and describes historic sites, structures, and objects within a State. It creates the historical data necessary to planning. Surveys also result in nominations to the National Register. Forty-five States are currently submitting nominations at the combined rate of approximately 100 properties monthly.

The other major support to the States is aid for acquisition and development projects. Purchases and restorations of historic properties are placed on a priority schedule in the statewide plan, enabling a State to counter the most pressing threats to its historic properties. Acquisition and development projects involve State, local, and private properties and are attracting an increasingly significant amount of State, local, and private funds. By provisions of law, grants are made on the basis of need as revealed in approved

statewide plans, which indicate more than 500 worthwhile projects now eligible for matching Federal assistance.

The program also provides financial assistance to the National Trust for Historic Preservation. Its technical assistance and education program renders invaluable aid to both private organizations and States, enabling the latter to receive additional benefit over and above the grants made to the States. Matching Federal assistance to the Trust also supports the administration of its properties and aids the Trust's acquisition and development of unusually worthy historic structures.

Examples of recent accomplishments:

Grants for State Historic Planning. The Secretary of the Interior announced on October 23, 1970, the apportionment of $2,185,631 for historical planning among 41 States. This allocation was made in accordance with the commitment to meet for the first time the amounts applied for by the States. Grants range from $4,403 to $237,518.

The apportionment attests to the States continuing development of their preservation planning, of which surveys are a vital part. Forty-three States have submitted historic preservation plans, which have been reviewed and approved. The collective submission constitutes the first result of a national planning program for historic preservation.

Grants for Acquisition and Development Projects. The program is funding acquisition and development projects for the first time in fiscal 1971, $2,308,996 being available for that purpose. Forty States have submitted 376 applications with a total matching Federal request of $16,793,230, attesting to the States' response to the program and the importance accorded to it.

The applications include requests from 30 States for 68 National Historic Landmarks, amounting to $2,471,954 in matching Federal funds limited to 50% of development costs. This illustrates how this program can lessen the urgency for the Federal government to administer such properties.

Grant to the National Trust for Historic Preservation. A grant of $1,042,023 to the National Trust has been made for the following purposes:

Technical Assistance and Educational Programs	$235,505
Maintenance and Administration of Trust Properties	$411,291
Acquisition and Development of Trust Properties	$395,227

(b) Maintenance of the National Register and administration of grants-in-aid program: Fiscal year 1971, $199,300; fiscal year 1972, $234,300; increase, $35,000. The increase consists of:

	Increase (+) or Decrease (-) Amount	Positions	Program	Total Positions	Explanation
(1)	$+35,000	2	$234,300	15	To provide for computer processing of data for the National Register.

Cost Factors Involved in Increases

Two permanent positions at average annual rate of $11,500, $23,000; supplies and materials, $2,000, equipment and computer rental, $10,000.

Need for increase: An additional $35,000 is requested to strengthen the capacity of the National Register to respond to Federal agencies consulting the Register as required by Section 106 of the National Historic Preservation Act of 1966. Before a Federal Agency can undertake a project it must consult the Register for precise geographical data and other information relating to registered properties. Manual retrieval operations are not immediately responsive to inquiry.

The Register is consulted with increasing frequency by a growing number of agencies. In fiscal 1971 inquiries will approach 1,000, a five fold increase over the previous year. The potential number of annual inquiries is very great because of the steady expansion of the Register. It is therefore imperative to adopt automatic data processing and retrieval.

The increase will initiate an automatic system allowing immediate and remote consultation of the National Register. It will fund the initial phase, consisting of the analysis and programming necessary to provide a system readily adaptable to needs other than Federal agency consultation, such as publication of the National Register.

Fund Requirements

Salary expenses	$23,000
Other expenses:	
Equipment, computer-time rental	10,000
Supplies and materials	2,000
Total	$35,000

Staffing Requirements

Positions	Number
System Analyst-Programmer, GS-12	1
Clerk-Typist, GS-5	1
Total	2

Program of work: The National Register of Historic Places, maintained under authority of the Historic Sites Act of 1935 (49 Stat. 666), is the official schedule of the nation's cultural property that is worth saving. It is an informative roster of the tangible evidence of our heritage. Further, under provisions of the National Historic Preservation Act of 1966 (80 Stat. 915), it is a protective inventory. Heads of Federal agencies are required to take into account the effect of Federal undertakings on registered properties and afford the Advisory Council on Historic Preservation an opportunity to comment. The National Register is thus a basic guide in environmental planning.

The National Register consists primarily of historic properties nominated by the States. Also included are historic areas in the National Park System and places approved by the Secretary of the Interior as National Historic Landmarks. Every State has entries in the National Register.

Provisions of law require that the contents of the National Register be made widely available. This is done by publishing current entries in the "Federal Register" each month. In addition, there is published a biennial reference

volume entitled "The National Register of Historic Places." The second edition, enlarged three-fold, is planned for fiscal 1972.

At the request of the Advisory Council on Historic Preservation, a Federal agency or a State, the National Register staff prepares evaluations of the effect of proposed Federal undertakings on registered properties and engages in consultations to remove or minimize harmful effects before the case is referred to the Advisory Council. In the past four years, 115 cases of potential threat were evaluated. This represents 6% of the entries on the Register. As the size of the National Register increases the number of cases can be expected to rise proportionately.

Administration of the grants-in-aid program involves the processing, review, evaluation, and approval of State historic preservation plans. They give direction to the State's program for historic preservation and set out both the short-term action plan and long-range program. Also involved is the processing of applications from the National Trust and from the States for matching grants to assist surveys and planning and support preservation projects, which must accord with the preservation plan. This procedure includes evaluating for legal compliance and program eligibility, apportionment of funds, preparation of contracts, and keeping of expenditure records. This function requires frequent consultation with the States in the mutual effort.

Examples of recent accomplishments:

Expansion of the National Register. As of December 31, 1970, the National Register contained 2,248 entries, of which 478 were enrolled during the first half of fiscal year 1971. This is an increase of 27% in six months, resulting in part from increased support of State surveys. Forty-five States are actively nominating properties, nearly doubling the participation of the previous year. Nominations average approximately 100 each month, entries per State ranging from a low of 12 to a high of 191. By the beginning of the 1972 fiscal year there will be 3,000 entries in the National Register, with a rising rate of increase.

Substantially more historic properties are protected than is indicated by the total entries; 120 entries are historic districts containing an estimated average of 300 individual buildings, or a total of 36,000 protected properties.

Publication of the National Register. For prompt official notice, current additions to the National Register are published monthly in the "Federal Register." A complete listing was published in February, 1970, as part of the "Federal Register" and will be done so again annually.

The "National Register of Historic Places" was published as a hard-bound reference volume in November, 1969, with a run of 7,550 copies. The first printing was soon exhausted and a second printing of 5,000 copies is nearly depleted, indicating its extensive use.

Advisory Services. All the States have been consulted and advised on the preparation of preservation plans and the conduct of surveys. Forty-three statewide plans have been submitted, reviewed and comments prepared to aid the States. Approval of these plans has provided 43 States with eligibility for project funding.

All the States were advised on the procedures adopted under Section 106 of the National Historic Preservation Act. In the first half of fiscal 1971, 61 federal undertakings were examined for adverse effect on registered properties -- a 300% increase over the same period in 1970. Consultations were held with States and Federal agencies and evaluation reports were prepared for the Advisory Council. Threats were posed by undertakings such as urban renewal projects,

highway construction, powerline installations, and river and harbor projects.

(c) Advisory Council on Historic Preservation support: Fiscal year 1971, $106,400; fiscal year 1972, $126,400; increase $20,000. The increase consists of:

	Increase (+) or Decrease (-)				
	Amount	Positions	Total Program	Total Positions	Explanation
(1)	$+20,000	--	$126,400	4	To provide additional support to Advisory Council on Historic Preservation.

Cost Factors Involved in Increases

Travel and other expenses necessary to provide additional support to Advisory Council on Historic Preservation, $20,000.

Need for increase: The National Environmental Policy Act of 1966 (P. L. 91-90) requires Federal agencies considering major undertakings that will affect historic sites to consult with other Federal, State and local agencies having expertise in historic preservation. Requests have already been received by the Council for assistance in this matter, which is expected to involve consultation with most of the major agencies in fiscal 1972.

An amendment to the 1966 National Historic Preservation Act on May 9, 1970, (P. L. 91-243), gives the Council new responsibilities as coordinator of the United States membership in the International Centre for the Study of the Preservation and Restoration of Cultural Property in Rome, Italy. The Rome Centre, established in 1958, is an intergovernmental organization of 50 nations. According to its statutes, the Centre shall: (a) collect, study, and circulate documentation concerned with the scientific and technical problems of the preservation and restoration of cultural property; (b) coordinate, stimulate or institute research in this domain, by means, in particular, of commissions to bodies or experts, international meetings, publications and exchanges of specialists; (c) give advice and recommendations on general or specific points connected with the preservation and restoration of cultural property; (d) assist in training research workers and technicians and raising the standard of restoration work. In carrying out its duties as coordinator of United States participation, the Council will: convene meetings of experts; publicize scholarships; arrange for the distribution of Rome Centre publications; recommend instructors to assist with the educational program of the Centre; and request assistance in the resolution of special preservation problems.

Increased funding will permit the Council to carry out its new responsibilities by providing additional temporary clerical and professional support services.

Program of work: The Advisory Council on Historic Preservation is a high level advisory and coordinating body whose members are The Secretary of the Interior, The Secretary of Housing and Urban Development, The Secretary of Commerce, The Secretary of the Treasury, The Attorney General, The Secretary of Transportation, The Secretary of Agriculture, The Administrator of the General Services Administration, The Secretary of the Smithsonian Institution, The Chairman of the National Trust for Historic Preservation, and 10 citizen members appointed by the President.

Under authority of the National Historic Preservation Act of 1966 (80 Stat. 915), the Advisory Council on Historic Preservation has the responsibility for (1) commenting on Federal, Federally assisted, and Federally licensed under-

takings having an effect on historic properties listed on the National Register of Historic Places; (2) for initiating studies of special preservation problems; (3) for recommending changes in existing laws and procedures pertaining to historic properties; (4) for recommending new regulations and legislation concerning historic preservation; (5) for coordinating the efforts of Federal, State, and local agencies; and (6) for generally advising the President and the Congress in historic preservation matters. The National Park Service is charged by law to provide staff assistance to the Council, which meets quarterly, to carry on these activities.

The foremost activity of the Council continues to be its advice to Government agencies on Federal undertakings in accordance with Section 106 of the Historic Preservation Act. To insure that registered properties were not needlessly destroyed or impaired, the Council found it necessary to give its comments on 22 occasions in the past three years. The number of matters requiring investigation and comment is increasing because of the growth of the National Register.

Examples of recent accomplishments: In the past year, Council actions have resulted in the continuing life of such significant structures as the U. S. Mint in San Francisco, California, and the Old Post Office in St. Louis, Missouri-- two of the greatest monumental public buildings in the trans-Mississippi West-- and in delaying the impairment of such important properties as Honey Hollow Watershed National Historic Landmark. The Council has also given major consideration to plans and projects affecting Pennsylvania Avenue National Historic Site and Union Station in Washington, D.C.; the Sterling Opera House in Derby, Connecticut; and Pennsbury Manor near Tullytown, Pennsylvania. Since the beginning of the 1970 fiscal year, the Council has commented formally and informally on 83 proposals related to programs of the Atomic Energy Commission; the Department of Interior; the Department of Housing and Urban Development; the Department of Transportation; the Department of Defense; the Department of Health, Education, and Welfare; the Department of Justice; the General Services Administration; and the District of Columbia Government.

The Council has also worked with a number of Government agencies in developing procedures for complying with the Historic Preservation Act and with the Council on Environmental Quality in developing guidelines, policies, procedures, and corrective legislation for dealing with historic preservation problems.

The Council, at the request of the State Department, prepared a discussion of the United States implementation of the UNESCO "Recommendation Concerning the Preservation of Cultural Property Endangered by Public and Private Works."

(d) Historic Sites Survey: Fiscal year 1971, $220,500; fiscal year 1972, $220,500; no change.

Program of work: The Historic Sites Survey, conducted under the authority of the Historic Sites Act of 1935 (49 Stat. 666), plays a unique role in the historic preservation movement. Stimulating broad public interest in the outstanding values of our heritage, it is the program which identifies those prime historic properties important to all Americans. Those are the properties eligible for the honorary distinction National Historic Landmark.

A National Historic Landmark is a district, site, building, structure or object that possesses national significance in American history, architecture, archeology, or culture. To date there are 894, situated in all 50 states, the District of Columbia, Puerto Rico, the Virgin Islands, and the Panama Canal Zone. Properties eligible for Landmark status are so designated by the Secretary of the Interior on recommendation of his Advisory Board on National Parks, Historic Sites, Buildings, and Monuments. These properties are awarded a certificate and bronze plaque attesting to their importance in illustrating our national development. Owners who apply for the certificate and plaque

agree to cooperate with the National Park Service to insure preservation of the site. The properties are also enrolled directly on the National Register of Historic Places.

The Historic Sites Survey identifies and evaluates sites through thematic studies of American history from prehistoric times to the present. Currently the subtheme "Architecture" is a major project. Sites of the Colonial period have been evaluated and studies are focused on buildings erected after 1784. The review and revision of the themes "Literature, Drama, and Music" and "War for Independence" are also major tasks. The identification of further sites associated with the American Revolution is now being undertaken, in anticipation of the Bicentennial of American independence. This includes a special study of sites associated with the Signers of the Declaration of Independence.

Publications record and disseminate the findings of the Survey to Americans of all ages, in all parts of the country. Of a projected series of thirty-five volumes, five have already been published. More than 100,000 copies have been sold, indicating wide public interest in historic sites. Special interest has been shown by schools, school children, teachers, historians, architects, and others. It is estimated that one additional volume can be produced by the Survey each year at present staffing and funding levels.

Examples of recent accomplishments: The National Survey completed the section of the theme relating to colonial architecture, which was reviewed, evaluated, and acted upon by the Consulting Committee and Advisory Board. This involved the study of 190 sites located in 15 states and the District of Columbia, from which 76 sites were selected as Landmarks. Part of the study of American architecture of the nineteenth century was concluded and reviewed by the Consulting Committee as well as the Advisory Board. In this portion were the states of Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont, where 65 sites were investigated for possible Landmark designation. The following ten special studies were also prepared and acted upon by the Secretary:

1. Blood Run Site, Iowa and South Dakota
2. First Missouri State Capitol Buildings, St. Charles, Missouri
3. Fort Mifflin, Philadelphia, Pennsylvania
4. Fort Warren, Boston, Massachusetts
5. The Hermitage, Hohokus, New Jersey
6. Lafayette Square, Washington, D.C.
7. Medicine Wheel, Medicine Mountain, Wyoming
8. Riverside Historic District, Riverside, Illinois
9. Thomas Creek Battlefield, Jacksonville, Florida
10. Wickyup (Admiral Richard Byrd Estate), East Sullivan, Maine

Eight additional evaluations related to the architectural theme have been reviewed by the Consulting Committee and Advisory Board:

1. Avery Coonley House, Riverside, Illinois
2. College of Charleston, Charleston, South Carolina

3. Jefferson Barracks, St. Louis, Missouri

4. Old Post Office, St. Louis, Missouri

5. Pottsgrove Mansion, Pottstown, Pennsylvania

6. Pullman Historic District, Chicago, Illinois

7. Union Station, St. Louis, Missouri

8. Unity Temple, Riverside, Illinois

In fiscal 1971 a total of 88 sites were designated as being of national significance, and a sizeable number are pending.

Sales of the hard-cover volumes continued to indicate popular acceptance of the series. As of December 31, 1970, sales of the four volumes published by the Government Printing Office were:

Colonials and Patriots (1965)	34,763
Prospector, Cowhand, and Sodbuster (1967)	30,408
Founders and Frontiersmen (1968)	15,688
Explorers and Settlers (1968)	23,825
Totals	104,684

(e) Historic American Buildings Survey: Fiscal year 1971, $225,500; fiscal year 1972, $225,500; no change.

Program of work: Conducted under authority of the Historic Sites Act of 1935 (49 Stat. 666), HABS has been for more than a generation a major force in the preservation movement, stimulating active public concern for our historic patrimony. A singularly influential Federal program, it is conducted by the National Park Service through formal agreement with the American Institute of Architects and the Library of Congress. It is assisted by numerous other institutions.

This program provides a permanent record in the form of measured drawings, photographs, and written data of the Nation's accumulated experience in building, including urban and rural ensembles as well as individual structures. This extensive archive, now comprising records of over 15,500 buildings and representing every State, is permanently maintained at the Library of Congress, where it is the most frequently used of the Library's graphic collections. It consists of more than 35,000 measured drawings, 45,000 photographs, and 15,000 pages of written data. These records have proved invaluable in restoring or reconstructing damaged or destroyed buildings. The content of the Survey is published in a geographical series of catalogs.

Field work is done by summer teams employing university students of architecture under faculty direction. It is sponsored with the cooperation of historical and preservation groups, foundations, State and local governments, and educational institutions - generally on a shared-fund basis. These cooperators contribute substantially in money, services, and records. This support amounted to $66,000 in money and over $23,000 in value of records and services in fiscal year 1970, witnessing the widely recognized value of HABS. A similar level of outside support is estimated in 1971 and 1972. Approximately 50 agencies or groups are involved annually in this productive association that has increased the effectiveness of the program beyond what would have

been possible with Federal funding alone.

Requests for surveys are made almost daily to the National Park Service. Emphasis is given to recording historic buildings and districts in urban areas in response to the wide-scale demolition in our cities. Surveys also illustrate and document the development of areas and towns through related groups of historic buildings. Individual structures threatened with demolition are also given priority.

Public interest and support exceeding the capacity to respond have created a serious backlog of records awaiting processing.

Three types of major projects are planned for the 1972 fiscal year:

1. Comprehensive Surveys. (Measured drawings, photographs, and documentary studies prepared by summer field teams.) These will depend on the contribution of matching funds or complete costs, with the finished records being donated to the National Park Service.

2. Documentary Projects. (Photographs, architectural and historical data.) Most of this type will be carried out on a shared-fund basis with interested organizations to record buildings threatened with destruction or alteration.

3. Catalogs. Under preparation in 1971 are Indiana, Maine, New York, Ohio, Philadelphia, Rhode Island, Texas, and Virginia. In 1972 it is proposed to start work on District of Columbia (definitive edition), Connecticut, Puerto Rico, and South Carolina. These are contingent on the support of non-Federal organizations. A program objective is the publication of catalogs covering the whole nation by 1976.

Examples of recent accomplsihments:

Library of Congress. Assistance has been provided for improvement in the indexing, filing, and retrieval of HABS records in consequence of the growth and increasing public use of the collection.

Comprehensive Surveys. During the first half of fiscal 1971 six comprehensive surveys were undertaken in Massachusetts, Rhode Island, New Jersey, Pennsylvania, Indiana and Tennessee. These included the preparation of measured drawings, photographs, and written documentation for approximately 100 structures of the 18th and 19th century, including country mansions, city houses, forts, commercial structures and educational buildings.

Documentary Projects. During the first half of fiscal 1971 approximately 110 historic buildings were recorded through documentary projects in Washington, D.C., New York, California, Virginia, Pennsylvania, Massachusetts, Illinois, South Carolina, Florida and New Jersey.

Publications and Reports. Catalogs published through fiscal 1970 are Chicago and nearby Illinois areas, District of Columbia, Massachusetts, Michigan, New Hampshire, Utah, and Wisconsin. Publication costs for six of these were borne by non-Federal sources. In 1971 three documentary reports have been issued for the District of Columbia and Connecticut, and the hard-cover "Recording Historic Buildings" is scheduled for publication.

(f) Historic American Engineering Record: Fiscal year 1971, $120,300; fiscal year 1972, $120,300; no change.

Program of work: The objective of this program is to identify and document engineering structures of historic importance-- such as bridges, canals and tunnels-- throughout the United States. Its purpose is to develop a permanent

record of the role of technological achievements in making the American environment. The documents consist of measured drawings, photographs, and written descriptive and historical analyses. Under the authority of the Historic Sites Act of 1935 (49 Stat. 666), the program is conducted by the National Park Service in partnership with the Library of Congress and the American Society of Civil Engineers. The resulting archives are permanently maintained at the Library of Congress.

Surveys are carried out by summer field teams employing university students under the direction of professionals from universities or other institutions, assisted by professional photographers. Field work is done in cooperation with interested public and private groups-- State and local governments, historical societies, universities, and engineering associations. Their cooperation often includes the donation of funds or services. Donations during fiscal 1970 totalled $6,300, and indications are that this level of outside support will increase in 1971 and 1972.

Emphasis is given to threatened examples of our nation's engineering genius and to urban structures. Recording projects and reports draw attention to them and stimulate interest in providing for their retention and use. About 500 examples have been lost in the past 10 years. It is estimated that more than 800 will be lost unless action is taken now to draw attention to their importance. Recording ensures that future generations may know these technological achievements.

Typical projects will document early canals, railroad viaducts, early waterworks, tunnels, and suspension bridges in widely scattered locations. Reports will be issued in a regular series; catalogs will be issued later. Recording projects proposed for fiscal 1972 are: Whitewater Canal, Indiana; structures of the Erie Railroad, New York; surveys of early engineering sites in selected States; and engineering structures in Seattle and vicinity, Washington. Small projects recording threatened structures in other areas are also proposed.

Examples of recent accomplishments: During the first half of fiscal 1971 approximately 50 historic works of engineering were recorded in New Jersey, Maryland, West Virginia, Virginia, and Rhode Island. The two principal projects were comprehensive studies including measured drawings, photographs and written documentation of significant sites on the old B&O Railroad from Baltimore to Cumberland, Maryland, and a statewide survey of sites in Virginia.

(g) Archeological investigations and salvage: Fiscal year 1971, $-0-; fiscal year 1972, $1,189,000; increase $1,189,000. The increase consists of:

	Increase (+) or Decrease (-) Amount	Positions	Total Program	Total Positions	Explanation
(1)	$+875,000	+21	$875,000	21	Transfer of the Archeological investigations and salvage subactivity from "Park and recreation programs" activity, "Management and protection" appropriation.
(2)	+314,000	+20	314,000	20	To continue the archeological investigations and salvage work in the Missouri River Basin formerly funded with the Bureau of Reclamation funds. (This increase represents a budget adjustment.)
	+1,189,000	+41	1,189,000	41	

Cost Factors Involved in Increases

(1) Twenty-one permanent positions at average annual rate of $15,000; $315,000; one man-year other than permanent employment at annual rate of $9,000; supplies, materials, equipment, personnel benefits, travel and other expenses, $301,000; contract work, $250,000.

(2) Twenty permanent positions at average annual rate of $11,000, $220,000; nine man-years other than permanent employment at average annual rate of $6,000, $54,000; supplies, materials, equipment, personnel benefits, travel and other expenses, $40,000.

Need for increase: This interagency archeological salvage program is a vital influence in the Nation's efforts toward historic preservation. It stimulates and supports a large part of the archeological field work done in the United States, in areas outside of the National Park System. This subactivity consists of the Archeological investigations and salvage program transferred from Park and recreation programs, "Management and protection" appropriation ($875,000) and the Archeological investigations and salvage work previously financed with funds transferred from the Bureau of Reclamation, "Construction and rehabilitation" appropriation (Missouri River Basin) ($314,000). These changes in financing represent no increase in staff or funds.

Program of work: Under the Antiquities Act of 1906 and the Historic Sites Act of 1935, the Federal Government assumed a responsibility for the preservation of antiquities and for the recovery of scientific data where destruction is threatened by Federal construction activity. The Reservoir Salvage Act of 1960 requires that the Secretary of the Interior perform archeological survey and salvage ahead of reservoir construction as expeditiously as possible.

The primary objectives of the program are: (1) to protect, conserve and salvage archeological and historical information and objects when threatened by Federal construction or other developmental activities; (2) to analyze all the scientific data inherent in the objects and the ecological factors which caused their deposition; (3) interpret this information for the professional community and interested public through publications.

Additional requirements of the program are: (1) archeological advice and assistance to other Federal agencies and State organizations as requested, (2) liaison with Indian tribes for carrying out archeological salvage on reservations, (3) liaison work between the Federal Power Commission, private power development licensees and research institutions capable of salvaging archeological values threatened by power projects, (4) salvage and processing of archeological material important to scientific knowledge which would otherwise be lost through reservoir flooding by projects of the Bureau of Reclamation and the Corps of Engineers, by urban renewal projects or other activities, (5) making available to State and local museums representative collections of artifacts and objects recovered.

Scientists agree that a minimum of 10% recovery is necessary to provide a valid sampling of archeological materials and data. Through coordination with nineteen Federal agencies, much field work is carried out under contractual arrangements with qualified institutions. These contracts, running from small amounts for surveys to large amounts for excavations, average about $250,000 per annum. Since the beginning of this program, there have been more than two thousand such contracts resulting in the recovery of several million valuable

and unusual remains, the acquisition of vast quantities of prehistoric ecological data, the analysis of much of this material, and the publication of over 2,600 articles, monographs, and books.

Examples of recent accomplishments: An interesting example of salvage archeology was the discovery in the Tellico Reservoir by the University of Tennessee, working under Park Service contract, of a historic Cherokee Village which served for a time as the capital of the nation. Artifacts from the site indicate there was a brisk trade in European goods at a date much earlier than was suspected. The village, Chota, was one of six 18th-century overhill Cherokee villages which are situated in the flood pool of Tellico Dam.

Archeological excavations were undertaken at the Ozette village site on the coast of Washington by Washington State University. Here a stratified site covering both the historic and earlier prehistoric periods was being eroded by sea-wave action. Unique and unusual materials of both the historic and prehistoric periods are being found, most of them in an excellent state of preservation. They include inlaid whale fins, baskets, textiles, wooden objects, many of which have been heretofore unknown.

A rare and urgent demand on the salvage program has been occasioned by the discovery in February 1968 of the steamboat "Bertrand," which sank in the Missouri River on April 1, 1864. This steamboat was discovered along the Missouri River on the DeSoto Wildlife Refuge in Nebraska. It has been excavated and contains one of the most important collections ever recovered from a historic site. The estimated 2 million artifacts include such items as cannon ammunition, cases of stomach bitters and other liquor, pickled and canned foods, kerosene lamps, a complete range of tool types and other equipment used in farming, mining and other industries, fancy cut glass and dishes, textiles, hats, toys, and numerous items representing a cross-section of 19th-century frontier life. This constitutes the largest precisely documented collection of historic materials from any site within the United States.

In the past year preservation activities have been confined mostly to the most perishable materials-- textiles, leather goods, and extremely fragile items. By year's end, it is estimated that 69% of the textile materials had received cleaning and preliminary preservation, including two bolts of cloth measuring over 80 feet apiece. During 1972, $140,000 is scheduled to continue protection and preservation of the artifacts found on the "Bertrand."

Explanation of proposed language change in the "Preservation of historic properties" appropriation

The House Appropriations Committee, in its report on the 1971 "public works" appropriations bill, directed that after fiscal 1971 investigations work accomplished by the various agencies in the Missouri River Basin be provided for by direct appropriation to the agencies rather than by transfer from the Bureau of Reclamation "Construction" appropriation. This Service proposes to include the archeological investigations and salvage work outside of parks and including the Missouri River Basin in the "Preservation of historic properties" appropriation. Amendment of the language to include: "and investigations, studies and salvage of archeological values," is for this purpose.

Personnel Summary

	1970 actual	1971 estimate	1972 estimate
Total number of permanent positions	40	48	91
Full-time equivalent of other positions ...	7	8	18
Average number of all employees	43	52	103
Average GS grade	8.7	8.7	8.7
Average GS salary	$11,486	$11,523	$11,526
Average salary of ungraded positions ...	$8,386	$8,740	$9,196

DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
PRESERVATION OF HISTORIC PROPERTIES

Itemization of Estimate

	Actual 1970	Available 1971	Estimate 1972	Increase (+) Decrease (-)
Program and Financing:				
Total obligations	$1,644,987	$6,927,658	$8,096,000	$+1,168,342
Unobligated balance available, start of year	-33,245	-75,658	....	+75,658
Unobligated balance available, end of year	75,658	....	....	....
Transferred from other accounts	-47,400	....	....	....
Appropriation	1,640,000	6,801,000	8,096,000	+1,295,000
Proposed supplemental for civilian pay act increases	....	51,000	....	-51,000
Obligations by Objects:				
11 Personnel compensation	$434,859	$660,200	$1,228,000	$+567,800
12 Personnel benefits	33,513	50,800	104,000	+53,200
21 Travel and transportation of persons	38,495	84,000	298,000	+214,000
22 Transportation of things	334	2,000	4,000	+2,000
23 Rent, communications, and utilities	1,407	4,000	11,000	+7,000
24 Printing and reproduction	19,853	44,000	155,000	+111,000
25 Other services	41,636	89,000	266,000	+177,000
26 Supplies and materials	4,295	10,658	38,000	+27,342
31 Equipment	1,595	3,000	12,000	+9,000
41 Grants, subsidies, and contributions	1,069,000	5,980,000	5,980,000	....
Total obligations	1,644,987	6,927,658	8,096,000	+1,168,342

UNOBLIGATED AND UNEXPENDED BALANCES

Mrs. HANSEN. Please insert in the record a tabulation of your unobligated and unexpended balances as of June 30, 1970, and as of February 28, 1971.

(The information follows:)

PRESERVATION OF HISTORIC PROPERTIES, UNOBLIGATED AND UNEXPENDED BALANCES

June 30, 1970		February 28, 1971	
Unobligated	Unexpended	Unobligated	Unexpended
$75,658	$638,440	$3,039,487	$5,898,735

Mrs. HANSEN. Are any of the funds for preservation of historic properties in reserve?

Mr. HARTZOG. There are none of them in the reserve.

GRANTS-IN-AID

Mrs. HANSEN. $5,980,000 is available in 1971 for grants-in-aid. Please insert in the record a listing by State of the total amount of grants made to each State to date for fiscal year 1971.

(The information follows:)

GRANTS-IN-AID FOR HISTORIC PRESERVATION—1971 APPORTIONMENT TO STATES

State	Survey and planning	Acquisition and development	Total
Alabama	$44,550.00	$30,199.48	$74,749.48
Alaska	4,534.91	44,627.84	49,162.75
Arizona	18,484.00	25,631.86	44,115.86
Arkansas	237,518.00	47,458.72	284,976.72
California	63,954.00	62,236.00	126,190.00
Colorado	15,441.00	19,000.75	34,441.75
Connecticut	21,116.00	30,997.90	52,113.90
Delaware	16,150.00	0	16,150.00
District of Columbia	20,000.00	25,601.75	45,601.75
Florida	92,018.00	82,819.34	174,837.34
Georgia	0	32,104.90	32,104.90
Hawaii	85,000.00	0	85,000.00
Idaho	10,000.00	0	10,000.00
Illinois	227,900.00	0	227,900.00
Kansas	77,074.00	41,954.84	119,028.84
Kentucky	49,000.00	0	49,000.00
Louisiana	0	15,638.38	15,638.38
Maine	7,500.00	15,478.59	22,978.59
Maryland	54,145.00	47,329.00	101,474.00
Massachusetts	42,000.00	27,622.66	69,622.66
Michigan	55,000.00	56,458.90	111,458.90
Minnesota	34,342.00	82,619.39	116,961.39
Mississippi	60,000.00	47,226.52	107,226.52
Missouri	44,013.00	63,363.54	107,376.54
Nebraska	14,000.00	41,237.66	55,237.66
Nevada	4,402.50	29,060.66	33,463.16
New Hampshire	21,000.00	37,501.53	58,501.53
New Jersey	0	50,923.90	50,923.90
New Mexico	0	82,065.20	82,065.20
New York	61,875.00	202,582.90	264,457.90
North Carolina	117,008.00	89,599.72	206,607.72
Ohio	15,000.00	39,438.78	54,438.78
Oklahoma	15,000.00	15,223.16	30,223.16
Oregon	43,118.00	0	43,118.00
Pennsylvania	116,000.00	60,541.00	176,541.00
Rhode Island	19,350.00	84,818.88	104,168.88
South Carolina	186,995.50	112,004.50	299,000.00
Tennessee	20,000.00	22,802.10	42,802.10
Texas	19,560.00	111,902.31	131,462.31
Utah	30,000.00	49,125.03	79,125.03
Vermont	0	33,765.40	33,765.40
Virginia	110,285.00	33,834.58	144,119.58
Washington	41,000.00	108,141.90	149,141.90
West Virginia	20,000.00	167,055.00	187,055.00
Wisconsin	15,000.00	74,724.40	89,724.40
Wyoming	36,297.84	76,043.25	112,341.09
Total (46)	2,185,631.75	2,323,762.22	4,509,393.97

Note: 1971 apportionment to the national trust, $1,042,023.

Mrs. HANSEN. What is the procedure you follow in approving grants to States, especially with regard to the assignment of priorities?

Mr. HARTZOG. Madam Chairman, we have developed criteria, as we have for all of these programs, in consultation with the State liaison officers. This is the press release of March 11 with a breakdown of that.

Mrs. HANSEN. Please insert the press release of March 11, 1971, in the record as well as the grant program priority schedule.

(The information follows:)

DEPARTMENT OF THE INTERIOR—NATIONAL PARK SERVICE—NEWS RELEASE

STATES RECEIVE $2.3 MILLION FOR HISTORIC PRESERVATION ACQUISITION AND DEVELOPMENT

Secretary of the Interior Rogers C. B. Morton announced today that $2,323,762.22 has been awarded to 39 States and the District of Columbia for acquisition and development projects directed toward historic preservation.

The money was made available under the terms of the National Historic Preservation Act of 1966, which was designed to encourage the preservation of buildings and sites which have historical, archeological, and architectural significance.

Secretary Morton said that the funds came from the $5.9 million appropriated under the act for fiscal 1971. A previous apportionment, announced on October 23, 1970, awarded $2.2 million to 40 States and the District of Columbia for historic planning and a grant of $1 million to the National Trust for Historic Preservation.

The apportionment is made through the National Register of Historic Places, the National Park Service office which implements the Historic Preservation Act.

States included in the apportionment have met criteria set up by the Congress for historic preservation, and have agreed to match Federal funds. A reserve fund is being held until March 31, 1971, for those States which have not yet applied.

Following is a list of States and their apportionments:

National Register of Historic Places—fiscal year 1971 apportionment for acquisition and development projects

State:	Apportionment
Alabama	$30,199.48
Alaska	44,627.84
Arizona	25,631.86
Arkansas	47,458.72
California	62,236.00
Colorado	19,000.75
Connecticut	30,997.90
District of Columbia	25,601.75
Florida	82,819.34
Georgia	32,104.90
Kansas	41,954.84
Louisiana	15,638.38
Maine	15,478.59
Maryland	47,329.00
Massachusetts	27,622.66
Michigan	56,458.90
Minnesota	82,619.39
Mississippi	47,226.52
Missouri	63,363.54
Nebraska	41,237.66
Nevada	29,060.66
New Hampshire	37,501.53
New Jersey	50,923.90

New Mexico	82,065.20
New York	202,582.90
North Carolina	89,599.72
Ohio	39,438.78
Oklahoma	15,223.16
Pennsylvania	60,541.00
Rhode Island	84,818.88
South Carolina	112,004.50
Tennessee	22,802.10
Texas	111,902.31
Utah	49,125.03
Vermont	33,765.40
Virginia	33,834.58
Washington	108,141.90
West Virginia	167,055.00
Wisconsin	74,724.40
Wyoming	76,043.25
	2,323,762.22

1971 APPORTIONMENT TO STATES

State	Survey and planning	Acquisition and development	Total
Alabama	$44,550.00	$30,199.48	$74,749.48
Alaska	4,534.91	44,627.84	49,162.75
Arizona	18,484.00	25,631.86	44,115.86
Arkansas	237,518.00	47,458.72	284,976.72
California	63,954.00	62,236.00	126,190.00
Colorado	15,441.00	19,000.75	34,441.75
Connecticut	21,116.00	30,997.90	52,113.90
Delaware	16,150.00	0	16,150.00
District of Columbia	20,000.00	25,601.75	45,601.75
Florida	92,018.00	82,819.34	174,837.34
Georgia	0	32,104.90	32,104.90
Hawaii	85,000.00	0	85,000.00
Idaho	10,000.00	0	10,000.00
Illinois	227,900.00	0	227,900.00
Kansas	77,074.00	41,954.84	119,028.84
Kentucky	49,000.00	0	49,000.00
Louisiana	0	15,638.38	15,638.38
Maine	7,500.00	15,478.59	22,978.59
Maryland	54,145.00	47,329.00	101,474.00
Massachusetts	42,000.00	27,622.66	69,622.66
Michigan	55,000.00	56,458.90	111,458.90
Minnesota	34,342.00	82,619.39	116,961.39
Mississippi	60,000.00	47,226.52	107,226.52
Missouri	44,013.00	63,363.54	107,376.54
Nebraska	14,000.00	41,237.66	55,237.66
Nevada	4,402.50	29,060.66	33,463.16
New Hampshire	21,000.00	37,501.53	58,501.53
New Jersey	0	50,923.90	50,923.90
New Mexico	0	82,065.20	82,065.20
New York	61,875.00	202,582.90	264,457.90
North Carolina	117,008.00	89,599.72	206,607.72
Ohio	15,000.00	39,438.78	54,438.78
Oklahoma	15,000.00	15,223.16	30,223.16
Oregon	43,118.00	0	43,118.00
Pennsylvania	116,000.00	60,541.00	176,541.00
Rhode Island	19,350.00	84,818.88	104,168.88
South Carolina	186,995.50	112,004.50	299,000.00
Tennessee	20,000.00	22,802.10	42,802.10
Texas	19,560.00	111,902.31	131,462.31
Utah	30,000.00	49,125.03	79,125.03
Vermont	0	33,765.40	33,765.40
Virginia	110,285.00	33,834.58	144,119.58
Washington	41,000.00	108,141.90	149,141.90
West Virginia	20,000.00	167,055.00	187,055.00
Wisconsin	15,000.00	74,724.40	89,724.40
Wyoming	36,297.84	76,043.25	112,341.09
Total—46	2,185,631.75	2,323,762.22	4,509,393.97

NATIONAL PARK SERVICE—PRESERVATION OF HISTORIC PORPERTIES, FISCAL YEAR 1972 ANALYSIS

	1971 funding level (with pay increase)	1972 program increase request	1972 proposed program level	1972 budget request	1972 Budget increase
Grants-in-aid	$5,980,000	$4,020,000	$10,000,000	$5,980,000	----------
National register	199,300	218,500	417,800	234,300	$35,000
Advisory council	106,400	162,000	268,400	126,400	20,000
Historic sites survey	220,500	191,800	412,300	220,500	----------
Historic American buildings survey	225,500	165,000	390,500	225,500	----------
Historic Ameircan engineering record	120,300	----------	120,300	120,300	----------
Archeological investigations and salvage	1,189,000	1,096,500	2,285,500	1,189,000	----------
Total	8,041,000	5,853,800	13,894,800	8,096,000	55,000

NATIONAL HISTORIC PRESERVATION ACT (PUBLIC LAW 89-665)

GRANTS PROGRAM PRIORITY SCHEDULE

To implement the new federalism by encouraging State and local governments and private participation in historic preservation, grants-in-aid will be apportioned in accordance with the following criteria:

Priority 1. Fifty percent matching grants to "States" for statewide historic preservation plans and surveys.

Priority 2. Fifty percent matching grants to the National Trust for Historic Preservation, not to exceed $1,750,000, or 17.5 percent of annual appropriation under current annual authorization, whichever is less.

Priority 3. Fifty percent matching grants to the "States" for projects submitted on or before March 1 of the preceding appropriation year (except 1971 Federal fiscal year which date is October 15, 1970), in the following order of precedence:

(*a*) Properties eligible for designation as national historic landmarks which are in clear and present danger of destruction or serious impairment;

(*b*) Any other properties on the National Register of Historic Places in urban areas in clear and present danger of destruction or serious impairment, whose loss would have serious adverse effect on the environment in which located;

(*c*) Any other properties on the National Register of Historic Places in clear and present danger of destruction or serious impairment, whose loss would have serious adverse effects on the community or rural environment in which located;

(*d*) All properties on the National Register of Historic Places not foreseeably threatened but with demonstrable need:

Provided, however, That until March 31 of the appropriation year not less than one-half percent of the annual appropriation under the current annual authorization shall be reserved for each "State" for matching under either priority No. 1 or priority No. 3—or the combination thereof;

Provided, further, That any funds so reserved for a "State" that are not apportioned to that "State" on or before March 31 of the appropriation year shall be released for apportionment to the remaining "States" in accordance with the priorities listed above.

And provided further, That the combined apportionments under priorities 1 and 3 to a State in any year may not exceed 5 percent of the current annual appropriation.

Mrs. HANSEN. You indicate that this program is funding acquisition and development projects for the first time in fiscal year 1971. Give us the details on this phase of the program.

Mr. HARTZOG. In the first instance, you will see from those criteria we said that they must go for the development of the statewide plans. After we allocated all the money that had been requested for the development of statewide plans, we then started project matching in accordance with the criteria set forth there. I have a detail of those that were

given for acquisition and development here also. These are the grants-in-aid planning, a separate list.

Mrs. HANSEN. You also indicate a grant of $1,042,023 has been made to the National Trust for Historic Preservation. Who are the individuals who comprise the directorship of this organization?

Mr. HARTZOG. I will be pleased to supply the board of directors for the record.

(The information follows:)

NATIONAL TRUST FOR HISTORIC PRESERVATION

BOARD OF TRUSTEES

Officers:

David E. Finley, chairman emeritus.
Gordon Gray, chairman.
George M. Elsey, vice chairman.
Peter Manigault, vice chairman.
Patricia H. Collins, secretary.
Robert C. Baker, treasurer.

Members:

Mrs. William Slater Allen, Providence, R.I.
Mrs. Vincent Astor, New York, N.Y.
Robert C. Baker, Washington, D.C.
Leonard Carmichael, Washington, D.C.
George M. Elsey, Washington, D.C.
Carl Feiss, Washington, D.C.
Alan Fisher, Denver, Colo.
Gordon Gray, Washington, D.C.
Ralph P. Hanes, Winston-Salem, N.C.
Mrs. Henry P. Hoffstot, Jr., Pittsburgh, Pa.
Henry Clay Hofheimer II, Norfolk, Va.
Mrs. John B. Hollister, Cincinnati, Ohio.
Mrs. Robert Homans, Hillsborough, Calif.
Carlisle H. Humelsine, Williamsburg, Va.
Mrs. J. Lee Johnson III, Fort Worth, Tex.
Philip C. Johnson, New York, N.Y.
Lawson B. Knott, Jr., Washington, D.C.
Austin P. Leland, St. Louis, Mo.
Mrs. Atherton Macondray, Washington, D.C.
Peter Manigault, Charleston, S.C.
Mrs. John A. McCone, San Marino, Calif.
Mrs. Z. Cartter Patten, Chattanooga, Tenn.
Samuel Reid Sutphin, Indianapolis, Ind.
Robert H. Thayer, Washington, D.C.
Charles van Ravenswaay, Winterthur, Del.
Walter Muir Whitehill, Boston, Mass.
Charles H. Woodward, Philadelphia, Pa.

Ex Officio Trustees:

The Attorney General of the United States represented by Miss Patricia H. Collins.
The Secretary of the Interior represented by George B. Hartzog, Jr.
The Director of the National Gallery of Art, J. Carter Brown.

Honorary Trustees:

Hon. Frances P. Bolton, Washington, D.C.
David E. Finley, Washington, D.C.

Honorary Members:

Mrs. Richard M. Nixon.
Mrs. Lyndon B. Johnson.
Mrs. Aristotle Onassis.
Mrs. Dwight D. Eisenhower.

Mr. HARTZOG. I would like to have this list of properties inserted in the record because I think it is a distinguished list of services by the National Trust for Historic Preservation, in meeting the opportunities of private citizens to participate in historic preservation. That is a record of the splendid work which they have done with the funds that have been made available to them on a matching basis.

(The information follows:)

NATIONAL TRUST FOR HISTORIC PRESERVATION

TEN PROPERTIES ADMINISTERED

Belle Grove, Middletown, Va.—Of native limestone, this one-story historic Shenandoah Valley home was built in 1787 by Maj. Isaac Hite, Jr. Hite served as an aide to Gen. Peter Muhlenberg, the "fighting parson" of the Revolutionary War and later married a sister of James Madison. Years later, Belle Grove was Gen. Philip Sheridan's headquarters during the Civil War battle of Cedar Creek.

Casa Amesti, Monterey, Calif.—The original Casa Amesti, erected in 1843, consisted of two rooms with an attic. This structure was retained when Don Jose Amesti, a Basque who came to California in 1822 during Spanish rule, enlarged the building in 1846 to its present dimensions. The two-storied, balconied structure reveals eastern influence in certain architectural details, although the adobe construction and hewn redwood logs are characteristic of early California styles. Italian formal gardens were designed by David Adler, noted Chicago architect.

Chesterwood, Stockbridge, Mass.—Surrounded by 70 acres of land, the studio of Daniel Chester French contains the artist's collection of casts and bronze studies for a large portion of his major works. French is best known for his "Sealed Lincoln" in the Lincoln Memorial, Washington, D.C. The studio was designed in 1897 by Henry Bacon, the architect of the Lincoln Memorial.

Decatur House, Washington, D.C.—Built in 1818 for the popular naval hero, Comdr. Stephen Decatur, with prize money he had won for defeating the Barbary pirates, the house was designed by Benjamin Latrobe, America's first professional architect. Of Georgian design with a vaulted entrance hall, Decatur House over the years was a center of Washington social life and the home of a succession of distinguished political, military and diplomatic figures.

Lyndhurst, Tarrytown, N.Y.—Overlooking the Hudson River, this 19th-century Gothic revival house is surrounded by 67 acres of landscaped grounds. It was designed by architect Alexander Jackson Davis and built in 1838 for Gen. William Paulding. In 1865, Davis enlarged the house and added a tower for second owner George Merritt. Jay Gould, railroad magnate and financier, bought the estate in 1880 and it was owned by his family until 1961.

Oatlands, Leesburg, Va.—A Georgian mansion surrounded with beautiful formal gardens and 261 acres of farm land, Oatlands House was built in 1800 by George Carter, a great-grandson of the famous early Virginia land baron, Robert "King" Carter. Everything necessary to the construction of Oatlands was made on the property—its bricks molded and fired on the estate, and its wooden structured members cut from the surrounding forests. Its magnificent gardens reflect early formal garden planning.

The Pope-Leighey House, Woodlawn Plantation, Mount Vernon, Va.—Frank Lloyd Wright, one of America's greatest 20th-century architects, designed this small, unassuming structure of cypress, brick and glass. Called a Usonian House, it was built in 1940 and rescued in 1964 from the path of a highway and relocated at Woodlawn. With the Woodlawn mansion, it affords an unusual contrast between the architecture and ways of life of the early 19th-century and mid-20th century.

Shadows-on-the-Teche, New Iberia, La.—Built by a wealthy planter, David Weeks, in 1831, the white-pillared elegance of The Shadows recalls the romance of the old south. The house is the story of one family in peace and war, in affluence and poverty, as told by the mute testimony of furnishings and mementoes left behind by five generations. Its design reflects the melange of European influences culminating in the Louisiana style.

Woodlawn Plantation, Mount Vernon, Va.—This Georgian mansion, with restored gardens, portrays the life of an early 19th-century Virginia family

closely associated with the first President of the United States. Near the Potomac River, just 3 miles from Mount Vernon, the house is on a site chosen by George Washington for the furture home of his foster daughter, Nelly Custis, who married his nephew Lawrence Lewis.

Woodrow Wilson House, Washington, D.C.—The home to which the 28th President of the United States retired in March 1921, following inaugural ceremonies for President Harding and in which he died 3 years later, vivdly depicts the Wilson era. Filled with President Wilson's collection of memorabilia, the house speaks so clearly that with only a little imagination, one can see the World War I doughboys marching, and sense the spirit of a battle-scarred leader, broken in health, but determined to end his days in striving to end wars.

APPROVED STATEWIDE HISTORIC PRESERVATION PLANS

(TOTAL: 43 STATES)

Alabama
Alaska
Arizona
Arkansas
California
Colorado
Connecticut
District of Columbia
Florida
Georgia
Idaho
Illinois
Kansas
Louisiana
Maine
Maryland
Massachusetts
Michigan
Minnesota
Mississippi
Missouri
Montana
Nebraska
Nevada
New Hampshire
New Jersey
New Mexico
New York
North Carolina
Ohio
Oklahoma
Pennsylvania
Rhode Island
South Carolina
Tennessee
Texas
Utah
Vermont
Virginia
Washington
West Virginia
Wisconsin
Wyoming

ADVISORY SERVICES

61 PROJECTS REVIEWED UNDER SECTION 106 (80 STAT. 915)

JULY 1–DECEMBER 31, 1970

State, property, and affecting project:

Arkansas

1. Pea Ridge National Historic Park; highway construction (DOT).
2. Fort Smith National Historic Site; highway construction (DOT).
3. Fort Smith; nuclear reactor (AEC).

Arizona

4. Casa Grande National Monument; underground transmission line (Arizona Public Service Co.).
5. Casa Grande National Monument; jetport construction (DOT).
6. Point of Pines; water line (BIA).

Colorado

7. Telluride Historic District; street widening (DOT).
8. Daniels and Fisher Tower; proposed demolition and clearance (HUD).

Connecticut

9. New London Railroad Station; Proposed demolition and clearance (HUD).
10. Seth Wetmore House; highway construction (DOT).

Delaware

11. Mendenhall House, Wilmington; proposed demolition and clearance (HUD).
12. Ferris House, Wilmington; proposed demolition and clearance (HUD).
13. Simmons House, Wilmington; proposed demolition and clearance (HUD).
14. Obadiah Dingee House, Wilmington; proposed demolition and clearance (HUD).
15. James Dingee House, Wilmington; proposed demolition and clearance (HUD).

16. Coxe House, Wilmington; proposed demolition and clearance (HUD).
17. Murdaugh House, Portsmouth Historic District; proposed demolition and clearance (HUD).

District of Columbia

18. Haleyon House, Georgetown Historic District; closure of alleyway.

Georgia

19. Fort Pulaski National Monument, Savannah Harbor; loading and turn around facility (Corps of Engineers).
20. Savannah Historic District; senior citizens high-rise residence (HUD).
21. Fort Pulaski National Monument; dredging (Army Corps of Engineers).
22. Fort Pulaski National Monument; gas terminal (Southern National Gas Co.).

Hawaii

23. U.S. Naval Base, Pearl Harbor; sewage plant construction (Army Corps of Engineers).

Idaho

24. Delamar House; clearance, urban renewal (HUD).

Indiana

25. Bailly Homestead, vicinity of Indiana Dunes National Lakeshore; nuclear powerplant (AEC).

Louisiana

26. Vieux Carre; expressway and bridge construction (DOT).

Maryland

27. Hampton National Historic Site; force main (FWQA).
28. Fort McHenry National Monument; bridge construction (DOT).
29. Potential entries vicinity of Chesapeake Bay; DIDS antenna installations (Department of Defense).

Massachusetts

30. Plymouth Plantation and Cole's Hill; nuclear powerplant (AEC).

Michigan

31. Potential entries vicinity of Detroit; nuclear powerplant (AEC).
32. Potential entries vicinity of Van Buren County; nuclear powerplant (AEC).

Minnesota

33. Old Federal Court Building, St. Paul; surplus property transfer (GSA; HEW).

Missouri

34. St. Louis Post Office; surplus property disposal (GSA).
35. Potential entries, Longview Reservoir; water impoundment (Army Corps of Engineers).
36. Potential entries, Blue Springs Reservoir; water impoundment (Army Corps of Engineers).

Montana

37. Butte Historic District; mine operation expansion (Federal agency involvement unclear).

Nebraska

38. Old City Hall, Lincoln; demolition, surplus property (GSA).

New Mexico

39. Randall Dovy House; enlargement of reservoir (Army Corps of Engineers).

New York

40. Fifth Avenue-Fulton Street Historic District, Troy; proposed demolition and clearance, urban renewal (HUD).
41. Gurley and Ilium Buildings; proposed demolition and clearance, urban renewal (HUD).
42. Adirondacks Forest Preserve; water pollution facility, Schroon Village (Federal Water Quality Administration) (FWQA).

SECTION 106 CONSIDERATIONS—JANUARY 4 TO PRESENT

State, Property, and Project:

Georgia

1. Fort Pulaski National Monument; gas terminal, Southern Natural Gas Co. (Federal involvement unclear).
2. Savannah Historic District; demolition and clearance, urban renewal (HUD).

Iowa

3. Amana Colonies; highway construction (DOT).

Ohio

4–24. Twenty nominations pending, historic structures, Toledo; demolition and clearance, urban renewal (HUD).

Oregon

25. Fort Clatsop National Memorial; proposed aluminum plant; construction of powerlines (Bonneville Power Administration; Corps of Engineers).

New York

26. Potential entries vicinity of Schuylerville; construction of Marina.

Virginia

27. Three Otlers; power line 800kv Appalachia Power Co. (NPS—Blue Ridge Parkway).
28. Poplar Forest; power line 800kv Appalachia Power Co. (NPS—Blue Ridge Parkway).

HISTORIC SITES SURVEY

Sites which have been designated as National Historic Landmarks as of February 26, 1971: 930.

HISTORIC SITES SURVEY

HARD-COVER BOOK SERIES OF NATIONAL PARK SERVICE WINS ANNUAL DISTINCTION

The wide public acceptance of the hard-cover book series of the National Survey of Historic Sites and Buildings has been regularly affirmed by exceptional sales figures and favorable reviews in academic journals and other periodicals. The Government Printing Office's 1970 Christmas gift list of "best sellers" consisted of 30 titles selected from the issuances of all Government agencies.

Of the 30 publications listed, five were from the National Park Service. The five consisted of the four available volumes of the National Survey of Historic Sites and Buildings series plus the National Register. The Department of the Interior had four other publications listed, and all other Government agencies accounted for 21. The National Park Service had the highest number of any bureau.

Mrs. HANSEN. What limitations, if any, exist in connection with the administration of this grant with regard to the type of Trust properties that will be acquired and developed?

Mr. HARTZOG. We don't have any limitation on what they can accept. I can tell you that as a member of the Board of Trustees of the National Trust for Historic Preservation, our general requirement is that the donations to the Trust be accompanied by endowments that will produce the anticipated revenue to defray the costs of operation, when taking into account the receipts from admissions and other uses.

As always happens in these endowed properties, up to this point at any rate, the inflation in operating costs far outstrips the increase in the income from the endowment, so that eventually these endowed properties have a tendency to operate at a deficit, and it is the money that comes then from the Federal Government to the Trust on a matching basis because you are still maintaining the partnership of

the Federal Government and private citizens in this preservation effort, which goes to defray some of the costs of maintenance of these properties, but it also goes importantly to the Trust's educational and public service programs.

ADMINISTRATIVE COSTS

Mrs. HANSEN. In your budget justifications I do not find a breakdown of the administrative costs of this program. May we have your general comments in this connection?

Mr. HARTZOG. When we set up this appropriation, it was agreed that we would spread these costs of administration and technical support, which is the cost of the office of Dr. Connally, among the items in this appropriation. His office is $65,800 spread back among these as an overhead expense.

Mrs. HANSEN. Please insert in the record a detailed tabulation of the total administrative expenses related to this program for fiscal years 1970, 1971, and 1972, indicating the amount of administrative expenses applicable to each activity of the program.

Mr. HARTZOG. That $65,800 is broken back against the amount shown for each of those. That doesn't include the facilitating services, which will be given to you as a separate program under that breakdown. We can do it either way. The way we have interpreted our understanding was that this administrative expense was Dr. Connally's shop, and it was not the accountants under the Division of Administration that keeps the accounting records and this kind of thing, which are generally financed out of the facilitating services in connection with GAE. I think if we continue to maintain that separation, it will be more meaningful to you.

(The information follows:)

PRESERVATION OF HISTORIC PROPERTIES—PRORATION OF ADMINISTRATIVE AND TECHNICAL SUPPORT EXPENSES FOR THE 1970, 1971, AND 1972 FISCAL YEARS

Subactivity	1970 actual	1971 estimated	1972 estimated
(a) Grants-in-aid			
(b) Maintenance of the national register and administration of grants-in-aid program	$21,700	$23,100	$13,200
(c) Advisory Council on Historic Preservation support			
(d) Historic sites survey	21,800	23,200	13,200
(e) Historic American buildings survey	17,800	18,700	13,200
(f) Historic American engineering record		800	13,000
(g) Archeological investigations and salvage			13,200
Total for administrative and technical support	61,300	65,800	65,800

Mrs. HANSEN. The committee will adjourn until tomorrow morning.

TUESDAY, APRIL 27, 1971.

MAINTENANCE OF NATIONAL REGISTER

Mrs. HANSEN. You are requesting an additional $35,000 and two positions to provide for computer processing of data for the National Register. Please highlight this program for the committee.

Mr. HARTZOG. Madam Chairman, the entries in the National Register have become so voluminous——

Mrs. HANSEN. You are talking about the State nominations?

Mr. HARTZOG. Yes, nominations by the States. I have a list of the States that have completed their statewide plans, and they are approved. I gave that to you for the record yesterday.

Under the Historic Preservation Act of 1966, no Federal license and no Federal grant-in-aid can be given to a project which might impinge on a property on the National Register. As a result, the Federal agencies who license, the Federal Power Commission, for example, and those with grants-in-aid program like the Department of Housing and Urban Development and the Bureau of Public Roads need this information on what the States have nominated and what the Secretary approved for the National Register. The volume is getting so that it is physically impossible to handle it by hand.

Mrs. HANSEN. Is the Bureau of Public Roads one of the greatest offenders against historic properties?

Mr. HARTZOG. Yes, ma'am. They have been working with us very cooperatively, however, in this particular area.

Mrs. HANSEN. Have they changed their policy in this connection?

Mr. HARTZOG. They have mended their ways considerably in this connection and I think they should be commended for it, because they have been very, very sensitive on this, but they do need the information. In order to be useful they should have it before they get their plans developed and the project underway. The only way we can do it is through computerization of the data on the sites that might be involved in a proposed section of road.

Mrs. HANSEN. What is your total request for maintenance of the National Register?

Mr. HARTZOG. For maintenance of the National Register, $234,300.

Mrs. HANSEN. In your justifications you make the statement: "In the past 4 years, 115 cases of potential threat were evaluated." What is this potential threat?

Mr. HARTZOG. The proposal to build the James Island Bridge landing in the historic district of Charleston, also, the New Orleans interstate highway around Jackson Square are typical examples.

Mrs. HANSEN. Is the New Orleans matter settled?

Mr. HARTZOG. It is settled. Secretary Volpe disapproved it, and has advised the Louisiana Highway Department that he is not going to give them any money for that and they might as well go select some other place for that interstate mileage.

(Discussion off the record.)

ADVISORY COUNCIL ON HISTORIC PRESERVATION SUPPORT

Mrs. HANSEN. An increase of $20,000 is requested for the Advisory Council on Historic Preservation Support. What is the membership of this Council?

Mr. HARTZOG. The membership includes Presidential appointees as well as 11 ex officio members. The ex officio members are the Secretary of the Interior, the Secretary of Housing and Urban Development, the Secretary of Commerce, the Secretary of the Treasury, the Attorney

General, the Secretary of Transportation, the Secretary of Agriculture, the Administrator of General Services Administration, the Secretary of the Smithsonian Institution, and the Chairman of the National Trust for Historic Preservation. The 10 citizen members are Dr. S. K. Stevens, Harrisburg, Pa., who is the chairman; Mr. Harold Kennedy, Washington, D.C.; Mr. John A. May, Columbia, S.C.; Hon. Albert M. Rains, Gadsden, Ala.; Mr. David K. Wilson, Nashville, Tenn.; Mrs. Lammot du Pont Copeland, Greenville, Del.; Mr. Joseph B. Cumming, of Augusta, Ga.; Mr. Lawrence Halprin, of San Francisco, Calif., and Mrs. Casey Ireland, Arlington, Va.

Mrs. HANSEN. What is the justification for the $20,000 increase you are requesting for this activity?

Mr. HARTZOG. The total program, Madam Chairman, of support to the Council will be $126,400. The need for this increase is that the numbers of these conflicts has increased to the point where the staff is simply unable to handle the volume of work; also because as the numbers of nominations by the States proliferate on the National Register the numbers of conflicts become increasingly greater. The Council is doing a tremendous service. It has won most issues in terms of preserving the historic values.

I think it is one of the most successful Presidential Government-citizen commissions operating in the Federal Establishment today.

ARCHEOLOGICAL INVESTIGATIONS AND SALVAGE

Mrs. HANSEN. Do you think that the $875,000 and 21 positions you are requesting for archeological investigations and salvage are adequate?

Mr. HARTZOG. No, ma'am.

Mrs. HANSEN. What do you think is adequate?

Mr. HARTZOG. Madam Chairman, we have more than two million archeological artifacts alone that have not been catalogued, and the publications relating to these, the dissemination of the already validated research knowledge in our file, typified by typewritten reports from the archeologists who have done the work, will require a considerable budgetary increase in order to get the information out into the world of scholarship and for the understanding and appreciation of the people of this historic culture.

I have a complete 5-year program for this, and I will be glad to supply it.

Mrs. HANSEN. Please insert the 5-year program in the record.

(The information follows:)

Archeological investigation and salvage program

1972 budget	$1,189,000
5-year program:	*(In millions)*
1973	$4.1
1974	5.2
1975	6.4
1976	6.7
1977	4.9

The primary objectives of the program are: 1. Protect, conserve and salvage archeological and historical information and objects presently in the possession of the Service or when threatened by Federal construction or other developmental activities. 2. Analyze all the scientific data inherent in the objects and

the ecological factors which caused their deposit. 3. Interpret and publish this information for the professional community and interested public.

Mrs. HANSEN. How inadequate is the $875,000 you are requesting for archeological investigations and salvage?

Mr. HARTZOG. Dramatically. I don't have the program with me this morning. It is coming down hopefully before this hearing is over. This was an omission that we didn't bring it. I went over it last night.

Mrs. HANSEN. Why didn't you request more than $875,000?

Mr. HARTZOG. This was all that could fit within the ceiling that we had.

Mrs. HANSEN. Was the ceiling established by the Department of the Interior?

Mr. HARTZOG. It was both departmental and OMB, yes, ma'am.

DEPARTMENTAL AND OFFICE OF MANAGEMENT AND BUDGET CEILINGS

Mrs. HANSEN. What was the ceiling?

Mr. HARTZOG. I have an analysis. This is a transfer from the Management and Protection appropriation.

Mrs. HANSEN. It doesn't do you much good to say how inadequate the funding levels are and then tell me that you have funding ceilings.

Mr. HARTZOG. Madam Chairman, that is a fact, however.

Mrs. HANSEN. I know, but this committee is not responsible for the ceilings.

Mr. HARTZOG. No, ma'am, but you asked me why it wasn't in the budget, and I told you that I couldn't fit it within the ceiling. What we asked for in terms of our total program is in this analysis, showing what the Department did to it and that is what OMB did to it.

Mrs. HANSEN. OMB was more generous than the Department of the Interior?

Mr. HARTZOG. Ironically, that is correct.

Mrs. HANSEN. Who established the departmental ceilings?

Mr. WILES. This year in the Department, Madam Chairman, we had a budget committee that was made up of the special assistant to the Secretary, the Under Secretary, the Deputy Assistant Secretary for Administration, the legislative counsel, the congressional liaison representative, and the budget officer.

Mrs. HANSEN. But most of the people who were on that committee are no longer with the Department of the Interior? Isn't that correct?

Mr. HARTZOG. Yes. The Deputy Assistant Secretary for Administration is still there, Mr. Hite.

Mr. WYATT. Who is the Special Assistant?

Mr. HARTZOG. Mr. Patrick Ryan.

Mr. WYATT. He is gone.

Mr. WILES. Right, and myself, two of us.

Mrs. HANSEN. Mr. Russell is no longer with the Department of the Interior.

Mr. HARTZOG. That is right.

Mrs. HANSEN. The same is true with former Secretary Hickel.

Mr. WILES. Right. Mr. Bracken is still there, and Mr. Hite and myself.

Mr. WYATT. What is Mr. Bracken's job now?

Mr. WILES. Legislative Counsel. I might say a little more here, the committee only gave ceilings to the Assistant Secretary level, and

then the Assistant Secretaries gave ceilings to the Bureaus, so what was included within the Bureau——

Mrs. HANSEN. Who is the Assistant Secretary that has the National Park Service under his jurisdiction?

Mr. HARTZOG. Dr.Glasgow, who is also gone.

Mrs. HANSEN. He has been gone for a long time.

Mr. WYATT. Has he been replaced?

Mr. HARTZOG. Yes, sir. Mr. Nathaniel B. Reid of Florida has been nominated and we expect his confirmation within the next week. He is a very distinguished gentleman who is the assistant to former Governor Kirk. He did such an outstanding job on environment in Florida that the incoming Democratic Governor, Governor Askew, asked him to remain in the same position, so he remained as his assistant for environmental programs, and as chairman of the Pollution Abatement Program Board for the State of Florida. He is a very talented and creative environmentalist, and we are extremely proud to have him. It is a great boost for us.

Mrs. HANSEN. In almost each instance the OMB allowance was higher than the departmental planning allowance.

Mr. HARTZOG. Yes. The Office of Management and Budget was extremely good to us this year.

Mr. WILES. That is true.

Mrs. HANSEN. This is very unusual.

Mr. HARTZOG. Ma'am, it is simply that they have begun to understand the problem.

Mr. WILES. It needs to be realized the department only had a certain amount of money to distribute and it was distributed at the highest level that each Assistant Secretary could give to those Bureaus whose programs he thought should be accelerated. Then each Bureau Director had more latitude this time than they have had in a long, long time. Each Bureau Director had his own choice of putting in those things that are most important to his program. The figure was low, of course. They couldn't include all the things they wanted to include.

Mrs. HANSEN. I am glad to have this piece of information.

(Discussion off the record.)

ARCHEOLOGICAL INVESTIGATIONS AND SALVAGE WORK IN THE MISSOURI RIVER BASIN

Mrs. HANSEN. You are requesting an increase of $314,000 and 20 positions for archeological investigations and salvage work in the Missouri River Basin formerly included in the Reclamation budget. What are the factors that prompted the transfer of this cost to your budget, other than what you explained yesterday?

Mr. HARTZOG. Those are the only ones so far as I know. It was the direction of the Department that we had to have this money transferred into our budget, and then I made the decision that inasmuch as it was going to be transferred into historic preservation, that the money that had previously been in our management and protection account relating to archeological salvage outside of the National Park System should also be transferred. This consolidated the program so that

you could have the oversight of just one item instead of having to look at it in two different appropriation activities.

Mr. WILES. Madam Chairman, this was directed in the report of the Public Works Appropriations Subcommittee, that the six bureaus participating in the Missouri River Basin project, starting in 1972, should seek appropriations in their own appropriations and not the public works bill. This is not an increase because the public works bill has been reduced accordingly for those six bureaus. It is not an overall increase for the Department.

Mr. HARTZOG. That transfer, Madam Chairman, means in the future all archeological salvage work we have to do inside the areas of the National Park System will be done as a percentage of the override, just as we handle the history studies for the individual parks.

ARCHEOLOGICAL WORK PERFORMED UNDER CONTRACT IN 1970

Mrs. HANSEN. Please insert in the record a tabulation for fiscal year 1970, indicating the archeological work performed under contract. This tabulation should indicate the contractor, the location of the work, the type of activity, and the total funding applied in each instance.

Mr. HARTZOG. We have it, but I don't think we have it in that detail, not quite all the information you asked for. We will revise it to put it in the way you asked for it.

(The information follows:)

ARCHEOLOGICAL PROGRAMS FOR FISCAL YEAR 1970

Regions	Type of Activity	Contractor	Funding
Northeast:			
Allegheny Reservoir, N.Y.	Salvage	Univ. of Buffalo Foundation	$ 4,000
Allegheny Reservoir, Pa.	Salvage	Carnegie Museum	5,000
Cape Cod Nat'l Seashore, Mass.	Salvage	Plimoth Found. Inc.	2,500
Independence NHP, Pa.	Salvage	Univ. of Pa.	3,000
La Farge Res., Wis.	Salvage	State Hist. Soc. of Wisconsin	7,000
Lower Kaskaskia Canalization Project, Ill.	Salvage	So. Ill. Univ.	6,400
Salt Creek Res., Ohio	Salvage	Cleveland State Univ.	4,000
Tocks Island Res., Pa.	Excav.	Franklin & Marshall College	7,000
Tocks Island Res., N.J.	Salvage	Seton Hall Univ.	2,000
Tocks Island Res., N.J.	Testing	N.J. State Museum	2,000
Tocks Island Res., N.J.	Salvage	Queen's Coll., CUNY	1,700
			44,600
National Capital:			
Great Falls Park, Va.	Survey	Catholic Univ. of America	100
Southeast:			
Carters Dam	Excav.	Univ. of Georgia	14,000
Cave Run Res. Proj., Ky.	Invest.	Univ. of Kentucky	27,000
Gainesville Lock & Dam, Ala.	Survey	Univ. of Alabama	6,400
Hayes Mound, Arkansas	Excav.	Univ. of Arkansas	3,500
Indian Knoll Site, Ky.	Survey	Univ. of Kentucky	250
Landleveling Damage, S.E. Ark.	Survey	Univ. of Arkansas	3,500
New Orleans Hurricane Protection, La.	Survey	Louisiana State Univ.	595
Landleveling Salvage, Miss.	Excav.	Miss. Dept. of Archives and Hist.	3,000
Tellico Res., Tenn.	Excav.	Univ. of Tennessee	32,000
Tellico Res., Tenn.	Survey	Univ. of Tennessee	10,000
Yatesville Res, Ky.	Survey	Univ. of Kentucky	750
			100,995

Regions	Type of Activity	Contractor	Funding
Midwest:			
Big Sioux Res., Nebr.	Survey	Univ. of Nebraska	2,000
Bijou Res., Colo.	Testing	Univ. of Colo.	1,800
Coralville Res., Iowa	Salvage	Univ. of Iowa	4,300
El Dorado Res., Kansas	Invest.	Univ. of Kansas	6,500
Great Portage NHS, Minn.	Salvage	Minn. State Hist. Society	6,378
*Hillsdale Res., Kansas	Invest.	Univ. of Kansas	10,000
*Kaysinger Res., Mo.	Salvage	Univ. of Missouri	10,000
La Farge Res., Wis.	Salvage	Wisc. State Hist. Society	7,000
Landleveling S.E. Mo. III	Invest.	Univ. of Missouri	5,000
Meramec Park Res., Mo.	Invest.	Univ. of Missouri	10,100
*Oahe Res., S.D.	Invest.	Grays Harbor Coll.	3,500
*Oahe Res., S.D.	Invest.	Univ. of Missouri	5,000
*Pony Creek Watershed, Iowa	Invest.	State Archeologist, Iowa	5,100
*Pony Creek Watershed, Iowa	Invest.	State Archeologist, Iowa	5,080
*Payor Mountains Survey, Mont., Wy.	Invest.	Univ. of Missouri	15,000
Purgatoire River Res., Colo.	Salvage	Trinidad State J.C.	3,300
Saylorville Res., Iowa	Excav.	Iowa State Univ.	6,000
*Tuttle Creek Res., Kansas	Survey	Univ. of Kansas	8,000
			114,058

* Missouri River Basin Account

Southwest:			
Amistad Res., Texas	Invest.	Univ. of Texas	40,000
Amistad Res., Texas	Excav.	Univ. of Texas	8,000
Archeomagnetic Dating, Okla.	Research	Univ. of Oklahoma	5,000
Cooper Res., Texas	Survey	Southern Methodist Univ.	3,200
Cooper Res., Texas	Survey	Southern Methodist Univ.	3,200
Dallas-Ft. Worth Int. Airport	Excav.	Southern Methodist Univ.	1,357
Ecleto Creek Watershed, Texas	Survey	Univ. of Texas	1,280
Ecological Survey, Chaco Canyon, N.M.	Survey	Univ. of New Mexico	6,400
Ft. Gibson Res., Okla.	Survey	Univ. of Tulsa	2,500
Grand Canyon NP, Arizona	Excav.	School of Amer. Res.	12,000
Guadalupe Mountains NP, Texas	Survey	Univ. of Texas	200

Regions	Type of Activity	Contractor	Funding
Southwest - Continued:			
Hugo Res., Okla.	Excav.	Univ. of Oklahoma	25,000
Lake Kemp Res., Texas	Excav.	Southern Methodist Univ.	2,171
Lake Palestine Res., Texas	Excav.	Southern Methodist Univ.	40,000
Lake Palestine Res., Texas	Survey	Southern Methodist Univ.	16,000
Lipan Creek Watershed, Texas	Survey	Univ. of Texas	2,800
Northfork Res., Texas	Excav.	Univ. of Texas	40,000
Salado Creek Watershed, Texas	Survey	Univ. of Texas	2,800
Southwestern Paleoclimate, Ariz.	Res. on tree-ring data	Univ. of Arizona	8,000
Wallisville Res., Texas	Excav.	Univ. of Texas	32,000
Wilkins Res., Arizona	Survey	Museum of N. Ariz.	1,631
			253,539
Western:			
New Melones Res., Calif.	Excav.	Cent. Calif. Archeo. Foundation	30,000
Pacific Northwest:			
John Day Res., Ore., Wash.	Excav.	Univ. of Oregon	20,000
Lower Granite Project, Wash.	Excav.	Wash. State Univ.	16,750
San Juan Island NHP, Wash.	Testing-Excav.	Univ. of Washington	20,000
			56,750
		GRAND TOTAL	600,042

GUIDELINES FOR DETERMINING PRIORITIES FOR ARCHAEOLOGICAL WORK

Mrs. HANSEN. What are the standard guidelines you follow in determining priorities of what archeological work will be done first?

Mr. HARTZOG. The money being as limited as it is, we consider the imminent threat of loss as really the overriding criterion. It is simply putting out fires.

Mrs. HANSEN. Do you consider that Lake Ozette meets the criterion of imminent threat?

Mr. HARTZOG. Whatever is threatened is the first priority. Ozette, of course, is a unique situation. That was started by transfer of funds to us from the Bureau of Indian Affairs. It didn't meet this criterion of imminent threat, but it met the second major criterion. That is an extremely valuable opportunity for original knowledge of baseline communities. This is not in our budget this year, but this is the basis on which it was initiated. We have had to confine ourselves pretty much to the first criterion of imminent hazard or imminent possibility of loss resulting from some incompatible hazard there.

Mrs. HANSEN. Is the largest number of threatened losses a result of Federal operations?

Mr. HARTZOG. Generally yes, although it can be State or local activities as well, but generally it is Federal.

Mrs. HANSEN. A major portion of the Federal operations that threaten losses probably involve construction of dams and roads.

Mr. HARTZOG. Yes, ma'am, and pipelines have been a major element too, but there we have been able generally to get the pipeline company to put up a percentage of the construction costs, in order to identify, excavate and salvage archeological specimens. I will be glad to supply for the record a written statement on the criteria for selecting these projects.

(The information follows:)

ARCHEOLOGICAL SALVAGE AND INVESTIGATIONS

National priorities for excavation of archeological sites threatened with destruction by federally funded or licensed construction activities will be based, in descending order, on the number of criteria each threatened site can meet. These criteria are:

1. Urgency of need for excavation based on construction agency time table.
2. Uniqueness of opportunity to acquire basic new data ("type" sites where no other chance for excavation can occur).
3. Expectation of providing information regarding broad anthropological questions within regional or cultural province.
4. Expectation of providing information on specific local problems.
5. Competent researchers available to undertake the project.
6. Cost estimates falling within the available funding.

Mrs. HANSEN. Where do the funds for Steamboat Bertrand appear in this budget?

Mr. HARTZOG. The Bertrand project is in this budget. It is in the $875,000 amount.

Mr. UTLEY. It is mentioned on page 132.

Mrs. HANSEN. You are requesting $140,000 for this project.

Mr. HARTZOG. That is out of the $875,000.

Mrs. HANSEN. Why isn't this project funded under your Missouri River Basin program?

Mr. HARTZOG. Because we were required by our former Assistant Secretary to pick it up out of our own archeological salvage work. The $314,000 is simply a transfer item with no increase in cost, so there was simply no way of putting it in there, without eliminating some of the on-going work on the Missouri Basin.

Mrs. HANSEN. Don't you establish the priorities?

Mr. HARTZOG. It is in the Missouri River Basin and normally an increase, if one had been given, would more logically have been there. Hereafter we are not going to have the Missouri River Basin separate from the rest of it.

Mr. QUICK. It is in the Missouri River Basin as a part of the $314,000 amount.

Mr. HARTZOG. You did transfer it then, but we picked it up this current year out of the $875,000.

Mr. QUICK. No, sir; out of the $314,000.

Mr. HARTZOG. I am sorry. I stand corrected.

Mrs. HANSEN. The Bertrand project is included in the Missouri River Basin program?

Mr. QUICK. Yes, Madam Chairman; this is included in the portion previously funded by transfer of the Missouri River Basin funds provided by the Bureau of Reclamation.

Mrs. HANSEN. I think this is where it belongs.

Mr. HARTZOG. It is, and that is where it should have been but when we were ordered to undertake the work we didn't have the money there. Apparently some arrangements were made in order to get it there.

Mr. WILES. The reason for that is that the only authority the Park Service had to do archeological work outside of parks was in connection with the Missouri River Basin transfer funds.

Mr. QUICK. It is in our budget in fiscal 1972, and this transfer puts it there, but it is from the funds previously——

Mrs. HANSEN. It is from the funds that were transferred.

Mr. QUICK. That is correct.

INCREASE IN PERMANENT POSITIONS

Mrs. HANSEN. You indicate the total number of permanent positions will increase from 48 in 1971 to 91 in 1972. Please give us a summary of what is involved in this increase of 43 permanent positions.

Mr. QUICK. Twenty one of those are from the transfer from management and protection of the archeological investigations and salvage, 20 are included in the $314,000 transferred from Reclamation, a total of 41 positions. The remaining two positions are for the computerization of data for the National Register.

CONSTRUCTION

Mrs. HANSEN. Please insert pages 135 through 142 of the justifications in the record at this point.

(The pages follow:)

DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

Construction

Appropriation, 1971	$16,259,000	
Supplemental appropriation, 1971	2,420,000	
Unobligated balance from prior years	3,151,410	
Total available for obligation		$21,830,410
Decreases:		
Buildings, utilities, and other facilities	22,971,082	
Acquisition of:		
Lands	21,657	
Water rights	17,283	
Roads and trails	40,688	
Undistributed	-1,720,300	21,330,410
Subtotal		500,000
Increases:		
Buildings, utilities, and other facilities		37,359,000
Total available for obligation		37,859,000
Less: Unobligated balance from F. Y. 1971		--
Budget Estimate 1972		37,859,000

Analysis by Activities

Activity	Amount Available 1971	Fiscal Year 1972			Total available 1972 compared to total available 1971	Page Ref.
		Estimated Total Available	Unobligated Balance from 1971	Budget Estimate		
1. Buildings, utilities, and other facilities	$22,971,082	$37,359,000	--	$37,359,000	$+14,387,918	137
2. Acquisition of:						
Lands	21,657	--	--	--	-21,657	140
Water rights	517,283	500,000	--	500,000	-17,283	140
3. Roads and trails	40,688	--	--	--	-40,688	--
Subtotal	23,550,710	37,859,000	--	37,859,000	+14,308,290	
Undistributed	-1,720,300	--	--	--	+1,720,300	
Total	21,830,410	37,859,000	--	37,859,000	+16,028,590	

Personnel Summary

	1970 actual	1971 estimate	1972 estimate
Total number of permanent positions	204	323	323
Full-time equivalent of other positions	160	260	300
Average number of all employees	352	568	608
Average GS grade	8.7	8.7	8.7
Average GS salary	$11,486	$11,523	$11,526
Average salary of ungraded positions	$8,386	$8,740	$9,196

1. Buildings, Utilities and Other Facilities - $37,359,000

The amount of $37,359,000 is requested for the construction of buildings, utilities, and other facilities. The 1972 program is designed to permit the National Park Service to pursue five objectives in carrying out its mandate to preserve the parks and to provide for their continued use and enjoyment. As with the current 1971 program, the requested funds will permit the Service to upgrade existing facilities and to provide new facilities to better serve park visitors and help them understand their relationship to the environment and to more fully appreciate their heritage.

The five objectives are:

1. Pollution abatement - $17,459,000. This amount will provide funds to accomplish the second of three stages to implement Executive Order 11507, dated February 4, 1970, which states that "actions necessary to meet the requirements of this order pertaining to air and water pollution at existing facilities are to be completed or underway no later than December 31, 1972." The Service received $1,850,000 in supplemental funds for 1971. This was the first stage. The final stage of implementation will be included in the 1973 budget. Deferral of the requested 1972 funding would mean that the Administration's commitment could not be met. Projects include the construction and reconstruction of sewerage systems, treatment plants, incinerators, sanitary land fills, and other utilities.

2. American Revolution Bicentennial - $7,361,000. Preparation for the two-hundredth anniversary of the birth of our Nation requires meeting development needs at 20 different parks having an historical significance relating to the revolution. As a continuation of the current program, the 1972 request will provide for new construction, restoration, or rehabilitation at the following 10 of these 20 areas: Independence National Historical Park, Pennsylvania; Castle Clinton National Monument, Federal Hall National Memorial, and Statute of Liberty National Monument, New York; Minute Man National Historical Park, Massachusetts; Morristown National Historical Park, New Jersey; Colonial National Historical Park and George Washington Birthplace National Monument, Virginia; and Thomas Jefferson Memorial and Washington Monument, District of Columbia.

3. Develop New Park Capacity - $6,867,000. Fiscal year 1972 projected visitation is estimated to increase by 10 million to 184 million. Planning, design, and construction of new facilities are necessary (1) if the ever-increasing number of park visitors are to be adequately served, and (2) if we are to provide satisfactory park experiences for those now without an opportunity to visit a developed park. Of the $6.9 million programmed for new capacity in all parks, $4.9 million is scheduled for areas authorized since 1960.

4. Maintain Existing Park Capacity - $1,594,000. Any park facility has a given life span which varies with use and degree of maintenance. To keep each facility fully functional throughout that time and to protect the investment of the Government, construction programs must provide for rehabilitation, replacement and reconstruction of these facilities.

5. General Support - $4,078,000. Funds are required annually for major alterations and improvement projects, for construction and/or replacement of exhibits and other interpretive facilities in existing park buildings, for facilities to serve concessioner developments and for advance planning. In most instances this program consists of numerous small items. The priority of specific project requirements change throughout the year and therefore, lump sum amounts are requested without project identification. Provision is made in this request for the following such lump sum items totaling $4,078,000.

(a) Major alterations and improvements--$1,478,000

A lump sum amount for major alterations and improvements is included to provide for numerous small items required to protect park visitors and Government property, to serve existing facilities, or to make existing facilities more functional.

(b) Exhibits and other interpretive facilities--$700,000

This lump sum item provides for construction or replacement of museum exhibits and audiovisual facilities and programs in existing buildings and along waysides. The installation of these facilities in new buildings, such as visitor centers, is included as a part of the total initial cost of the structures. The fragile nature of the artifacts and many of the exhibits require periodic treatment. Many of the increasing number of interpretive facilities in the National Park System in visitor centers, waysides, museums, and historical structures have required refurbishing and improvement during the past decade. The amount of $400,000 which was provided in 1971 for this program is no longer adequate to keep pace with the expanding needs. Recasting of exhibits and audiovisual facilities to present the latest information available using modern materials and equipment is required if these facilities are to be effective. An increase of $300,000 is requested to provide for this additional work.

(c) Facilities to serve concessioner developments--$300,000

This lump sum amount is intended to provide for minor extensions of or connections to park utility systems (water, sewer, and power) to serve developments constructed and operated by concessioners under long-term contracts. The $300,000 requested is the same amount provided for 1971.

(d) Advance planning--$1,600,000

Advance planning enables the Service to provide preliminary planning and investigations as necessary to determine the cost, scope, and rate of obligation for future year construction. It involves on-site studies of soil conditions, the mapping of the topography, general layout for future projects, and preliminary drawings. Advance planning must be accomplished at least two years prior to the year in which actual construction is scheduled. This enables cost estimates and constructions decisions to be completed prior to requesting specific funds for design and construction. This schedule also permits management decisions to be made based upon actual preliminary plans which can identify the entire scope of new construction starts. The increase of $500,000 is needed if development of the National Park System is to continue to proceed in a systematic and efficient manner, especially in view of growing future needs for new park capacity, and Bicentennial and pollution abatement control projects.

Parks with Major Projects

Parks which are scheduled for major design and construction activity (excluding pollution abatement projects) are listed below:

Independence National Historical Park, Pennsylvania $5,259,000
Construction of a visitor center, reconstruction of City Tavern, restoration of Second Bank of U.S.; planning for two other Bicentennial projects: restoration of Franklin House and Court and Old City Hall.

Chamizal National Memorial, Texas $1,234,000
Construction of an international visitor use facility.

Castle Clinton National Monument, New York ..... $ 900,000
Completion of historical restoration.

Ozark National Scenic Riverway, Missouri ..... $ 815,000
Construction of campground at Big Spring, planning at Alley Spring.

Jefferson National Expansion Memorial National Historic Site, Missouri ..... $ 770,000
Planning for utilities and ancillary facilities and construction of various site improvements including rough grading and audiovisual equipment.

Yosemite National Park, California ..... $ 643,000
Construction of amphitheater, utilities and other visitor facilities in the Valley.

Redwood National Park, California ..... $ 600,000
Construction of administration building.

Fire Island National Seashore, New York ..... $ 582,000
Development of dune and dock facilities at Watch Hill.

Lake Mead National Recreation Area, Arizona-Nevada ..... $ 475,000
Expansion of water system.

Major Construction Projects for the National Capital Parks

The requested 1972 program contains $2,346,000 (excluding pollution abatement projects) for Service projects in the District of Columbia and nearby Maryland and Virginia. Five major projects scheduled are:

Executive Residence (White House) - $1,000,000 to improve the safety standards of the air conditioning and electrical systems.

Sculpture Gardens - $600,000 for initial development, including skating rink.

Thomas Jefferson Memorial - $400,000 for flood lighting system.

Frederick Douglass Home - $156,000 for a visitor center, community buildings and an access road.

Anacostia Park - $100,000 for community recreation facilities.

Manner in Which Work is Accomplished

Most of the project planning, designing and construction supervision work is performed by professional employees of the Service. In some instances, however, it is feasible and in the interest of the Government to have such work performed under contract. Situations under which such work is accomplished by contract include cases where the workload at a given time is such that Service forces could not complete the work on schedule, where in-house capability for accomplishing a particular type of work is lacking, and where outside firms or individuals have expertise peculiar to the needs of the job to be done. Most of the actual construction work is accomplished under contract. However, some projects are carried out by Service forces when it is feasible and advantageous to the Government to do so.

2. Acquisition of Land and Water Rights

Analysis by Subactivities

Subactivity	FY 1971 Amount Available	FY 1972 Estimate	Total Available 1972 Compared to Total Available 1971
(a) Acquisition of lands	$ 21,657	-	$-21,657
(b) Acquisition of water rights	517,283	$500,000	-17,283
Total	538,940	500,000	-38,940

(a) Acquisition of lands. Fiscal year 1971, $-0-; fiscal year 1972, $-0-; no change. The fund requirements for this purpose are included in the budget of the Bureau of Outdoor Recreation to be funded from the Land and Water Conservation Fund as authorized by the Land and Water Conservation Fund Act of 1965, as amended.

(b) Acquisition of water rights. Fiscal year 1971, $500,000; fiscal year 1972, $500,000; no change.

The 1972 fiscal year program calls for continuing effort to:

(1) Select well sites, drill and pump test wells to determine the quantity and quality of water available for use, and the collection of data needed by engineers to facilitate the design of water systems. The knowledge gained from the geohydrological investigations under the Water Resources Studies program (financed under the "Management and protection" appropriation) aids in the selection of suitable well sites.

(2) Drill production wells suitable for long term use.

(3) Perfect and protect water rights for systems which are being supplemented or enlarged. Increasing numbers of the Eastern States are adopting regulatory or appropriative water laws applicable to the use of ground water and the drilling, development, and use of wells. As a result, the Service must obtain increasing numbers of State permites and establish appropriate water rights.

(4) Prevent or eliminate conflicts between Federal, State, and private water rights. This involves water rights adjudications and other suits and condemnations to acquire, establish, or protect Federal water right title.

To accommodate increasing visitation, new water supplies will be needed at North Cascades National Park, Delaware Water Gap National Recreation Area, Yosemite National Park, Great Smoky Mountains National Park, Indiana Dunes National Lakeshore, and others. Investigations, site selection, and test wells will be undertaken at Everglades National Park, Biscayne National Monument, North Cascades National Park, Death Valley National Monument, Bighorn Canyon National Recreation Area, Yosemite National Park and 31 other areas. Measuring equipment will be selected and installed at Sequoia National Park.

DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
CONSTRUCTION

Itemization of Estimate

	Actual 1970	Available 1971	Estimate 1972	Increase (+) Decrease (-)
Program and Financing:				
Total obligations	$8,842,724	$21,830,410	$37,859,000	$+16,028,590
Unobligated balance available, start of year	-4,304,448	-3,151,410	....	+3,151,410
Unobligated balance available, end of year	3,151,410	....	....	....
Transferred to other accounts	72,671	....	.....	....
Transferred from other accounts	-62,357	....	....	....
Appropriation	7,700,000	18,679,000	37,859,000	+19,180,000
Obligations by Objects:				
11 Personnel compensation	$3,213,984	$5,399,000	$5,950,000	$+551,000
12 Personnel benefits	347,059	606,000	654,000	+48,000
21 Travel and transportation of persons	173,810	330,000	570,000	+240,000
22 Transportation of things	60,532	97,000	110,000	+13,000
23 Rent, communications, and utilities	174,150	288,000	325,000	+37,000
24 Printing and reproduction	68,930	128,000	135,000	+7,000
25 Other services	564,063	1,523,000	2,525,000	+1,002,000
26 Supplies and materials	525,184	753,000	860,000	+107,000
31 Equipment	774,618	1,413,000	1,640,000	+227,000
32 Land and structures	2,940,968	11,293,410	25,090,000	+13,796,590
42 Insurance claims and indemnities	-573	....	....	....
Total obligations	8,842,725	21,830,410	37,859,000	+16,028,590

UNOBLIGATED AND UNEXPENDED BALANCES

Mrs. HANSEN. Please insert in the record a tabulation of your unobligated and unexpended balances as of June 30, 1970, and as of February 28, 1971.

(The information follows:)

CONSTRUCTION

Unobligated and Unexpended Balances

June 30, 1970		February 28, 1971	
Unobligated	Unexpended	Unobligated	Unexpended
$3,151,410	$9,904,798	$15,114,256	$20,843,396

Mrs. HANSEN. What construction projects, if any, are being delayed because of limitation of funds or otherwise imposed by the Office of Management and Budget or the Department of the Interior?

Mr. HARTZOG. I have none, Madam Chairman, none in construction.

Mrs. HANSEN. None?

Mr. HARTZOG. None. The only holdup I have is in land and water conservation cash outlay ceiling, that is all.

Mrs. HANSEN. How did you survive not having funds placed in reserve?

Mr. HARTZOG. It is just a meritorious program.

PRIOR YEAR CONSTRUCTION PROJECTS

Mrs. HANSEN. Please insert in the record a detailed listing of all construction projects for which funds were appropriated prior to fiscal year 1970, and for which unobligated balances currently exist. This tabulation should indicate the year the appropriation was enacted, the name and location of the project, and the amount of the unobligated balance.

(The information follows:)

Listing of unobligated construction projects as of April 29, 1971, involving appropriations enacted prior to the 1970 fiscal year.

CONSTRUCTION

The projects listed below had not been obligated as of April 29, 1971. While these projects were appropriated in a prior year, they had been placed in reserve by the Office of Management and Budget under the President's Directive of September 4, 1969. They were rescheduled in the 1971 fiscal year program and the funds were released.

Region, Area, and Project Title	Fiscal Year	Programmed Amount
Western Region		
Sequoia-Kings Canyon NPs (California)		
Giant Forest		
Water System Improvements	1969	$516,000
Giant Forest and Ash Mountain		
Sewage Facilities	1969	916,000
National Capital Parks		
Watt's Branch Linear Park		
Development for Visitor Use	1967	360,000

PARKWAY AND ROAD CONSTRUCTION (LIQUIDATION OF CONTRACT AUTHORIZATION)

All 1969 and prior year projects had been obligated as of April 29, 1971.

POLLUTION ABATEMENT

Mrs. HANSEN. $17,459,000 is requested for pollution abatement. Yesterday we had a brief discussion in this connection, but I think we should have the complete details on your pollution abatement program, what it involves, and the probability of the Park Service being able to comply with Executive Order 11507.

Mr. HARTZOG. Madam Chairman, we have a program which, if implemented with the appropriation as requested in this budget and with the appropriations needed in 1973, will permit us to complete all of the pollution abatement projects now affected by this Executive order.

Mrs. HANSEN. Does this include water supply and sewage projects?

Mr. HARTZOG. And sewage disposal, yes, ma'am.

Mrs. HANSEN. What other projects are involved in this program?

Mr. HARTZOG. Air pollution, incinerator operation or open pit garbage disposal.

Mrs. HANSEN. Will you please insert in the record a statement showing the amount of funds in your fiscal year 1972 estimate for pollution abatement and environment protection.

(The information follows:)

DEPARTMENT OF THE INTERIOR: NATIONAL PARK SERVICE

ACTIVITIES IN POLLUTION ABATEMENT AND ENVIRONMENTAL PROTECTION

[In thousands of dollars]

Description of project or activity	Location	Estimate fiscal year 1972
Pollution control and abatement activities:		
Management and protection: Water resource studies.	Various (National Park Service budget justifications fiscal year 1972 p. NP94).	$100
Construction:		
Pollution control and abatement:		
Air	Various (See enclosed 1972 fiscal year pollution abatement program for specific projects and locations).	1,831
Water	do	15,628
Total, pollution control and abatement activities.		17,559
Selected environmental protection and enhancement activities:		
Financial aid to State and local governments:		
Preservation of historic properties: Matching grants-in-aid to States for purchase and restoration of historic properties and planning for developing those properties.	Various (NPS Budget justifications, pages NP121–122).	6,000
Direct Federal activities:		
Develop recreational facilities and related activities:		
Construction, buildings, utilities and other facilities.	Various	18,600
Maintenance and rehabilitation, B. & U.: Development and maintenance of facilities in parks excluding pollution abatement and historic properties projects.	Various (NPS Budget, pages NP33–79)	37,600
Management and protection planning		4,000
Rehabilitation of historic properties:		
Construction, building, utilities and other facilities.	Various	1,800
Maintenance and rehabilitation, B. & U.: Construction and maintenance funds for developing, rehabilitating, and maintaining historic properties.	Various (NPS Budget Jstifications, fiscal year 1972, pages NP33–79).	100
Park roads and trails:		
Parkways and roads	Various	30,000
Maintenance and rehabilitation, R. & T.: Construction and maintenance of parkways, roads and trails.	Various (NPS Budget Justifications, fiscal year 1972, pages NP33–79).	18,000
Total, selected environmental protection and enhancement activities.		$116,100

DEPARTMENT OF THE INTERIOR: NATIONAL PARK SERVICE
ACTIVITIES IN POLLUTION ABATEMENT AND ENVIRONMENTAL PROTECTION—Continued
[In thousand of dollars]

Description of project or activity	Location	Estimate fiscal year 1972
Understanding, describing and predicting the environment:		
Management and protection:		
South Florida environmental program	Florida	$1,000
Natural science studies and park environmental management studies.	Various	1,100
Total, understanding, describing and predicting the environment.		2,100

Mrs. HANSEN. I saw an article in the paper concerning a sewage problem in one of your caves——

Mr. HARTZOG. Mammoth Cave.

We have a problem and we are actively investigating it. We have been on it now for over a year, in which we did discover some polluted effluent going out of the sewer system at the Job Corps camp at Mammoth Cave through one of the underground streams there. We think we have it corrected now.

Mrs. HANSEN. What was the cause of this problem?

Mr. HARTZOG. Seepage through the sewage filter system.

Mr. GOWANS. What has happened is we have constructed lagoons above the cave area.

Mrs. HANSEN. How successful are these sewage lagoons? In my own town we have one on a creek. I can't imagine that there isn't seepage, particularly when the tide comes in.

Mr. HARTZOG. Some of them are extremely successful and some of them are extremely unsuccessful. I was in the Everglades a short time ago, and I asked about the lagoons there. The superintendent tells me that they have been operating beautifully.

Mrs. HANSEN. They have been operating without seepage?

Mr. HARTZOG. No seepage, and practically no maintenance to them. Once you get one of them really going, it is just great, but we have got some of them that we have never been able to get to operate.

Mrs. HANSEN. Why?

Mr. HARTZOG. Mr. Gowans is our programs officer and also a civil engineer. I will let him speak to that.

Mr. GOWANS. The common practice is to seal the bottom so there is no seepage. It is a closed system where the bacteria works within the lagoon. It is a system in which extreme climate sometimes causes the bacteria to die off and gets the system out of balance. The Mammoth Cave situation is that there is apparently some pollution showing up inside the cave, but we have been unable to determine exactly how it was getting there. We have been checking the lagoons but have not determined any leakage.

Mrs. HANSEN. Are there any other types of sewage systems that could be installed?

Mr. GOWANS. Yes. There could be another sewage system and I would suppose that we would go into a more expensive operation, if the present system could not be corrected.

(Discussion off the record.)

Mrs. HANSEN. Please insert in the record your schedule of pollution abatement program for fiscal years 1971, 1972, and 1973.

Mr. HARTZOG. We have that listed by fiscal year 1972 projects too, if you would like to have the project listing accompany that.

Mrs. HANSEN. Yes.

Mr. HARTZOG. It is pretty extensive, but we will be pleased to let you do anything with it you would like. The last half of that tabulation there is pollution.

(The information follows:)

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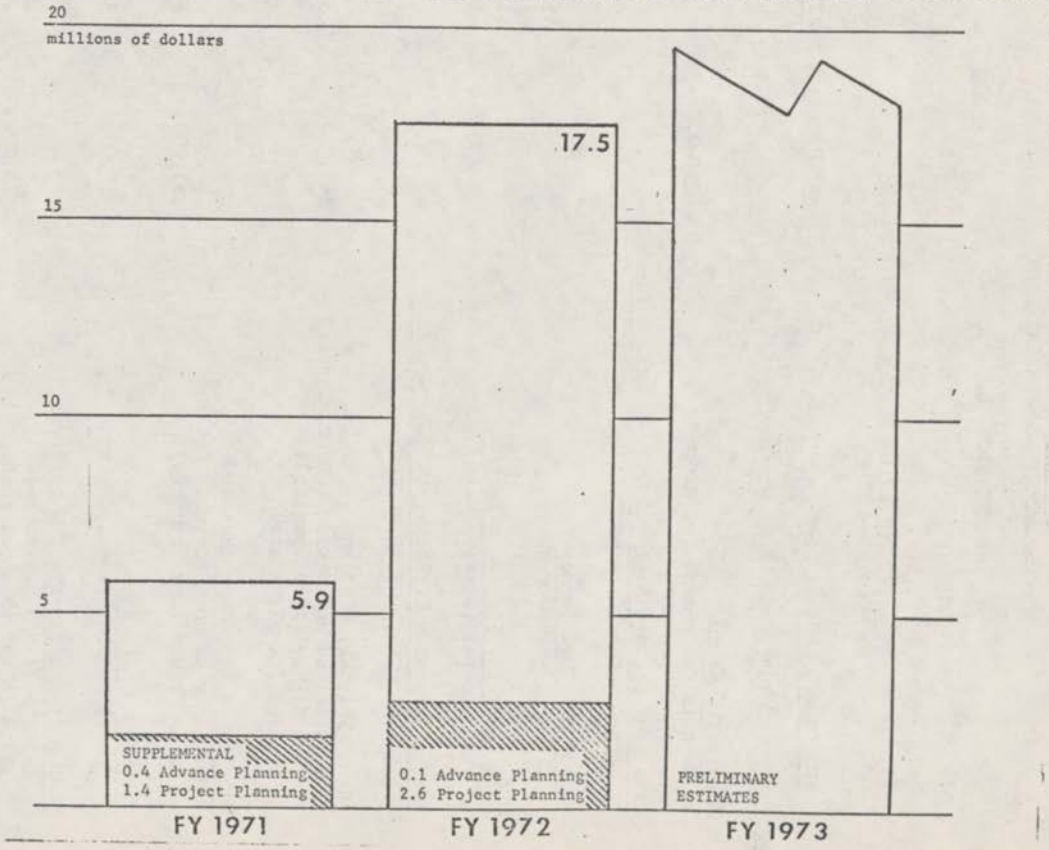
National Park Service
CONSTRUCTION OF AIR AND WATER POLLUTION ABATEMENT FACILITIES



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1972 POLLUTION ABATEMENT PROGRAM

REGION AND AREA	WATER	AIR
NORTHEAST REGION		
Acadia NP, Maine		
Seawall Campground (Developments)	$ 175,000	$ --
Allegheny Portage Railroad NHS, Pennsylvania		
Park General (Developments)	--	40,000
Edison NHS, New Jersey		
Glenmont (Developments)	--	18,000
Fort Necessity NB, Pennsylvania		
Park General (Developments)	--	18,000
Home of Franklin D. Roosevelt NHS, New York		
Park General (Developments)	51,000	--
Isle Royale NP, Michigan		
Mott Island and Windigo (Developments)	144,000	36,000
Rock Harbor (Developments)	--	46,000
Windigo (Developments)	--	40,000
Minute Man NHP, Massachusetts		
Battle Road Unit (Developments)	142,000	--
North Bridge (Developments)	51,000	--
Morristown NHP, New Jersey		
Jockey Hollow (Developments)	17,000	14,000
Statue of Liberty NM, New York		
Liberty Island (Developments)	--	36,000
Ellis Island (Project Planning)	78,000	--
Vanderbilt Mansion NHS, New York		
Park General (Developments)	184,000	--
Totals, Northeast Region	$ 842,000	$ 248,000

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1972 POLLUTION ABATEMENT PROGRAM

REGION AND AREA	WATER	AIR
SOUTHEAST REGION		
Appomattox Court House NHP, Virginia		
Park General (Developments)	$ 16,000	$ --
Blue Ridge Parkway, North Carolina and Virginia		
North Carolina		
Parkway General (Project Planning)	13,000	--
Parkway General (Developments)	--	69,000
Mount Pisgah (Developments)	189,000	--
Virginia		
Parkway General (Developments)	--	69,000
Peaks of Otter (Developments)	240,000	--
Vinton (Developments)	25,000	--
Cape Hatteras NS, North Carolina		
Bodie Island (Developments)	53,000	--
Ocracoke Island (Developments)	60,000	--
Christiansted NHS, Virgin Islands		
Fort Christiansvaern (Developments)	75,000	--
Colonial NHP, Virginia		
Yorktown (Developments)	14,000	--
Everglades NP, Florida		
Flamingo (Project Planning)	60,000	--
Flamingo (Developments)	15,000	--
Special Study to meet New Standards	100,000	--
Fort Jefferson NM, Florida		
Garden Key (Developments)	8,000	--

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REGION AND AREA	WATER	AIR
SOUTHEAST REGION (Continued)		
Great Smoky Mountains NP, North Carolina and Tennessee		
North Carolina		
Balsam-Heintooga (Developments)	$ 104,000	$ --
Forney Ridge (Developments)	42,000	--
Oconaluftee JCCC (Developments)	167,000	--
Tennessee		
Cable Mill (Developments)	90,000	--
Cades Cove (Developments)	395,000	--
Cosby (Developments)	139,000	--
Twin Creek (Developments)	39,000	--
Horseshoe Bend NMP, Alabama		
Headquarters and Heavy Visitor Use Area (Developments)	31,000	--
Natchez Trace Parkway, Alabama, Mississippi and Tennessee		
Mississippi		
Tupelo Subdistrict (Developments)	235,000	--
Tennessee		
Jeff Busby Park (Developments)	71,000	--
Meriwether Lewis District (Developments)	17,000	--
San Juan NHS, Puerto Rico		
Fort El Morro (Developments)	20,000	--
Shenandoah NP, Virginia		
Big Meadows (Project Planning)	16,000	--
Skyland (Project Planning)	30,000	--
Virgin Islands NP, Virgin Islands		
Saint John (Developments)	--	33,000
Totals, Southeast Region	$2,264,000	$ 171,000

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REGION AND AREA	WATER	AIR
SOUTHWEST REGION		
Amistad NRA, Texas		
Diablo East (Developments)	$ 642,000	$ --
Arches NM, Utah		
Park General (Developments)	--	47,000
Bandelier NM, New Mexico		
Frijoles Canyon (Developments)	237,000	--
Bryce Canyon NP, Utah		
Headquarters (Developments)	22,000	--
North Campground (Developments)	77,000	--
Rainbow Point (Developments)	26,000	--
Canyonlands NP, Utah		
Island-In-The-Sky (Developments)	--	57,000
Carlsbad Caverns NP, New Mexico		
Park Headquarters (Developments)	154,000	--
Chiricahua NM, Arizona		
Headquarters (Developments)	43,000	--
Fort Union NM, New Mexico		
Park General (Developments)	--	8,000
Gila Cliff Dwellings NM, New Mexico		
Park General (Project Planning)	20,000	--
Grand Canyon NP, Arizona		
Indian Gardens (Developments)	246,000	--
North Rim (Developments)	493,000	--
Phantom Ranch (Project Planning)	60,000	--
South Rim (Project Planning)	122,000	--

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1972 POLLUTION ABATEMENT PROGRAM

REGION AND AREA	WATER	AIR
SOUTHWEST REGION (Continued)		
Hubbell Trading Post NHS, Arizona		
Headquarters (Developments)	$ 44,000	$ --
Natural Bridges NM, Utah		
Headquarters (Developments)	--	40,000
Petrified Forest NP, Arizona		
Painted Desert and Rainbow Forest (Developments)	--	131,000
Sanford NRA, Texas		
Bates Canyon (Developments)	24,000	--
Blue West (Developments)	24,000	--
Sanford-Yake (Developments)	66,000	--
Zion NP, Utah		
Zion Canyon (Developments)	244,000	--
Totals, Southwest Region	$2,544,000	$ 283,000

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1972 POLLUTION ABATEMENT PROGRAM

REGION AND AREA	WATER	AIR
WESTERN REGION		
Death Valley NM, California		
Cow Creek (Developments)	$ 41,000	$ --
Lake Mead NRA, Arizona-Nevada		
Cottonwood Cove (Developments)	289,000	--
Echo Bay (Developments)	161,000	--
Eldorado Canyon (Developments)	130,000	--
Las Vegas Wash (Developments)	127,000	--
Willow Beach (Developments)	137,000	--
Lassen Volcanic NP, California		
Manzanita Lake (Developments)	203,000	--
Muir Woods NM, California		
Park General (Project Planning)	23,000	--
Redwood NP, California		
Requa (Developments)	45,000	--
Sequoia and Kings Canyon NPs, California		
Park General (Project Planning)	--	26,000
Ash Mountain (Developments)	30,000	--
Cedar Grove (Developments)	28,000	--
Dorst Creek (Developments)	14,000	--
Grant Grove (Project Planning)	32,000	--
Lodge Pole (Developments)	762,000	--
Mount Whitney (Developments)	30,000	--
Potwisha (Developments)	14,000	--
Yosemite NP, California		
Arch Rock (Project Planning)	13,000	--
Back Country Campground (Project Planning)	30,000	--
Badger Pass (Developments)	143,000	--
El Portal (Project Planning)	--	33,000
Hodgdon Meadows (Developments)	304,000	--
Tenaya Lake (Developments)	24,000	--
Tuolumne (Developments)	32,000	--

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1972 POLLUTION ABATEMENT PROGRAM

REGION AND AREA	WATER	AIR
WESTERN REGION (Continued)		
Yosemite NP, California (Continued)		
Valley (Project Planning)	$ 205,000	$ --
Valley (Developments)	112,000	--
Wawona (Project Planning)	24,000	--
White Wolf (Developments)	61,000	--
Totals, Western Region	$3,014,000	$ 59,000

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REGION AND AREA	WATER	AIR
PACIFIC NORTHWEST REGION		
Coulee Dam NRA, Washington		
Fort Spokane (Developments)	$ 30,000	$ --
Keller Ferry (Developments)	30,000	--
Kettle Falls (Developments)	30,000	--
Spring Canyon (Developments)	30,000	--
Crater Lake NP, Oregon		
Sleepy Hollow (Developments)	36,000	--
Glacier Bay NM, Alaska		
Bartlett Cove (Project Planning)	15,000	--
Katmai NM, Alaska		
Brooks River (Developments)	400,000	11,000
Mount McKinley NM, Alaska		
Eielson Visitor Center (Developments)	22,000	--
Hotel Riley Creek (Developments)	247,000	--
Mount Rainier NP, Washington		
Ohanapecosh (Project Planning)	5,000	--
Sunrise (Project Planning)	19,000	--
North Cascades NP, Washington		
Stehekin Valley (Project Planning)	5,000	13,000
Olympic NP, Washington		
Lake Crescent (Project Planning)	9,000	--
La Push (Developments)	27,000	--
Oregon Caves NM, Oregon		
Headquarters (Project Planning)	10,000	--
Totals, Pacific Northwest Region	$ 915,000	$ 24,000

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1972 POLLUTION ABATEMENT PROGRAM

REGION AND AREA	WATER	AIR
MIDWEST REGION		
Black Canyon of the Gunnison NM, Colorado		
Headquarters (Project Planning)	$ 65,000	$ --
Colorado NM, Colorado		
Headquarters Area (Developments)	25,000	--
Glacier NP, Montana		
Apgar (Project Planning)	31,000	--
Granite Park, Sperry Chalet, Waterton (Project Planning)	5,000	--
Headquarters (Project Planning)	--	23,000
Headquarters-Apgar (Project Planning)	97,000	--
Headquarters and St.Mary (Developments)	--	66,000
Lake McDonald (Project Planning)	54,000	--
Logan Pass and Lake McDonald (Project Planning)	15,000	--
Many Glacier (Project Planning)	30,000	--
Rising Sun (Project Planning)	22,000	--
St. Mary (Project Planning)	90,000	30,000
Sperry Chalet (Project Planning)	6,000	--
Various Areas-Midwest Region: also see Yellowstone, Rocky Mountain and Grand Teton	25,000	--
Grand Teton NP, Wyoming		
Jackson Lake Lodge (Project Planning)	60,000	--
Moose (Developments)	101,000	276,000
Various Areas-Midwest Region: also see Yellowstone, Glacier and Rocky Mountain	25,000	--
Mount Rushmore NM, South Dakota		
Park General (Developments)	200,000	--

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1972 POLLUTION ABATEMENT PROGRAM

REGION AND AREA	WATER	AIR
MIDWEST REGION (Continued)		
Ozark NSR, Missouri		
Alley Spring (Developments)	$ 143,000	$ --
Big Spring (Developments)	247,000	--
Owls Bend (Project Planning)	10,000	--
Pipestone NM, Minnesota		
Park General (Developments)	81,000	--
Rocky Mountain NP, Colorado		
Glacier Basin Campground (Developments)	93,000	--
Headquarters Area (Developments)	188,000	--
Hidden Valley (Project Planning)	17,000	--
Various Areas-Midwest Region: also see Yellowstone, Glacier and Grand Teton	25,000	--
Shadow Mountain NRA, Colorado		
Shadow Mountain Campground (Project Planning)	7,000	--
Stillwater Campground (Developments)	80,000	--
Theodore Roosevelt NMemP, North Dakota		
Headquarters (Developments)	30,000	--
Yellowstone NP, Wyoming-Montana-Idaho		
Apollinaris Springs (Developments)	21,000	--
Beartooth (Developments)	29,000	--
Bridge Bay (Developments)	98,000	--
Canyon (Developments)	400,000	--
East Entrance (Developments)	83,000	--
Grant Village (Project Planning)	--	16,000
Grant Village (Developments)	33,000	--
Grant Village-West Thumb (Developments)	522,000	--
Lake, Fishing Bridge, Bridge Bay(Developments)	580,000	241,000
Lamar (Developments)	88,000	--
Madison Junction (Developments)	94,000	--
Mammoth (Project Planning)	48,000	--
Mammoth (Developments)	--	357,000
Norris Junction (Developments)	63,000	--
North Entrance (Project Planning)	5,000	--
Northeast Entrance (Developments)	50,000	--

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1972 POLLUTION ABATEMENT PROGRAM

REGION AND AREA	WATER	AIR
MIDWEST REGION (Continued)		
Yellowstone NP, Wyoming-Montana-Idaho (cont.)		
Old Faithful (Project Planning)	$ 78,000	$ --
South Entrance (Developments)	113,000	--
Stevphens (Developments)	25,000	--
Tower Falls (Developments)	701,000	--
West District (Project Planning)	--	37,000
West Entrance (Developments)	93,000	--
Various Areas-Midwest Region: also see Glacier, Rocky Mountain and Grand Teton	25,000	--
Totals, Midwest Region	$4,921,000	$1,046,000

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1972 POLLUTION ABATEMENT PROGRAM

REGION AND AREA	WATER	AIR
NATIONAL CAPITAL PARKS		
George Washington Memorial Parkway, District of Columbia, Maryland and Virginia		
District of Columbia		
Columbia Island Marina (Developments)	$ 364,000	$ --
Virginia		
Belle Haven Marina (Developments)	104,000	--
Daingerfield Marina (Developments)	121,000	--
National Capital Parks-Central, D.C.		
Buzzard Point Marina (Developments)	80,000	--
National Capital Parks-East, D.C.		
Anacostia Park, District Yacht Club (Developments)	60,000	--
Anacostia Park, Eastern Power Boat Club (Developments)	60,000	--
Anacostia Park Marina (Developments)	65,000	--
Anacostia Park Seafarers Marina (Developments)	52,000	--
Anacostia Park, Washington Yacht Club (Developments)	60,000	--
Prince William Forest Park, Virginia		
Cabin Camp 3 (Developments)	110,000	--
Cabin Camp 5 (Developments)	10,000	--
Oak Ridge Campground (Developments)	14,000	--
Pine Grove Picnic Area (Developments)	28,000	--
Totals, National Capital Parks	$1,128,000	$ --

1973 POLLUTION ABATEMENT PROGRAM

The 1973 Fiscal Year Pollution Program will propose construction of those facilities for which project planning is provided in the 1972 Fiscal Year Program listed above. Actual cost estimates have not yet been completed.

AMERICAN REVOLUTION BICENTENNIAL

Mrs. HANSEN. $7,361,000 is requested in connection with the American Revolution Bicentennial. Please discuss what this program involves, and what kind of facilities you will be constructing.

Mr. HARTZOG. Yes, ma'am. There are 20 areas in the national park system that are directly involved in the commemoration of the American Revolution, and the project listing of these sites are in the Northeast Region—you can follow along as I read it—complete the restoration at Castle Clinton for $900,000. The $362,000 at Federal Hall is for interpretive exhibits and audiovisual facilities. That is about 60-percent completed. Independence National Historical Park, $5,259,000 for restoration and reconstruction projects involving the Franklin House and 5 Market Street, which is the project planning money. You will remember the 4-step process in this. This would be the money to develop the working drawings and specifications, and we would be back next year hopefully for the construction money for that.

Mrs. HANSEN. Is the Betsy Ross House owned by the Park Service?

Mr. SCHMIDT. No, Madam Chairman; it is owned by the city of Philadelphia.

Mr. HARTZOG. Also Franklin Court, Old City Hall, Second Bank of the United States. This says developments, Frank. What is that, the continued restoration?

Mr. SCHMIDT. Yes.

Mr. HARTZOG. City Tavern is also a continued restoration, isn't it?

Mr. SCHMIDT. Reconstruction.

Mr. HARTZOG. There is also included in this program, the construction of a visitor center at Independence National Historical Park.

Mrs. HANSEN. Where is the visitor center going to be located?

Mr. HARTZOG. This map shows the layout of the park. You can see it marked there a little to the north of the center line.

Mrs. HANSEN. I would love to visit this facility to see what the progress has been.

Mr. HARTZOG. Nothing would give us more pleasure, because there has been considerable progress there.

(Discussion off the record.)

Mrs. HANSEN. I see your 1972 request for the American Revolution Bicentennial includes improvement of Statue of Liberty.

Mr. HARTZOG. Yes, ma'am; the symbolism of liberty, and the American Museum of Immigration are fundamental to the story of the Revolution. By the way, Madam Chairman, I think one of the things that the record ought to show is that the thrust of the Commission's celebration is not simply a little spectrum of history that involves that 7 or 8 years, but rather a commemoration of 200 years of history. Importantly affecting that 200 years of history are the developing years during the colonial period.

Mrs. HANSEN. I understand. But I also thought you were emphasizing those particular places that were identified with the time of the American Revolution.

Mr. HARTZOG. Hank, do you have any better answer on that?

Mr. SCHMIDT. Madam Chairman, this was identified as a site to be identified in the bicentennial. There have been a series of four contracts to date to develop the American Museum of Immigration. This

is related to the bicentennial, the continued progress of the many people who come to this country, not just through the eastern seaboard but through the entire country. We are in the next to the last stage of the completion of the Museum of Immigration. The Statue of Liberty story completes a part of the story of the overall immigration to this country. This is what we would like to do.

Mr. HARTZOG. I think this is the only one, however, that we have in the 20 parks that did not involve some actual event associated with the Revolution.

Mrs. HANSEN. That is the reason I asked the question.

Mr. HARTZOG. Isn't that right, Hank?

Mr. SCHMIDT. Yes.

Mr. HARTZOG. Continuing at Minute Man, $135,000 for the visitor center project planning and the wayside rehabilitation project planning at Morristown, $11,000 for a protective alarm system and interpretive films project planning, Statue of Liberty, $277,000 to dredge a turning basin, Colonial National Historical Park, $5,000 to rehabilitate the carriage house, George Washington Birthplace, $6,000 for a protective alarm system.

Mrs. HANSEN. Where is the carriage house located?

Mr. HARTZOG. The carriage house is shown here on the map. In the National Capital Parks, the Thomas Jefferson Memorial flood lighting, $400,000; the Washington Monument Grounds, lighting and parking project planning, $6,000.

DELAY IN REPAIRING PARK BENCHES AT THE WASHINGTON MONUMENT

Mrs. HANSEN. Why don't you wait until the demonstrations are completed to repair the park benches that were destroyed.

Mr. HARTZOG. I am, Madam Chairman, but there will be more.

(Discussion off the record.)

Mr. WYATT. I have had a number of Members of Congress, knowing that I serve under Mrs. Hansen on this committee, who have expressed themselves very strongly on the fact, and they volunteered this to me without my bringing the subject up, that those park benches should stay as they are for a while, so that people are really going to understand, No. 1, what has happened, and No. 2, so they won't be destroyed again as things get more violent here in the next couple of weeks.

Mrs. HANSEN. In last night's paper there was an article about the new set of demonstrator's looking for other park benches to destroy. If you think this committee intends to appropriate funds to repair the park benches once a week, you are mistaken.

Mr. DICKENSON. The climax of the demonstrations is May 3d and it will end about May 8.

Mr. HARTZOG. We couldn't possibly replace them before then. They won't be replaced for the event that is coming up.

Mrs. HANSEN. I don't think the park benches should be repaired once a week.

Mr. HARTZOG. We have no plans to put the slats back?

Mr. DICKENSON. We have considered a temporary expedient, but not the final project.

Mr. HARTZOG. I think in light of the sense of the committee, we just should not do anything.

Mr. DICKENSON. I will be pleased to respond.

Mr. WYATT. I think you are in for a lot of trouble as far as Members of Congress are concerned, and probably the general public too, if you go to any expense that is going to be flushed down the toilet, so to speak, during the next couple of weeks.

(Discussion off the record.)

CONTINUATION OF AMERICAN REVOLUTION BICENTENNIAL PROJECTS

Mr. HARTZOG. I am down to the northeast region. Independence National Historical Park, Independence Hall site improvements, project planning, $5,000.

Minute Man visitor center project planning, $47,000 and Battle Road reconstruction, $130,000.

Morristown is visitor parking, walks and trails, $88,000.

Colonial is to relocate Yorktown Battlefield Tour Road, $34,000 and Virginia Route 238, away from the center of the Battlefield, $59,000. These are the road and trail planning projects associated with the utility items we gave you. You can have this list for the record.

(The information follows:)

AMERICAN REVOLUTION
BICENTENNIAL CONSTRUCTION PROJECTS

Area and Facility	Amount Requested
NORTHEAST REGION	
Castle Clinton NM, New York	
Completion of Restoration (Developments)	$ 900,000
Federal Hall NMem, New York	
Interpretive Exhibits and Audiovisual Facilities (Dev)	362,000
Independence NHP, Pennsylvania	
Restoration and Reconstruction Projects:	
Franklin House and 5 Market St. (Project Planning)	213,000
Franklin Court (Project Planning)	22,000
Old City Hall (Project Planning)	26,000
Second Bank of U.S. (Restoration)	440,000
City Tavern (Reconstruction)	658,000
Visitor Center (Developments)	3,900,000
	5,259,000
Minute Man NHP, Massachusetts	
Visitor Center Area (Project Planning)	114,000
Wayside Rehabilitation (Project Planning)	21,000
	135,000
Morristown NHP, New Jersey	
Protective Alarm System and Interpretive Films (Project Planning)	11,000
Statue of Liberty NM, New York	
Dredge Turning Basin (Developments)	277,000
SOUTHEAST REGION	
Colonial NHP, Virginia	
Rehabilitate Carriage House (Project Planning)	5,000
George Washington Birthplace NM, Virginia	
Protective Alarm System (Project Planning)	6,000
NATIONAL CAPITAL PARKS	
Thomas Jefferson Memorial	
Flood Lighting System (Developments)	400,000
Washington Monument Grounds	
Lighting and Parking (Project Planning)	6,000
Total of above projects	7,361,000

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AMERICAN REVOLUTION
BICENTENNIAL ROADS AND TRAILS

Area and Facility	Amount Requested
NORTHEAST REGION	
Independence NHP, Pennsylvania	
Independence Hall Site Improvements (Project Planning)	$ 5,000
Minute Man NHP, Massachusetts	
Visitor Center Area (Project Planning) and Battle Road Reconstruction (Developments)	177,000
Morristown NHP, New Jersey	
Visitor Parking, Walks and Trails (Project Planning and Development)	88,000
SOUTHEAST REGION	
Colonial NHP, Virginia	
Relocate Yorktown Battlefield Tour Road and Virginia Route 238 (Project Planning)	93,000
Total	363,000

EXHIBITS AND OTHER INTERPRETIVE FACILITIES

Mrs. HANSEN. Justify your requested increase of $300,000 for exhibits and other interpretive facilities.

Mr. HARTZOG. Madam Chairman, this program has gone along at a set pace for a number of years, and it is just simply not meeting our need for getting the exhibits refurbished that are necessary in our public use facilities. This is in the same category as was our advance planning 2 or 3 years ago. These are stable programs which go on at a fixed rate over a long period of time, and inflation and everything else has caught up with us.

Mrs. HANSEN. In how many facilities will you perform this work?

Mr. HARTZOG. It is quite a long list and I will be glad to provide that program. This is the lump-sum exhibit program for 1972.

Mrs. HANSEN. Is it nationwide?

Mr. HARTZOG. Yes, ma'am; nationwide.

VISITATION AT FORT WASHINGTON

Mrs. HANSEN. How many visitors do you have per year at Fort Washington?

Mr. DICKENSON. It is running at 800,000 a year.

Mr. HARTZOG. This is a very, very popular place for State societies, picnics, dinner parties, and these kinds of things.

Mrs. HANSEN. What is involved in your traveling exhibits program?

Mr. HARTZOG. This, Madam Chairman, is an effort to communicate the values of parks to people outside of parks. For example, you know we started this artists-in-the-parks program about 4 or 5 years ago. One of the traveling exhibits that we now have is to put together the best of these art works of the Nation's parks and circulate them around the country. We have been working with the U.S. Travel Service to develop some exhibits for them that they can use as a part of their travel promotion efforts.

ADVANCE PLANNING

Mrs. HANSEN. $1.6 million is requested for advance planning. This is an increase of $500,000. Please justify this request.

Mr. HARTZOG. This again, Madam Chairman, is the second step in our planning process. Our construction requirements in the national park system at the moment are $1.8 billion. In order to get on top of the advance planning, and to keep the construction program moving, even at its current level, we have to increase the amount of money available for advance planning.

Mrs. HANSEN. Does this include planning of roads?

Mr. HARTZOG. This includes advance planning for roads. Oh, I am sorry. You have advance planning for roads in here. How much is this?

Mr. GOWANS. $600,000 for parkways and $1,400,000 for roads and trails.

Mr. HARTZOG. They are approximately the same for buildings and utilities, and roads and trails.

Mrs. HANSEN. What various buildings and utilities nationwide are involved in your advance planning program?

Mr. HARTZOG. This is the 1972 advance planning program. These are pro forma programs which show what we would like to do with the money that is in this budget, if you give it to us. If you change it, then we have got to change that.

Mrs. HANSEN. The committee may wish to amend the budget.

Mr. HARTZOG. And improve.

Mr. HANSEN. Are you also doing advance planning for sewage treatment plants?

Mr. HARTZOG. That is right. This as you see is the second step. In other words, the first step is the master planning process. The second step is the advance planning, the site planning and the interpretive prospectuses related to the construction project. The third step is project planning with which you plan your construction, working drawings, specifications, getting the contract ready to go to bid. The fourth step is the actual construction money to build the facility.

(Discussion off the record.)

GREAT SMOKY MOUNTAINS ROAD CONSTRUCTION PROGRAM

Mrs. HANSEN. As you are well aware, for several years there has been intense discussion on the roadway program in the Great Smoky Mountains National Park. We have discussed this at great length in the hearings a few years ago. Would you please give the committee a detailed summary of the current situation in this connection?

Mr. HARTZOG. Madam Chairman, under the direction of the former Secretary, which was confirmed by our present Secretary, I was directed to analyze the alternative for trying to settle our contract relationship with North Carolina and Swain County with respect to the obligation of the United States to build a road on the north side of Lake Fontana. I completed that report sometime in late February and released it for public comment. The public comments are now being received until May 1, after which I am to make a final recommendation to the Secretary, and hopefully we will be able to find a solution to this problem. In the meantime we are continuing to construct that part of the road which goes to Monteith Branch, because this is necessary in order to make anything useful out of what has already been done.

You see on this map, the State out of Bryson City has built this road up to the park boundary. We have already constructed this portion of the road which you see in black on the map. We must get this road over to some place where we can develop recreation facilities at the end of it. Otherwise it will be a stub road going no place.

Mrs. HANSEN. I have received a letter from the Wilderness Society. The letter says—

> Under the Department of Interior, National Park Service roads and trails is an item titled "Bryson City to Monteith Road". Seventy one thousand dollars is proposed for planning and $644,000 for construction, for a total amount of $715,000.

The letter goes on to discuss this project at some length, stating it has been a matter of public controversy. The last paragraph of the letter reads:

> We respectfully and strongly suggest . . . that this is no time to be appropriating money for any new road construction in the Great Smoky Mountains National Park. We urge you to examine closely the proposed expenditure of $715,000 to extend the Bryson City to Monteith Road at this time in light of the opposition and the uncertainties indicated above. In our opinion the entire item should be dropped from the budget pending the comprehensive road system study now recommended by the Director of the National Park Service.

They urge that the committee save $715,000 by deleting this project.

Mr. HARTZOG. If you were saving it I would be in agreement, but you are not saving it at all. Every proposal, including the concept which I have recommended, contemplates taking this road to Monteith Branch, at which point, if they adopt the concept which I have recommended, it would cross Fontana Lake by bridge and go to the south side of Fontana Lake. In any event, we would need this section of road. I am not advocating that we abandon this at all. I think we need to construct it in order to have a viable system. Even under this concept which I had recommended, It has been my understanding the Wilderness Society was in accord with it. I don't doubt your reading of the letter. I am just saying I will be happy to put the letter they wrote me in the file. We will be happy to get the whole record in.

Mrs. HANSEN. I think the wilderness society agrees with your overall view.

Mr. HARTZOG. If they do it involves building this road to Monteith Branch. Here is a copy of the concept.

Mrs. HANSEN. The letter also states—

> In addition to those who oppose any construction of the road whatsoever, the fact is that nobody—including the National Park Service—knows where it is going, if at all. Is it going northward across the Great Smoky Mountains National Park, to become one more—the fifth—transmountain road across the Great Smokies range? Is it going westward all the way to Fontana Dam, in satisfaction of the vexatious 1943 agreement? Is it going westward only to Monteith Point, there to terminate at a marina to be built at public expense on the edge of the Fontana Reservoir—which is drawn down annually 150 vertical feet or more? Is it to be turned sharply south, brought out of the park by bridging Fontana Reservoir at a narrow place, and connected to existing U.S. 19 or N.C. 28?

Mr. HARTZOG. What I have proposed is that from Monteith Branch it go south across the reservoir to the south side, at which point it would join up with an extension of the Foothills Parkway from Chilhowee. This is a map. It is not too clear because we are out of copies. Roughly this is what would be developed. This is the road that we are talking about from Bryson City. We would take it here and then extend it to the Foothills which now ends at Chilhowee. We would bring the Foothills around to hook up with a bridge across here to make this usable, and bring the Blue Ridge Parkway into Bryson City, and bring an extension off of the Cumberland Parkway down to the Blue Ridge Parkway, so that we would have a belt parkway routing around the park. The other part of my proposal is to close U.S. 441, and the Clingmans Dome Road, which is the only road in the Smokies that

really violates the virgin area of the park. I am at a loss to understand why they should oppose this item.

Mrs. HANSEN. How many miles of road work would this $715,000 construct?

Mr. HARTZOG. This will construct approximately eight-tenths of a mile of the 2-mile section remaining to be built.

Mrs. HANSEN. You are requesting $900,000 for Castle Clinton National Monument. Does this complete the construction of this project?

Mr. HARTZOG. This does complete it, Madam Chairman.

Mrs. HANSEN. You are requesting $867,000 for the Delaware Water Gap NRA. This item has an asterisk by it, what does that indicate?

Mr. HARTZOG. That indicates Bureau of Public Roads construction project.

Mrs. HANSEN. The funds you requested for this area are to construct an entrance road and parking facilities. What is the size of the parking area?

Mr. HARTZOG. This is the proposed construction in red on the map.

Mr. Schmidt, what is the size of that parking area? I don't have that information, Madam Chairman. I will supply it.

(The information follows:)

Delaware Water Gap, NRA, Slateford Creek, $867,000.

The funds for the 1972 fiscal year will add an additional 2 miles to the entrance road and provide two parking areas. One will provide for 75 automobile spaces and five bus spaces and the other will provide for 150 automobile spaces.

FIRE ISLAND NATIONAL SEASHORE

Mrs. HANSEN. You are requesting $582,000 for development of dune and dock facilities at Watch Hill, Fire Island National Seashore. May we have your comment in this connection.

Mr. HARTZOG. That is to construct boat-docking facilities in the Watch Hill area. This would be a dock site facility including a comfort center, visitor center with a lobby for 50 people, concession unit for grocery and marine supplies, marine repairs and ferry operations. The dune facility would include bathhouses for men and women, first aid station, information office and interpretive overlook.

Mrs. HANSEN. What is your visitation per year at Fire Island National Seashore?

Mr. HARTZOG. 460,000 approximately.

FORT STANWIX NATIONAL MONUMENT

Mrs. HANSEN. Justify your request of $100,000 for Fort Stanwix National Monument.

Mr. HARTZOG. This is for advance planning, and archeological investigations, Madam Chairman, in connection with the restoration and interpretation of that fort. It is necessary to get the archeology done before we proceed with the reconstruction.

AMERICAN REVOLUTION BICENTENNIAL CELEBRATION

Mrs. HANSEN. You have an item of $5,264,000 for Independence Hall Historical Park listed under your construction program. Is this item

also included in your American Revolution Bicentennial program we discussed earlier?

Mr. HARTZOG. Yes, ma'am.

Mrs. HANSEN. I don't want to find you requesting the same funds two or three times.

Mr. HARTZOG. No, ma'am; I would never do that.

Mrs. HANSEN. I think Mr. McDade would be interested in a discussion of the American Revolution Bicentennial program.

Mr. MCDADE. Very much. Do you want to elaborate on them a little bit for me.

Mr. HARTZOG. Yes, sir. We have 20 areas in the system that are directly related to the bicentennial, and we have something in excess of $7 million in this budget to begin to get these areas ready for the visitor influx that we expect in the bicentennial celebration. The areas that we are proposing to work on this year would be Castle Clinton, Federal Hall, Independence, Minute Man, Morristown, Statute of Liberty, Colonial, George Washington Birthplace, Thomas Jefferson Memorial, and the Washington Monument Grounds.

Mr. CLAWSON. And the total of that is what?

Mr. HARTZOG. $7,361,000 for buildings and utilities and $363,000 for roads and trails.

Mr. MCDADE. Do you have any estimates at all yet as to how many visitors you might get during the bicentennial year in these areas, any idea at all?

Mr. HARTZOG. We have got a 5-year projection on our visitation. I don't know whether I have it with me this morning or not.

Mr. MCDADE. Perhaps you can put it in the record for me. Thank you, Madam Chairman.

(The information follows:)

FORECAST OF VISITS TO AREAS OF THE NATIONAL PARK SYSTEM ASSOCIATED WITH THE AMERICAN REVOLUTION BICENTENNIAL CELEBRATION

[In thousands]

Area	Fiscal years				
	1972	1973	1974	1975	1976
Adams NHS, Mass	11.9	11.9	11.9	11.9	12.8
Colonial NHP, Va	9,356.4	9,732.2	10,108.0	10,483.8	11,541.3
Cowpens NBS, S.C	42.8	45.8	48.8	51.8	57.7
Federal Hall National Memorial, N.Y	62.1	65.0	67.9	70.8	78.1
Fort Stanwix NM, N.Y. [1]	.....	.....	.....	.....	.....
George Rogers Clark NHP, Ind	73.2	78.0	82.8	87.6	97.5
George Washington Birthplace NM, Va	102.7	102.7	102.7	102.7	110.8
Guilford Courthouse NMP, N.C	854.2	861.4	868.6	875.8	949.5
Hamilton Grange National Memorial, N.Y	5.1	5.1	5.1	5.1	5.5
Hopewell Village NHS, Pa	207.2	221.7	236.2	250.7	279.3
Independence NHP, Pa	2,506.1	2,572.6	2,639.1	2,705.6	[2] 14,000.0
Kings Mountain NMP, Ga	455.6	473.7	491.8	509.9	561.2
Minute Man NHP, Mass	579.3	607.7	636.1	664.5	734.3
Moores Creek NMP, N.C	45.9	47.9	49.9	51.9	57.2
Morristown NHP, N.J	476.7	476.7	476.7	476.7	514.5
Salem Maritime NHS, Mass	309.5	329.7	349.9	370.1	411.6
Saratoga NHP, N.Y	319.1	344.7	370.3	395.9	442.7
Statue of Liberty NM, N.Y.-N.J	1,150.8	1,167.1	1,183.4	1,199.7	1,304.5
Thomas Jefferson Memorial, D.C	1,379.9	1,379.9	1,379.9	1,379.9	1,489.1
Washington Monument, D.C	1,775.3	1,775.3	1,775.3	1,775.3	1,915.9

[1] Fort Stanwix is presently closed to the public and the land is not federally owned. If the necessary land acquisition and developments are completed in time for the bicentennial we can expect visitation to be in excess of 100,000 visits.

[2] Independence NHP visitation will be heavily influenced by the bicentennial exposition planned for the Philadelphia area. This forecast is subject to revision depending on the proposed plans for the exposition and for the developments at Independence itself.

CHICKAMAUGA AND CHATTANOOGA NATIONAL MILITARY PARK

Mrs. HANSEN. You are requesting $832,000 for the Chickamauga and Chattanooga National Military Park. This is for relocation of a highway.

Mr. HARTZOG. Yes, ma'am. By agreement between us and the State of Georgia, we are relocating State Highway 37 outside of the park.

Mrs. HANSEN. Is this a high priority item?

Mr. HARTZOG. Yes, ma'am.

Mrs. HANSEN. Why?

Mr. HARTZOG. Because we need to get that State traffic out of the park in order to make it a visitor experience instead of just a commercial traffic thoroughfare through this park.

FOOTHILLS PARKWAY

Mrs. HANSEN. Justify your request of $422,000 for the Foothills Parkway, Tenn.

Mr. HARTZOG. That is for resurfacing of the Gatlinburg spur.

Mrs. HANSEN. How many miles of road will this resurface?

Mr. HARTZOG. Madam Chairman, the information is not on this sheet, but I believe it is 5½ miles.

GREAT SMOKY MOUNTAINS NATIONAL PARK

Mrs. HANSEN. You are requesting $5,018,000 for the Great Smokies National Park for road construction. What is involved in this request?

Mr. HARTZOG. Yes, ma'am. This is the Bryson City-Fontana road, and also the towns in there.

Mrs. HANSEN. Is it the Wilderness Society's contention that there should be no roads through the Great Smoky Mountains?

Mr. HARTZOG. I think it is really their contention there shouldn't be any roads, period. This is the way I read their messages. This is the Cataloochee connection in red.

NATCHEZ TRACE PARKWAY

Mrs. HANSEN. You are requesting $1,170,000 for the Natchez Trace Parkway. Is this proposed construction a result of the planning funds this committee appropriated last year?

Mr. HARTZOG. That is the part you gave us the planning money for.

Mrs. HANSEN. Are you requesting planning funds this year for further road construction?

Mr. HARTZOG. We have got a portion of the project planning money in here for the Ridgeland subdistrict and Port Gibson subdistrict, and that is all.

Mrs. HANSEN. Please insert in the record the funds that are needed to plan all the sections of the Natchez Trace Parkway.

Mr. HARTZOG. I will be pleased to do that.

(The information follows:)

NATCHEZ TRACE PARKWAY PLANNING REQUIREMENTS FOR COMPLETION OF MAINLINE PARKWAY

Section:	Project and location	Project planning requirements
	TENNESSEE	
1A	Construction: Tennessee Route 100 to Tennessee Route 96, 12.5 miles	$560,000
1B	Construction: Tennessee Route 96 to Williamson-Maury County Line, 10.7 miles	490,000
1C	Construction: Williamson-Maury County Line to Duck River, 12.5 miles	610,000
1D	Construction: Duck River to County Road at Weatherly Fire Tower, 7.6 miles	460,000
1E	Paving: County Road at Weatherly Fire Tower to Tennessee Route 48, 8.6 miles	30,000
	Subtotal, Tennessee	2,150,000
	ALABAMA	
2A	Construction: Alabama-Tennessee State Line, Tennessee River, 13.3 miles	50,000
2C	Paving: Tennessee River to Highway U.S. 72, 6.2 miles	30,000
2D	Construction: Highway U.S. 72 to Alabama-Mississippi State Line, 11.5 miles	570,000
	Subtotal, Alabama	650,000
	MISSISSIPPI	
3A	Construction: Mississippi Route 30 to Mackey's Creek, 10.5 miles	570,000
3B	Construction: Mackey's Creek to Mississippi Route 363, 10.7 miles	550,000
3C	Construction: Mississippi Route 363 to Highway U.S. 45, 15.8 miles	420,000
3P	Construction: Highway U.S. 51 to Highway U.S. 80, 14.0 miles	670,000
3U	Construction: Mississippi Route 552 to Jefferson-Claiborne County Line, 1.8 miles	50,000
3V	Construction: Mississippi Route 552 to Mississippi Route 553, 11.0 miles	460,000
3X	Construction: Highway U.S. 61 to Natchez, 8.9 miles	380,000
	Subtotal, Mississippi	3,100,000
	Grand total, Natchez Trace Parkway planning requirements	5,900,000

The Federal Highway Administration could effectively use approximately $1 million per year to accelerate this planning and permit construction to proceed.

VICKSBURG NATIONAL MILITARY PARK

Mrs. HANSEN. You are requesting $87,000 for Vicksburg NMP to obliterate the Graveyard Road and sections of Jackson Road. What is involved in this request?

Mr. HARTZOG. This is a part of the road relocation project to get it out of the Vicksburg Battlefield.

Mrs. HANSEN. I thought that was completed?

Mr. HARTZOG. It is, and this is the cleanup of it, and the obliteration of the old sections that were in the park, $87,000.

VIRGIN ISLANDS NATIONAL PARK

Mrs. HANSEN. Justify your request of $84,000 for reconstruction and paving of roads at Virgin Islands National Park.

Mr. HARTZOG. This is to reconstruct and pave the north shore road from Cinnamon Bay to Maho Bay, a distance of 1.5 miles, and the King Hill Road from Maho Bay to Center Line Road 1.3 miles, and the Annaberg and Mary Point spur road to King Hill Road, 1.3 miles.

CANYONLANDS NATIONAL PARK

Mrs. HANSEN. Justify your request of $171,000 for the Big Spring Canyon bridge, Canyonlands National Park.

Mr. KOWSKI. That is a planning portion for the bridge that is to continue the Squaw Flat Road over into the Needles Section of Chesler Park. It will be a BPR project.

LYNDON B. JOHNSON NATIONAL HISTORIC SITE

Mrs. HANSEN. What is involved in your request of $2,000 for Lyndon Johnson Historic Site?

Mr. KOWSKI. That is a maintenance building that is required at the birthplace. There are no facilities there for housing or anything else. The planning will be done for a utility building and also for public restrooms. There are no public restroom facilities there.

DEATH VALLEY NATIONAL MONUMENT

Mrs. HANSEN. You are requesting $397,000 to reconstruct and resurface 10 miles of roads at Death Valley National Monument. Is that correct?

Mr. HARTZOG. That is correct. That is to reconstruct the road, a portion of it, and 4 miles of that road was obliterated in the flood of 1968.

We had to provide a temporary bypass. The additional 6 miles was partially flood damaged, requiring resurfacing.

LAKE MEAD NATIONAL RECREATION AREA

Mrs. HANSEN. You are requesting $288,000 to extend boat-launching ramps at seven developed areas and $472,000 to reconstruct and improve the north shore road at Lake Mead NRA. How many miles of road will this provide reconstruction for and what is involved in your request to extend boat-launching ramps?

Mr. HARTZOG. What we are doing, Madam Chairman, is extending the launching ramp from elevation 1,220 feet down to 1,160 feet, so that as the water goes down, people can launch their boats. When that lake was formed, this work was not done. That was back in the thirties when we weren't planning this kind of recreational use. As you recall, this has been an item which has been in the budget for several years.

When we learned that there is to be a drawdown in the water level, then we try to get in there and extend those ramps down so that you don't have such a wide area between the ramp and the lake level. The north shore road is about a 9.3-mile portion, indicated in red on this map and the ramps that we would extend are those red dots on the map.

LASSEN VOLCANIC NATIONAL PARK

Mrs. HANSEN. You are requesting $740,000 to realine and reconstruct Route 1 at Lassen Volcanic National Park. How many miles of road will this provide reconstruction for?

Mr. HARTZOG. Slightly over 7.5 miles.

REDWOOD NATIONAL PARK

Mrs. HANSEN. Justify your request of $600,000 for administration building and parking at Redwood National Park.

Mr. HARTZOG. You added the planning money to the budget last year. This is simply to implement those plans. Even if we go ahead with what we are talking about, we would need this building.

Mrs. HANSEN. You are not always this fast in your construction program.

Mr. HARTZOG. No, ma'am, but once you give me a direction, I try to accelerate the movement. That is what you did last year.

YOSEMITE NATIONAL PARK

Mrs. HANSEN. You are requesting $1,052,000 to resurface Wawona road from the south entrance to the tunnel at Yosemite National Park. How many miles of road will this provide resurfacing for?

Mr. HARTZOG. 25.7 miles.

Mrs. HANSEN. What is your visitation per year at Yosemite National Park?

Mr. HADLEY. 2,458,000.

Mr. CLAWSON. In connection with the roadwork that is done, in what season is it performed? How much does it tie up the traffic and cause public dislocation and inconvenience?

Mr. HARTZOG. In these higher mountain parks such as Yellowstone where the visitation season and the work season are the same, it is quite troublesome, but otherwise we try to schedule the construction at the low ebb of the visitor season.

Mr. CLAWSON. To a degree that might be true with some in California.

Mr. HARTZOG. Yes, at Lassen that will be particularly true, because there the construction season and visitor season are about the same.

Mr. CLAWSON. They are identical and parallel?

Mr. HARTZOG. Yes.

Mrs. HANSEN. Will you have to delay your construction program at Yosemite National Park?

Mr. HARTZOG. I don't think so. There is a long enough construction season there.

TRAFFIC PROBLEM ON BLUE RIDGE PARKWAY

Mr. GALIFIANAKIS. You made a reference earlier to the traffic problem along the Blue Ridge Mountains. What do you propose to do? Do you have a research facility that deals with the problem of traffic in national parks, the national park system?

Mr. HARTZOG. Yes, sir; we have had that unit as a part of our planning and design process now for about 3 years.

Mr. GALIFIANAKIS. Is that your own or outside research?

Mr. HARTZOG. We use both. I have an in-house capability of one man, and then when we get involved in a study that requires more than that man's capability, we go out and contract for it.

Mr. GALIFIANAKIS. Do you know offhand what your prospects are for solving the problem along the Blue Ridge Parkway?

Mr. HARTZOG. The Blue Ridge that I was referring to is from the junction of the Blue Ridge Parkway over to Gatlinburg in the Great Smoky Mountains, just that section of it. There we would propose to start initially with the free bus service during the height of the visitation, say from 9:30 in the morning until 3:30 or 4 in the afternoon, and then let the private cars go over the remaining part of the day and at night, but we still haven't come on any definite time table for trying to implement that program yet.

Mr. GALIFIANAKIS. Do these considerations include monorail-type of transportation?

TRAMWAY PROPOSAL AT NORTH CASCADES NATIONAL PARK

Mr. HARTZOG. Yes, sir, they do; and also tramways. As a matter of fact we have in the North Cascades master plan, a proposal for a tramway that would take people up. We think this is one of the better ways of getting access into rugged country that roads shouldn't be built into.

Also where the country is fragile, as it is in the North Cascades, with a tram setup, we can control the amount of visitation that is put up on top to get into the back country. When you get enough, you just cut it off. We are exploring all of these.

Mrs. HANSEN. You have divided opinions on the tramway.

Mr. HARTZOG. Extremely so, but the Congress in its wisdom confirmed our judgment that it ought to be a tram, and that legislation approved the plan with the tram in it, and I am very hopeful that the distinguished chairman of this committee and the membership of this committee will support it with implementing the money.

(Discussion off the record.)

CRATER LAKE NATIONAL PARK

Mrs. HANSEN. You are requesting $1 milion for Crater Lake National Park. How many miles of roads will this provide reconstruction and surfacing for?

Mr. HARTZOG. Six and a quarter miles from the west boundary to Annie Spring. That is all within the Park.

Mrs. HANSEN. Why does it cost so much per mile?

Mr. RUTTER. Because it is in volcanic country, the base material is very expensive and hard to come by. There will have to be reconstruction because of the original construction.

Mr. HARTZOG. The committee can't hear you. Please speak a little louder.

Mr. RUTTER. The base material is very costly, pumice and sand. There has to be a lot of replacement and reconstruction.

Mrs. HANSEN. You have a short construction season?

Mr. RUTTER. A very short construction season and there will be a long haul for material.

Mrs. HANSEN. What is your annual visitor load?

Mr. RUTTER. About 555,000.

KATMAI NATIONAL MONUMENT

Mrs. HANSEN. You are requesting $209,000 for Katmai Monument. What is your annual visitation at this facility?

Mr. RUTTER. 9,100.

Mrs. HANSEN. Why aren't you proceeding more rapidly on the aircraft apron and the dock improvements?

Mr. RUTTER. The visitation is picking up. The only means of access now is by airplane. The plane is coming up on the beach, as you probably remember. What we want to do is put an apron in there so it doesn't tear up the beach. It is an amphibious plane, but it does come up on to the beach to unload. We want to stabilize the beach area, so that we don't tear it up.

Mrs. HANSEN. I hope you construct a better apron at this facility than the one that was constructed at Glacier Bay. That is the most slippery wharf I have ever seen in my life.

Mr. RUTTER. It has all been covered with asphalt paper that has been sanded.

Mrs. HANSEN. You did take my suggestion?

Mr. RUTTER. Yes, ma'am.

Mr. HARTZOG. We always do, Madam Chairman. There isn't any question about that.

Mrs. HANSEN. I couldn't see why, when every fish dock in the Columbia River was covered with it, why it couldn't be useful at Glacier Bay.

Mr. HARTZOG. We agreed completely.

NORTH CASCADES NATIONAL PARK

Mrs. HANSEN. You are requesting $1 million for Roland Point Road at North Cascades National Park. I thought you didn't want any roads in this facility? I thought the purpose of this park was to get away from this type of thing.

Mr. HARTZOG. There was one road proposed in there and this is it, the Roland Point Road.

Mrs. HANSEN. How many miles is that road?

Mr. RUTTER. I don't have a figure for the entire length. This portion is just for the access to the bridge across and the approaches to the bridge. That is 1 to 1½ miles. Most of the funds will be for the bridge construction.

OLYMPIC NATIONAL PARK

Mrs. HANSEN. You are requesting $25,000 for Quinault bridge replacement at Olympic National Park. May we have your comments in this connection?

Mr. RUTTER. To come from the south shore over into the Quinault Road you have to cross the river. We had a bridge out over a year ago. There are two little approach bridges to it. We have to rebuild these, and this is the planning portion for reconstruction in 1973.

Mrs. HANSEN. What is involved in your request of $46,000 for the Kalaloch Motel parking area?

Mr. RUTTER. They built a new motel unit and two new cabins. We haven't finished the parking area. It is rough graded and graveled.

Mrs. HANSEN. Isn't Kalalock Lodge operated as a concession?
Mr. RUTTER. Yes, ma'am.
Mrs. HANSEN. They do an exceptionally good job.
Mr. RUTTER. Very good.

BIGHORN CANYON NATIONAL RECREATION AREA

Mrs. HANSEN. You are requesting $992,000 for Bighorn Canyon Recreation Area. Is this request adequate?

Mr. HARTZOG. No, ma'am, it isn't, but it provides all I could get into this budget for them.

Mrs. HANSEN. What do you consider is adequate?

Mr. HARTZOG. I have the program here. The total cost of this job is $20,793,000. Of course, they would like to have all of it, but there isn't any way that I know of to do it.

Mrs. HANSEN. How many miles of roads are left to be completed?

Mr. HARTZOG. You gave us the money last year to do the Horseshoe Bend to Devil's Canyon section, which is 6.9 miles, and the total road is 50.3 miles, so you have 43.4 miles left to do.

Mrs. HANSEN. If you are ever going to complete this project, you are going to have to request additional funds.

Mr. HARTZOG. Yes, ma'am. This $50,000 that I have in here is to do the project planning on the next section, which is the Devil's Canyon overlook junction to Barry's Landing.

Mrs. HANSEN. How many miles is that section?

Mr. HARTZOG. It is 10.7 miles. That is the project planning. In other words, with that money we would do the plans and specifications and then hopefully be back next year requesting the construction funds.

Mrs. HANSEN. What will the construction cost for that section be?
Mr. HARTZOG. $4,290,000.
Mrs. HANSEN. Is this all that you could accomplish during this year?
Mr. HARTZOG. No, but that is all I can finance this year.
Mrs. HANSEN. That isn't what I asked you.
Mr. HARTZOG. That is why I answered you the way I did.
Mrs. HANSEN. How much construction could you accomplish?

Mr. HARTZOG. I could do the $4,290,000 and use all the rest of the planning money of $1,633,000. In other words, about $6 million.

Mrs. HANSEN. How far behind are you on your total resurfacing of roads in the national parks?

Mr. HARTZOG. I thought you were going to ask me that question yesterday, and I brought the chart to show you.

Mrs. HANSEN. Some of your roads are in very bad shape.
Mr. HARTZOG. I agree.

JEFFERSON NATIONAL EXPANSION MEMORIAL NATIONAL HISTORIC SITE

Mrs. HANSEN. Justify your request of $770,000 for Jefferson National Expansion Memorial, NHS.

Mr. HARTZOG. This is for site improvements, putting in the underground utilities systems, the lighting, rough grading of the site, and finishing the inside museum theaters. You saw those vacant walls for the theaters, and this is to try to get that finished.

YELLOWSTONE NATIONAL PARK

Mrs. HANSEN. You are requesting $38,000 for Yellowstone National Park. Is this adequate?

Mr. HARTZOG. No, ma'am; it is not, but I didn't propose any more because the Centennial is going to be next year. This is what I made the big push for in last year's budget. You were generous enough to give me something in excess of $12 million in the current fiscal year. Therefore, I didn't request additional funds this year, because there are other things that were of higher priority.

PACE OF ROAD CONSTRUCTION

Mrs. HANSEN. Your pace of road construction is not adequate in many of the park areas and yet you are requesting $707,000 to reconstruct and resurface 26.5 miles of roads at the C. & O. Canal NHP, and that area has just been recently authorized.

Mr. HARTZOG. Yes, ma'am, but we own that towpath already as a part of the park.

Mrs. HANSEN. But your road construction program seems to be lagging behind in most park facilities except at the C. & O. Canal NHP.

Mr. HARTZOG. No, ma'am, that is a slow build considering what needs to be done out there.

Mrs. HANSEN. Construction of roads at the Bighorn Canyou NRA is lagging behind.

Mr. HARTZOG. And I am even further behind on the C. & O. Canal, so it is a relative position in poverty. It is not anything dealing with affluence at either place.

NATIONAL CAPITAL PARKS

Mrs. HANSEN. Justify your request of $100,000 for the Anacostia Park.

Mr. HARTZOG. We are trying to continue that recreation program for which you approved the reprograming for us in the 1971 fiscal year, to do something about this long neglected recreation resource in the Capital.

Mrs. HANSEN. Justify your request of $600,000 for Sculpture Garden development.

Mr. HARTZOG. This is to continue the second part. You gave us some money in 1971 to restart. We had gotten all the way to $1.5 million when you disappropriated it a few years ago.

Mrs. HANSEN. How many sculpture gardens are we going to have in Washington, D.C.

Mr. HARTZOG. So far as I know, just two, the Hirshhorn and this National Sculpture Garden in connection with the National Gallery of Art. You gave me $200,000, I believe it was, under roads and trails, and then $600,000 in buildings and utilities. Then when you directed that I slip one and three quarter million dollars, that was one of the projects that we listed for slippage, but it gave us enough money to get the planning done.

Mrs. HANSEN. What do you consider more important, the sculpture garden or the C. & O. Canal NHP?

Mr. HARTZOG. Madam Chairman, that is like asking me which you love most, your older child or your younger one. They are equally needed.

Mrs. HANSEN. Which facility has the greater use?

Mr. HARTZOG. The C. & O. Canal.

(Discussion off the record.)

Mrs. HANSEN. You are requesting $1,000,000 for the White House electrical and air conditioning improvements. May we have your comments in this regard.

Mr. HARTZOG. This is a continuation of the program which has been under way in cooperation with General Services Administation which started in 1970–71. This will be going on for another 5 years at this rate or maybe a little more.

DEFINITION OF "BUILDINGS AND UTILITIES"

Mr. CLAWSON. This is a general statement for my education. Building and utilities, what does this mean? What are you actually doing?

Mr. HARTZOG. This is the title of the appropriation from which we build administrative headquarters, visitor center, campgrounds, utilities where we put in the power lines, the water and sewage systems, and also landscape the grounds in connection with those installations. It is buildings, utilities and grounds.

Mr. CLAWSON. It probably gets into the disposal of waste, sewage?

Mr. HARTZOG. All of that is buildings and utilities, dealing with air pollution, incinerator operations, garbage dump disposals, sewage treatment plants, water intake structures and this kind of thing.

Mr. MCDADE. Where will we be, assuming that you get the money you are requesting?

Mr. HARTZOG. Half through.

BOAT SEWAGE DISPOSAL

Mr. CLAWSON. May I ask one specific question? With the sewage discharge system what actually takes place? How do you dispose of it after you have provided for that discharge?

Mr. HARTZOG. There are two methods. The boats that are now being manufactured are required to have a self-contained sewage disposal system on them, so that they don't dump in the water.

Mr. CLAWSON. You have a timetable for those in existence?

Mr. HARTZOG. I think by, I believe it is, 1975, no boat can be operated on Coast Guard regulated waters that doesn't have the self-contained sewage disposal system. When they come into shore, they pump it out of their system into either a sewage holding tank which we have, and then we go around with tank trucks which pick it up or else it is pumped out and goes into the sewage treatment plant at the marina installation itself.

Mr. CLAWSON. So it gets into the sewage treatment plant?

Mr. HARTZOG. Yes, sir.

Mr. CLAWSON. That is rather costly, isn't it?

Mr. HARTZOG. It is very costly. We do the same thing for the house trailers. We have these central sewage dump stations. They are nor-

mally in connection with an existing sewage system, so that when a trailer pulls up, it dumps its sewage.

Mr. CLAWSON. Right into the system itself?

Mr. HARTZOG. Yes.

POLLUTION ABATEMENT PROJECTS

Mrs. HANSEN. How did you select the pollution abatement projects?

Mr. HARTZOG. We selected them, Madam Chairman, on the basis of the capability of getting the planning done. They were not selected on any basis of criteria that we use normally for our construction program.

In other words, the President said, "Do it all," and we went to our service centers with the regional directors and said, "You agree on what your needs are and the rate at which you can go on the projects which you want in" and we put them in on that basis, half this year and half next year.

Mrs. HANSEN. Is this for planning and construction?

Mr. HARTZOG. Planning and construction. One of the things that control the construction projects in here was the fact that you gave us planning money, so that for all those that have the plans ready, the construction money is in here. If you take any of these out for which the planning is already done, it wouldn't foul it up.

ACQUISITION OF WATER RIGHTS

Mrs. HANSEN. Please insert in the record your total expenditures by fiscal year for the period 1961 through 1970 for the acquisition of water rights.

Mr. HARTZOG. Madam Chairman, I am not sure we can do that. I will do the very best I can with it, because much of our water rights are purchased in connection with land acquisition, buying the land. I don't know whether we can go back and reconstruct it. This money not only covers the acquisition. It is a misnomer. It can be used to go out and buy an individual water right although we seldom have a necessity for doing that any more. A large part of this money is used for the development of underground water sources, wells, and for explorations by the Geological Survey.

(The information follows:)

CONSTRUCTION—ACQUISITION OF WATER RIGHTS ACTIVITY

Expenditures by fiscal years

Fiscal year:	*Expenditures*
1961	$219,800
1962	259,686
1963	257,413
1964	367,638
1965	245,311
1966	573,500
1967	504,754
1968	862,926
1969	497,498
1970	429,741
Total	4,218,267

Mrs. HANSEN. The committee will adjourn until 1:00 p.m.

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AFTERNOON SESSION

DEVELOPMENT BACKLOG

Mrs. HANSEN. The committee will come to order. Please discuss for the committee your construction backlog.

Mr. HARTZOG. In areas that were authorized prior to January 1, 1960, we have a statutory ceiling of $47.2 million, and areas authorized between 1960 and the end of the 90th Congress, $59.5 million, and areas acted on during the 91st Congress, $121.6 million. This third category, Madam Chairman, includes some areas that were actually established prior to January 1, 1960, but which because of expiration of ceiling we had to come back for reauthorization. This was prepared in response to the Chairman of the Senate Interior Appropriations Subcommittee, broken down in this way. He wanted to know how much development had been authorized by the 91st Congress, even though it involved an older area.

On that, the amount appropriated through the 1971 fiscal year, was $40.1 million. The balance of the ceiling is $188.8 million, and additional ceiling requirements on those $83.8 million. The development needs of the service are $1.6 billion, which has been updated since the date of this report to include the latest cost increases. It comes out to $1.8 billion.

Mrs. HANSEN. This is your construction backlog?

Mr. HARTZOG. Yes. I have got it broken down by areas in the system, by categories. We had them retype that since that submission. The updated figure is $1.8 billion on the gross for construction. I have got a chart here that gives you an insight into how this comes about, Madam Chairman. Of approximately 7,500 miles of visitor use roads in older areas maintained by the National Park Service, 1,100 miles require replacing or resurfacing, at a cost of $64 million.

At the moment, with the backlog that we have in our maintenance money, 4,200 miles are being maintained below acceptable standards. This means that this figure is going to be going right back into required reconstruction. Like that road in Olympic that you went over, which if it had been properly maintained and resealed in time, the surface wouldn't have deteriorated. Because there was no maintenance money to do it, the pot holes stayed and the next thing we had was a surface unraveling which now requires reconstruction.

Mrs. HANSEN. How much money would be needed per year to maintain your roads at an acceptable standard?

Mr. HARTZOG. In accordance with the standards that we have developed for acceptable maintenance of our total operations, it would be $10.2 million for M. & P. and M. & R. That breaks out to be about $4.6 million of M. & P. and about $5.6 in M. & R.

Mrs. HANSEN. Isn't it true that your construction costs are rising rather sharply?

Mr. HARTZOG. That is why I wanted you to see this chart on the example of roads alone, because much of the construction backlog that is building up is building up for this precise reason, that we are inadequately maintaining the facilities we now have, so that when they have deteriorated beyond salvage, there is nothing you can do with them except reconstruct them.

There is only 2,200 miles out of 7,500 miles in the National Park System that is being maintained at acceptable standards with the maintenance money we now have.

Mrs. HANSEN. How many years have you had this lag in maintenance funding?

Mr. HARTZOG. Interestingly, Madam Chairman, you know it became almost a national scandal in 1955. It was at that point that the administration and the Congress authorized the mission 66 program. At the end of the mission 66 program our maintenance was in worse shape than it was at the beginning of mission 66. What had happened was that most of the money that went into mission 66 went into the construction or reconstruction of facilities at a higher level of sophistication, and the maintenance money to maintain those more sophisticated facilities wasn't provided, so that overall we were in worse shape at the end of mission 66 in terms of maintaining our physical plant and managing our resources and serving our visitors in terms of personal services than we were when we started off, because the operating money didn't keep pace with the construction money that was provided.

In my statement last year or the year before, I analyzed this situation. I have that and I will be glad to extract that part of it and give it to you for insertion in the record at this point, if you would like to have it.

Mrs. HANSEN. Please, do.

(The information follows:)

EXCERPT FROM THE DIRECTOR'S STATEMENT BEFORE THE HOUSE SUBCOMMITTEE ON APPROPRIATIONS CONSIDERING THE DEPARTMENT OF THE INTERIOR AND RELATED AGENCIES APPROPRIATIONS FOR 1970

Slightly over a decade ago, in the 1957 fiscal year, funding for maintenance and operation of physical facilities amounted to 31.2 cents per park visit. In 1957, it was acknowledged that funding for operation and maintenance of park facilities had deteriorated to a dangerously low point. Accordingly, a massive new financial program for the National Park Service was initiated to provide adequate staffing and funding for maintenance of physical facilities and for other purposes.

In 1968, funding for operation and maintenance of physical facilities amounted to 20.2 cents per park visit, a decline of 35 percent from the 1957 level.

Certainly, in the meantime, there have been improvements in productivity resulting from improved mechanical equipment, such as mechanical garbage compactors, etc. A review of the physical condition of the plant indicates, however, that funding and staffing have not kept pace with the mounting workload. An example of one obvious problem area is park road maintenance. The Bureau of Public Roads and most State roads commissions suggest resealing roads comparable to those in the parks with asphalt and chips up to ¾'' in thickness every 6 to 10 years. Presently, the National Park Service is resealing its roads on an average cycle of 18 years.

Where resealing is neglected, water seeps into the base material and causes raveling, softening and eventual deterioration of the pavement. This results in pot holes and break-up of original paving. Such conditions exist along many park roads today. Accordingly, some of our park roads no longer provide a quality park experience to our visitors.

Still another test indicates that maintenance funding for the Service is lagging. For example, several other agencies of the Federal Government have building maintenance responsibilities similar to those of the National Park Service. In fiscal year 1968, the cost of building maintenance and operation per square foot of buildings for five of these other Government agencies ranged from a low of about $.77 per square foot to a high of approximately $1.67 per square foot. Funding available to the Service for building maintenance and operation was $.64 per

square foot. This condition is aggravated, moreover, when it is remembered that many of our public use buildings, such as Independence Hall, Custis-Lee Mansion, etc., are extremely fragile irreplaceable historic structures which require an extraordinary amount of care to preseve their historical quality and their physical condition.

Yet a third test—annual maintenance funding available in comparison with levels of funding suggested by other agencies having maintenance tasks similar to those of the Service—reflects a lag in funding for operation and maintenance of physical facilities in the parks. For example, information obtained from the Bureau of Public Roads, General Services Administration, and similar State agencies suggests annual funding of maintenance and operation of physical facilities at levels not less than 5 percent of the book value of fixed assets. Funding available to the Service, in 1968, for maintenance and operation of physical facilities amounted to 3.5 percent of the book value of fixed assets.

The lag in maintenance is certainly the most serious issue the Service faces in operating the areas of the system, but it is not the sole difficulty. We likewise have serious problems in the visitor protection and interpretive programs, especially law enforcement.

Mrs. HANSEN. If the committee was interested in reducing this maintenance backlog what would be the first increment?

Mr. HARTZOG. May I suggest this for your consideration, and I think it is very interesting. In the 1970 fiscal year, that was the first time I zeroed in to the administration and the Congress on precisely what this backlog was. At that point it was $18 million. You reduced it $6 million in 1971, and this budget proposes to reduce it another $3 million this year. We have got to get at it faster than that, if we are going to do it. I would suggest for your consideration something between $7 and $10 million. That is the only way we can get at it, in light of the escalating demands on us.

We found, for example, when we computed the deficiency in needed operating resources in the National Capital Parks for last year that we, because of the great increases in these special events and demonstrations and the requirements——

Mrs. HANSEN. I don't think enough funds are available just to meet the demonstrations and special events.

Mr. HARTZOG. That is my problem. This deficit was computed at $10.2 million for this budget submission. The recomputation, based on the experience operating with these standards for 3 years is that they project for next fiscal year an operating deficit of $24 million. Most of that deficit is projected for the National Capital Parks.

Mrs. HANSEN. What park areas have the most critical needs? You have some areas in this country that if your park roads are not adequately maintained, you are in severe danger as to accidents.

Mr. HARTZOG. That is right. All of these high mountain parks are in that category, and all of these densely used roads, such as Highway 441 through the Smokies, present that difficulty.

Mrs. HANSEN. I can foresee that the increasing events of protests are going to cause this maintenance backlog to increase.

Mr. HARTZOG. Yes, you can see that for maintenance of these parks which you gave us money to put into class A condition we have simply not been able to maintain them. I can't take the same maintenance dollar and pick up trash behind 1,900 special events and demonstrations and maintain parks too. You just can't do both. With the increasing numbers of these demonstrations, and with these parks becoming symbols for demonstrations throughout the system, it is just outrunning us.

(Discussion off the record.)

Mr. HARTZOG. Madam Chairman, there is one thing that you are considering in connection with our 1971 budget that is going to relieve our situation a little bit. That is the inclusion of the language that permits us to use the funds available to us in emergencies and other unforeseen law enforcement situations. We desperately need this same provision in our 1972 regular budget.

(Short recess.)

Mr. HARTZOG. This is the document in which we have identified the major themes of natural history in the United States and have classified the areas of the National Park System that represent those themes, thereby permitting us to develop the gaps that are not represented in the system.

UNOBLIGATED CONSTRUCTION BALANCE

Mrs. HANSEN. You had an unobligated construction balance of $4.4 million in 1970; you estimate an unobligated balance of $3.1 million in 1971; but you indicate no unobligated balance in 1972. What are the factors on which you predicate the obligation of all your construction funds in 1972?

Mr. HARTZOG. Madam Chairman, I think that is wrong. I'll ask Mr. Norwood to answer this.

Mr. NORWOOD. The basis on which these estimates are made is that construction funds need to be supported by the cash appropriations in order that they can be obligated. When we make these estimates, we estimate that we will get them under contract by the end of the fiscal year. As a matter of practicality, however, that has not happened and probably will not happen.

Mr. HARTZOG. Why do you estimate none?

Mr. NORWOOD. We estimate no unobligated balance at the end of the year to support the estimate of appropriations required. A few years ago, if you will recall, we used to estimate slippages, and we would get the program approved but with less than the full amount of funds appropriated, which presented a great many difficulties, both for the committee and for us.

Mr. HARTZOG. That is the origin of slippage? I didn't know that. It was before my time.

Mr. WILES. This is a normal practice, Madam Chairman. If you knew which projects were going to be unobligated at the end of the year, there would be no sense in appropriating the money.

Mrs. HANSEN. I have some very good ideas of what won't be obligated.

Mr. NORWOOD. The contract for construction funds, requires you to have the cash in the bank, or the obligating authority, to enable you to make the contract.

You have to have the appropriations available in order to make construction contracts. This does not happen in situations where you have contract authorization prior to receiving cash. In our construction program we need the appropriation before we can even go out for bids.

Mrs. HANSEN. I suspect you are going to try to obligate all the funds appropriated.

Mr. NORWOOD. We are certainly going to try.

Mrs. HANSEN. You are afraid I am going to notice an unobligated balance. Isn't this correct?

Mr. HARTZOG. That is apparently the reason we show you a blank. We are afraid what you will do if we put a figure in there.

PARKWAY AND ROAD CONSTRUCTION

(Liquidation of Contract Authorization)

Mrs. HANSEN. Please insert pages 143 through 150 of the justifications in the record at this point.

(The pages follow:)

DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

Parkway and Road Construction (Liquidation of Contract Authority)

Unexpended, start of 1971	$11,709,311	
Appropriation, 1971	17,650,000	$17,650,000
Total available fiscal year 1971	29,359,311	
Less Parkway and Road Construction (Estimated expenditures F.Y. 1971)	-19,600,000	
Unexpended balance start of 1972	9,759,311	
Budget estimate, fiscal year 1972	18,500,000	18,500,000
Total available fiscal year 1972	28,259,311	
Less Parkway and Road Construction (Estimated expenditures F.Y. 1972)	26,000,000	
Unexpended balance, start of 1973	2,259,311	
Increase in cash requested		+850,000

Analysis of Cash by Fiscal Year

	Actual 1970	Estimate 1971	Estimate 1972	Increases or Decreases
Total expenditures, Parkway and Road Construction	$19,546,307	$19,600,000	$26,000,000	$+6,400,000
Unexpended balance, start of year	-9,755,618	-11,709,311	-9,759,311	+1,950,000
Unexpended balance, end of year	11,709,311	9,759,311	2,259,311	-7,500,000
Appropriation to Liquidate Contract Authority	21,500,000	17,650,000	18,500,000	+850,000

CONTRACT AUTHORITY AND LIQUIDATION PROGRAM

	Contract Authority Available	Obligations	Unliquidated Obligations Prior Years	Total Obligations	Unliquidated Obligations Carried Forward	Expenditures
FISCAL 1970 ACTUAL						
Parkways	$31,000,000	$ 2,377,185	$ 3,866,714	$ 6,243,899	$ 2,560,587	19,546,307
Roads and trails	66,849,195	10,693,834	13,449,977	24,143,811	8,280,816	
Total	97,849,195	13,071,019	17,316,691	30,387,710	10,841,403 1/	19,546,307
FISCAL 1971 ESTIMATE						
Parkways	42,000,000	1,564,315	2,560,587	4,124,902	564,315	19,600,000
Roads and trails	56,155,361	25,796,711	8,280,816	34,077,527	18,038,114	
Total	98,155,361	27,361,026	10,841,403	38,202,429	18,602,429	19,600,000
FISCAL 1972 ESTIMATE						
Parkways	60,435,685	3,640,000	564,315	4,204,315	575,179	26,000,000
Roads and trails	60,358,650	23,060,000	18,038,114	41,098,114	18,727,250	
Total	120,794,335	26,700,000	18,602,429	45,302,429	19,302,429	26,000,000

1/ Available cash for liquidation was $11,709,311

DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

PARKWAY AND ROAD CONSTRUCTION (LIQUIDATION OF CONTRACT AUTHORITY)

Itemization of Estimate

	Actual 1970	Available 1971	Estimate 1972	Increase (+) Decrease (-)
Program and Financing:				
Total obligations	$13,071,019	$27,361,026	$26,700,000	$-661,026
Unobligated balance available, start of year:				
Appropriation	-500	-11,709,311	-9,759,311	+1,950,000
Contract authority	-63,040,926	-73,068,865	-61,035,024	+12,033,841
Unobligated balance available, end of year:				
Appropriation	11,709,311	9,759,311	2,259,311	-7,500,000
Contract authority	73,068,865	61,035,024	91,835,024	+30,800,000
Contract authority lapsing	6,192,231	6,622,815	....	-6,622,815
Unfunded balance, start of year	70,602,500	83,910,269	79,637,454	-4,272,815
Unfunded balance, end of year	-83,910,269	-79,637,454	-111,137,454	-31,500,000
Unfunded balance lapsing (Contract authority)	-6,192,231	-6,622,815	....	+6,622,815
Appropriation to liquidate contract authority	21,500,000	17,650,000	18,500,000	+850,000

PARKWAY AND ROAD CONSTRUCTION
(LIQUIDATION OF CONTRACT AUTHORITY)

	Actual 1970	Estimate 1971	Estimate 1972
Appropriation (Cash)	$21,500,000	$17,650,000	$18,500,000
Unexpended balance, start of year	9,755,618	11,709,311	9,759,311
Total Available	31,255,618	29,359,311	28,259,311
Less expenditures	-19,546,307	-19,600,000	-26,000,000
Unexpended balance, end of year	11,709,311	9,759,311	2,259,311

Need for funds (cash): The amount of $18.5 million is requested under this appropriation to make payments as requirements accrue in the liquidation of obligations incurred under the contract authorization for construction of parkways and roads and trails.

CONTRACT AUTHORITY (PROGRAM LEVEL)

The 1972 fiscal year obligation program for "Parkway and road construction" is $26.7 million.

Contract authorization for the Service's parkways and roads and trails construction programs is provided in Sections 5(7) and 5(8) of the Federal-Aid Highway Act of 1968 and Sections 105 (a) (9) and 105 (a) (10) of the Federal-Aid Highway Act of 1970 (Public Law 91-605), approved December 31, 1970. At the beginning of 1972, based upon current estimates, an amount of $120.8 million will be unprogrammed and available for apportionment from these authorizations. This amount will provide for the $26.7 million program level in 1972 leaving a balance of $94.1 million available for programs in 1973 and future years.

This is a continuing program aimed at providing adequate and safe access to the National Park System and its visitor facilities and principal points of interest. The program encompasses (1) rehabiliation and replacement work to maintain the presently existing roads' usefulness for park visitors and (2) new construction to serve expanded use and additional areas in the System. Just to prevent deterioration in the roads and possible loss in investment, there is an annual accrual of rehabilitation and replacement needs. These needs alone provide the basis for over half of the requested program. In addition to these recurring needs, the Service's road system must expand if it is to serve the increasing number of visitors, new areas, and the expanded facilities.

The "Parkway and road construction" program is broken down into two activities:

1. Parkways -- $3,640,000

The proposed program will permit work on four of the nine authorized parkways in addition to advance planning. The following parkways are scheduled for 1972 projects:

1. Blue Ridge Parkway, Georgia-North Carolina-Virginia $1,281,000
   Grade separation structures in Virginia and North Carolina; survey of extension into North Carolina and Georgia.

2. Natchez Trace Parkway, Mississippi $1,247,000
Construction of Section 3-C in Lee County.

3. Foothills Parkway, Tennessee ..... $ 422,000
Resurface Gatlinburg Spur.

4. George Washington Memorial Parkway, Virginia ..... $ 90,000
Improve traffice access at Iwo Jima Memorial.

Advance Planning ..... $ 600,000

This is the same level as programmed in 1971. Large projects are accomplished through a cooperative agreement with the Bureau of Public Roads. The purpose of these funds is the same as explained under the "Construction" appropriation.

2. Roads and Trails -- $23,060,000

The 1972 program has four objectives, two of which are supporting ones:

1. Maintain Existing Capacity - $10,981,000. Measures such as resurfacing and reconstruction are necessary to prevent deterioration resulting in a loss of investment to the existing road system. As part of these measures, the upgrading of roads to current safety standards is of top priority.

2. Develop New Capacity - $8,717,000. In response to increased traffic volume, new road capacity must be developed. In many instances developing new capacity requires final surfacing and relocation of roads. Project planning for work scheduled for construction in 1973 is included in this item.

The supporting objectives are:

3. American Revolution Bicentennial - $363,000. Several road projects support facility construction at four park areas associated with the American Revolution.

4. General Support - $2,999,000. As in the "Construction" appropriation, funds are requested to provide necessary ongoing support for the developments essential to continue park programs. Individual project requirements, within the three categories listed below, will vary during the course of the year.

(a) Improvement, betterment, resurfacing, and reconstruction - $1,399,000

This sum provides for numerous projects required to protect park visitors against unsafe conditions. Projects making up this lump sum amount include resurfacing, reconstruction, and erosion prevention.

(b) Facilities to serve concession developments - $200,000

This amount provides for access roads, walks and trails to serve developments constructed and operated by concessioners under long term contracts.

(c) Advance planning - $1,400,000

The amount of $1.4 million is proposed for advance planning. The need for a $400,000 increase in these funds is the same as discussed under the "Construction" appropriation.

Parks with Major Projects

Parks having projects of major interest are:

Great Smoky Mountains National Park, North Carolina-Tennessee	$5,018,000
National Capital Parks	$1,399,000
North Cascades National Park, Washington	$1,350,000
Yosemite National Park, California	$1,177,000
Crater Lake National Park, Oregon	$1,000,000
Lassen Volcanic National Park, California	$ 919,000
Delaware Water Gap National Recreation Area, Pennsylvania-New Jersey	$ 867,000
Bighorn Canyon National Recreation Area, Wyoming-Montana	$ 855,000
Chickamauga-Chattanooga National Military Park, Georgia-Tennessee	$ 832,000
Lake Mead National Recreation Area, Arizona-Nevada	$ 760,000
Joshua Tree National Monument, California	$ 608,000
Rocky Mountain National Park, Colorado	$ 585,000
Sequoia and Kings Canyon National Parks, California	$ 468,000
Redwood National Park, California	$ 435,000
Death Valley National Monument, California-Nevada	$ 397,000
Glacier National Park, Montana	$ 337,000
Olympic National Park, Washington	$ 300,000

Personnel Summary

	1970 actual	1971 estimate	1972 estimate
NATIONAL PARK SERVICE			
Total number of permanent positions	286	286	286
Full-time equivalent of other positions ..	109	150	150
Average number of all employees	395	426	426
Average GS grade	8.7	8.7	8.7
Average GS salary	$11,486	$11,523	$11,526
Average salary of ungraded positions	$8,386	$8,740	$9,196
ALLOCATION ACCOUNTS			
Total number of permanent positions	140	156	156
Full-time equivalent of other positions ..	8	8	8
Average number of all employees	120	120	120
Average GS grade	9.4	9.8	9.8
Average GS salary	$10,780	$12,250	$12,250

DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
PARKWAY AND ROAD CONSTRUCTION (LIQUIDATION OF CONTRACT AUTHORITY)

Itemization of Estimate

	Actual 1970	Available 1971	Estimate 1972	Increase (+) Decrease (-)
Obligations by Objects:				
11 Personnel compensation	$5,482,417	$5,894,200	$5,959,000	$+64,800
12 Personnel benefits	534,770	575,000	580,000	+5,000
13 Benefits for former personnel	2,000	2,000	2,000	....
21 Travel and transportation of persons	292,610	340,000	340,000	....
22 Transportation of things	99,257	114,000	114,000	....
23 Rent, communications, and utilities	130,344	176,000	176,000	....
24 Printing and reproduction	6,577	8,000	8,000	....
25 Other services	1,500,825	1,699,000	4,789,000	+3,090,000
26 Supplies and materials	281,798	393,000	393,000	....
31 Equipment	37,865	53,000	53,000	....
32 Lands and structures	4,941,227	18,187,826	14,286,000	-3,901,826
42 Insurance claims and indemnities	-1,671	....	....	....
96 Portion of foregoing originally charged to object class 32	-237,000	-81,000	....	+81,000
Total obligations	13,071,019	27,361,026	26,700,000	-661,026

CASH BALANCES

Mrs. HANSEN. Please insert in the record your cash balance as of June 30, 1970 and as of February 28, 1971.

(The information follows:)

PARKWAY AND ROAD CONSTRUCTION—CASH BALANCES

June 30, 1970, $11,709,311; February 28, 1971, $19,649,492.

INCREASE IN FUNDS REQUESTED FOR ADVANCE PLANNING

Mrs. HANSEN. Your estimate includes $1.4 million for advance planning. This is an increase of $400,000 over 1971. Please justify the necessity for this increase in funding.

Mr. HARTZOG. Madam Chairman, this is to actually implement our four-step planning process that we have been working on so as to minimize the amount of unobligated money that we have left over in any 1 fiscal year. What we have been trying to do, and we have been working on it now for several years, is to get the master plan done in the first step, the advance planning which is the site planning and the related planning documents, museum prospectus and this kind of thing as a second step; the construction working drawings and specifications as a third step; and then come to you with the construction estimate of the amount of money we need in that fiscal year. This serves two purposes. One is that we can tell you with relative assurance that the working drawings and specifications will be finished and that we will indeed award that contract that year. It also enables us, once we have finished the working drawings, to provide you with a realistic estimate and get over this matter of missing our targets as badly as we have in the past.

ADMINISTRATIVE PROVISIONS

Mrs. HANSEN. Please insert page 151 of the justifications in the record.

(The page follows:)

DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

Administrative Provisions

Authorization is requested for the purchase of 137 passenger motor vehicles for replacement only, including not to exceed 90 for police-type use, and the purchase of one aircraft for replacement only. No additional passenger motor vehicles or aircraft are being requested for fiscal 1972.

The passenger motor vehicles to be replaced will be within the age or mileage standards for replacement as prescribed by the General Services Administration. Many of them are used for patrol purposes and law enforcement functions by employees such as park rangers and the U.S. Park Police, and often at high speeds for the apprehension of speeders and other law violators. They must, therefore, be in good condition to insure safety of the operator and the public. Many of the vehicles operated by the Service are used in rugged mountainous or desert terrain and under difficult weather and road conditions.

Passenger Motor Vehicles to be purchased:	
Number	137
Estimated gross cost	$236,300
Old vehicles to be exchanged:	
Number	137
Estimated allowance	$ 63,400
Net cost	$172,900

The aircraft to be replaced was destroyed in an accident on November 25, 1970. Replacement is necessary in order to continue the important search, rescue and law enforcement patrols over the Lake Mead National Recreation Area, Nevada and Arizona.

Aircraft to be purchased:	
Number	1
Estimated gross cost	$ 55,000
Old aircraft to be exchanged:	
Number	1
Estimated allowance (Salvage value)	$ 3,000
Net cost	$ 52,000

The language referring to the $400 by which the general purchase price limitation on the purchase of police-type vehicles may be exceeded is proposed for deletion in view of the provisions of Public Law 91-423, approved September 26, 1970.

Public Law 91-423 provides that the Administrator of General Services shall make determinations concerning equipment and systems which are customarily incorporated into a passenger motor vehicle completely equipped for ordinary operation. Also, the law provides that the price of such additional equipment and systems shall not be considered in determining whether the cost of the vehicle is within any maximum price otherwise established by law. This will permit the purchase of police-type vehicles in the number specified herein equipped with police-type and safety features that are important for effective enforcement work, as may be prescribed by regulations issued by the Administrator of General Services.

REPLACEMENT OF PASSENGER CARRYING VEHICLES AND AIRCRAFT

Mrs. HANSEN. Please justify the request for the purchase of 137 passenger motor vehicles including 90 for police-type use.

Mr. HARTZOG. These are the ones for replacements only, fully amortized.

Mrs. HANSEN. These vehicles have reached the required mileage for replacement?

Mr. NORWOOD. Reached the age or the mileage, or both.

Mrs. HANSEN. Please justify the request for the purchase of one replacement aircraft.

Mr. HARTZOG. Madam Chairman, this is the plane that we lost at Lake Mead in the tragic accident last year that took the lives of three people when it crashed in Lake Mead.

Mrs. HANSEN. What was the cause of that crash?

(Discussion off the record.)

Mrs. HANSEN. What are your general safety regulations with regard to the use of Park Service aircraft?

Mr. HARTZOG. One is that they can only be flown by our own pilot or by a relief pilot employed by us. Of course they have all of the required hours checks that any other licensed aircraft would have. In other words, we have the same safety standard requirements that you would have for any charter craft or any commercial craft. I don't have the details of them in my head, but I know we send the motors in to be rebuilt, we take the plane down and have it serviced, and carry out other required steps.

(Discussion off the record.)

REPROGRAMING

Mr. HARTZOG. May I again call your attention, while we were discussing these administrative provisions, to our request to renew in 1972 that same provision on law enforcement that you proposed to include in our management and protection appropriation 1971 supplemental.

Mrs. HANSEN. What is the justification for the proposed provision?

Mr. HARTZOG. We need this for the simple reason that these special events and demonstrations have accelerated so rapidly on us that they are sapping our resources just as much as wildfire is. Unless there is some provision made whereby we can get relief, we are simply going backward in terms of the increases that you have given us. For example, right now in the 1971 fiscal year, as I told you in connection with the supplemental, over and above what is in the supplemental and what you have already given us we are behind $853,000, as a result of trash cleanup and overtime for Rangers and Park Police. That doesn't include this event of last weekend. Our gross estimate is perhaps $250,000 for last week. With this thing coming up between now and May 9, I think we are easily facing a $1.5 million deficit, which unless you give me some relief here, the only thing I can do is to cut back on park operations for which you have been giving me the money to try to get up to standard.

Mrs. HANSEN. It is kind of discouraging to a committee that has been trying faithfully to provide adequate funds for particular programs to have those funds reprogramed to meet law enforcement situations.

Mr. HARTZOG. But it is the only mechanism, Madam Chairman, that I have for dealing with the situation. I think it really is no different than a wildfire that is man caused, and out of that number of 739 that we gave you yesterday, 399 of those were man-caused.

Mrs. HANSEN. 399 of the 739 fires were man-caused?

Mr. HARTZOG. Right. Shouldn't this be in the same category?

Mrs. HANSEN. Aren't these fires caused by carelessness?

Mr. HARTZOG. Yes, ma'am. Shouldn't this be in the same category? This is what it is, carelessness and indifference on the part of people. It is just a different thing. You are not burning woodland. You are tearing up property, increasing trash cleanup and requiring additional policing to protect people. The logic of it would seem to me to be analogous.

Mrs. HANSEN. A policy might develop to close the national parks, due to lack of funds.

Mr. HARTZOG. We had that one time, you know, and I got an awful lot of conversation from this end of the avenue. You talk about somebody getting a lot of advice. I really did.

Mrs. HANSEN. The point is, should you penalize the parks of the Midwest, Northwest, or the Southeast for demonstrations that occur in other parts of the country?

Mr. HARTZOG. Madam Chairman, it is happening all over.

COST OF DISTURBANCE AT YOSEMITE NATIONAL PARK

In Yosemite the management and protection amount is, as I remember it, about $1.5 million in that park. That event in Yosemite last summer cost that park $271,000. There goes better than 18 percent of its total management and protection funds in one weekend.

Mrs. HANSEN. This is the point I mentioned yesterday. If events of protests continue to increase in the national parks there isn't going to be enough money to do an adequate management and protection job.

Mr. HARTZOG. I know, but the courts of the United States have said I can't prohibit them.

Mrs. HANSEN. Of course not, but the question is you might reach a point in time where funds aren't adequate to meet the costs of maintenance and protection.

Mr. HARTZOG. I recognize the validity of your point. I am simply trying to lay before you, as well as I know how, the dilemma in which I am caught. On the one hand they tell me I can't enforce the regulations against demonstrations—that is the judiciary system—on the other hand I am enjoined by the statute to maintain these resources unimpaired, and to manage these resources for the enjoyment and benefit of the public. To do that I simply have got to clean up the debris and I have got to maintain order, and it costs that much in order to maintain order. We maintained order.

Anybody who would have gone to Yosemite Valley last summer after the Fourth of July weekend, according to the old timers who have been living in that Valley 60 and 70 years as a part of the concession operation there, would have had as quiet and inspirational and as enjoyable an experience as they would have had if they had visited that park 50 years ago, perhaps even better, because of things that have been done in the valley to enhance its physical appearance. But

because of the bad publicity that resulted, the people stayed away from it, when actually the quality of the experience had improved. We had no more incidents there, but it cost $271,200 to maintain that police presence there, and assure that kind of order and tranquility in the Valley.

DEFICIT IN PARK PROGRAMS

Mrs. HANSEN. One of the things that disturbes this committee is the $1.8 billion construction deficit.

Mr. HARTZOG. Yes, ma'am; in construction.

Mrs. HANSEN. Try as we will, we can't reduce that deficit.

Mr. HARTZOG. No. As a matter of fact, we are not even keeping up with the escalation in the construction indices.

Mrs. HANSEN. How do you ever expect to reduce this deficit if you have to apply an ever-increasing amount of funds for management and protection of your current resources?

Mr. HARTZOG. Madam Chairman, we really are not ever going to reach that point until, in my judgment, as I suggested for your consideration and that of the committee yesterday, we change our whole attitude about what these parks are and we recognize that these parks are symbols of our inheritance rather than simply resources of land, water, buildings, and structures; and that, therefore, when you are managing the symbols of your inheritance, it is a much more expensive proposition than just maintaining a forest environment or an agricultural environment or an open space environment.

You have many, many additional expenses resulting from the protest demonstration special event. Not all of these costs arise out of the people who are protesting. Many of them arise from the other side of the spectrum of people who are there protesting the protesters. In other words, these parks are being used by those on both sides of the spectrum of a philosophical viewpoint in this country as a place to express their feelings.

Mrs. HANSEN. I think the taxpayers have to realize that they are going to pay for these costs.

Mr. HARTZOG. I think it is the same problem as maintaining antiques and heirlooms vis-a-vis maintaining modern furniture that you buy and replace in a decade or so.

(Discussion off the record.)

Mrs. HANSEN. I want to point out you are not ever going to reduce the construction backlog or the maintenance backlog on the present funding estimates. Particularly when you consider the increasing cost of events of protests. I think the taxpayers of the United States have to realize that this is an inherent cost of maintaining their national parks.

Mr. HARTZOG. I agree with you, and if I might suggest for your consideration to add to that, really what we are both talking about is that parks have taken on an added dimension in the last one or two decades and they are not simply resources for physical recreation. They are symbols in the value system of our society, and this dimension has not been weighed in the balance. They have become the focal point for representation of philosophical, and social values, that was never contemplated as a part of the system. At some point we have got to crank these costs in.

As long as the taxpayer realizes what the money is going for.

Mr. GALIFIANAKIS. Is that supportable, George, that they never have been used in a symbolic way?

Mr. HARTZOG. I mean they haven't been used that way heretofore. Nobody has used Yosemite Valley, for example as a focal point to speak to a social issue, or political issue. They didn't use the Washington Monument for this purpose until the decade of the sixties in any significant number.

Sure, there would be a rally occasionally. We even had a Scout Jamboree there, but I gave you the figures yesterday. In 1965, to give you some idea, in the parklands of the District of Columbia, there were only 309 special events, whereas in 1970 there were 1,900.

Mr. GALIFIANAKIS. Is it because we have become more statistics minded recently or have we kept figures over the past number of years? I remember reading about the symbol that Independence Hall represents and the large numbers of people attending but they seem to have been more orderly.

I wonder if that is the difference; if you have had a relatively strong participation around these symbols but they have been orderly ones?

Mr. HARTZOG. One of the most disorderly ones I know anything about, only from reading about it, was the bonus march in the thirties, you know. This has been part of the statistics.

I am not sure this protest is necessarily more disorderly. It is the fact that it is increasing in intensity that I think dramatizes the need.

We have always expected there would be some special events, like the Christmas pageant. That has been going on long enough that it has been included in the budget because it takes a lot of our resources in connection with cleaning up and other things there on the ellipse during Christmas.

The Cherry Blossom Festival has been going on long enough to be cranked into the budget but what is happening to us is that these special events and demonstrations, or whatever you want to call them, have accelerated at such a rate, and the people are looking and leaning toward their national parks as the symbols in which the express their views, to the point where these costs have simply gotten out of hand in the terms of the way we look at our budget.

Mrs. HANSEN. The budget requests do not recognize the increasing maintenance and construction costs. There is a departmental ceiling and a OMB ceiling.

People are complaining about the maintenance of many park areas. A reporter said to me the other day that the national parks in California were not properly maintained. The budget requests don't recognize the needs and they don't recognize the cost of the demonstration.

Mr. HARTZOG. That is why I am happy you are putting it in the record. I have been making speeches for the last 5 years on this subject, but I am not sure that I have really gotten through to anybody except the committees with whom I work directly.

Mrs. HANSEN. As Chairman of the Interior and Related Agencies Appropriations Subcommittee, it is up to me to point out what the costs are, how the costs are being met, and what the needs are.

Mr. GALIFIANAKIS. It is a budgetary problem with us, but are we concerned as to who enforces the law?

Mrs. HANSEN. It is very discouraging for this committee to have a $1.8 billion construction backlog and a $10 million per year deficiency in operations and maintenance.

Mr. GALIFIANAKIS. Coming out of your budget.

Mr. HARTZOG. Deficiencies in my budget, yes, sir. To meet the needs that exist today in the system.

As we remarked just before you came in, at the rate my construction budget is being funded, it is not even enough to keep even with the cost indices escalation annually.

Mr. GALIFIANAKIS. You are really asking us to now treat this problem and you are groping, really, for the funds with which to meet both law enforcement and clean-up aspects.

Mr. HARTZOG. Yes; I am asking that you consider this as an added dimension to park use that has not really been recognized in the Congress and in the administration.

Mr. GALIFIANAKIS. Actually, the figure that you gave us is a figure that was not in the contemplation of your expenditure in the first instance.

Mr. HARTZOG. That is exactly right.

The circuit court of appeals has said that we cannot prohibit demonstrations. The only thing that we can do—well, you tell them, Mr. Dickenson. There were 15 days' notice and unless there is something you can prove——

Mr. DICKENSON. The court of appeals has instituted a 15-day notice system. The only means for the Government to counter any type of demonstration is to seek injunctive relief and you must prove a threat to Presidential security, a threat to the security and welfare of a city or irreparable damage to park resources and facilities.

Mr. GALIFIANAKIS. Does it make any difference to you, George, whether the bill is presented for repayment or are you just as happy if you can say "Here, we have incurred this expense; you defray it?"

Mr. HARTZOG. Either way. What I have suggested for the consideration of the chairman of the committee and the committee is an administrative provision that would authorize me to defray the expenses for these items out of funds that are available to me and then seek a supplemental just as we do in the case of fires.

Mrs. HANSEN. You plan to treat the law enforcement costs exactly as forest fires costs.

Mr. HARTZOG. I would say "Provided, that any funds available to the National Park Service may be used, with the approval of the Secretary, to maintain law and order in emergency and other unforeseen law enforcement situations in the National Park System."

Mr. GALIFIANAKIS. Is there such a thing as a Presidential contingency and emergency fund?

Mrs. HANSEN. The President has an emergency fund but that is used for grave national emergencies. I don't think the protests are considered national emergencies.

Mr. HARTZOG. It will close some parks unless some provision is made for it, because you just don't have the money to bring the people on and pay them, that is all.

Mrs. HANSEN. When you don't have adequate management and protection funds you might have to close some parks.

Mr. HARTZOG. And I did that.

Mr. GALIFANAKIS. You prefer to have the control over the fund to meet the need for clean-up as soon as it occurs?

Mr. HARTZOG. My preference is that language, where we can come back to you and justify the circumstances.

I would not be exercising this responsibility alone because it is proposed we seek the Secretary's approval that the incident did constitute an exception from the program before funds would be made available. I accept that as a normal restraint.

GETTYSBURG NATIONAL MILITARY PARK LAND ACQUISITION REPROGRAMING

Mrs. HANSEN. You are requesting to reprogram funds to acquire 6.76 acres of property owned by Gettysburg National Museum, Inc. What amount of funds are involved in this request?

Mr. HARTZOG. $3,350,000. I have that in my lump sum in-holding appropriation that you have given me.

Mrs. HANSEN. What would be the balance of your in-holding account if this request is approved?

Mr. HARTZOG. The balance is about $500,000.

Mrs. HANSEN. It is a good thing the end of the fiscal year is June 30.

Mr. HARTZOG. It surely is because I need to be put back in business after that date.

OPPORTUNITY LAND ACQUISITION

That is one of the best innovations this committee has come up with because it is difficult to prove in dollars and cents how valuable it is. We only know that we have been able to keep many of these strategic properties out of the hands of the speculators. As you and I know from what happened to us at Olympic when that piece of property fell into the hands of a speculator, and we had to go back and buy, in that one instance alone it cost us several hundred thousand more than if we could have bought it when the man came in and was in personal distress and wanted to sell it.

So this puts us in the market of an opportunity buyer.

GETTYSBURG NATIONAL MILITARY PARK LAND ACQUISITION

Mrs. HANSEN. This is to purchase the Electric Map Museum.

Mr. HARTZOG. Yes. He is giving us all of the Civil War artifacts as a part of it and in the meantime Mr. Rosensteel, who with his wife is a joint owner, has passed away since they signed this option. The option provides it cannot be assigned, so it is imperative that we get this strategic piece of property because that collection is worth over half a million dollars. They have a fine arts insurance policy on it for a half a million dollars. It is the finest Civil War collection anywhere in the world. The property is absolutely imperative for the protection of the battlefield.

INDIANA DUNES NATIONAL LAKESHORE

Mr. YATES. The Beverly Shores section of the Indiana Dunes has a critical problem because of Lake Michigan. The lake is washing away the shore. I received a letter, after inquiring about it, that the

Corps of Engineers is looking into the matter and will decide what to do and may take as long as 2 or 3 years to decide what to do. By that time you may not have any shore left. I wonder whether it could be speeded up?

Mr. HARTZOG. I will check into it. I am not familiar with it. I will check into it and see what we can do.

CONCLUDING REMARKS

Madam Chairman, if I may be permitted to say something either on or off the record to you and the members of this subcommittee, I would just like to express for myself and for all of those people who are not here, our deep appreciation for your consideration of the national park system and for the many, many wonderful things you have done over the years, and to the new members, what a great delight it is for us to have the opportunity of working with you.

We look forward to serving you in every way possible and I hope if we can serve you in any way at any time, you will just let us know.

Mrs. HANSEN. Mr. Hartzog, I would certainly like to express my appreciation and the committee's appreciation for the continuing work of the National Park Service. I am particularly enthused about your historical preservation program, your historical interpretation program, and the creation of the type of park management that gives the feeling of pride in the heritage of this country. But I am disturbed by the backlog in construction and operation and maintenance.

I would also like to express my appreciation and the appreciation of the committee to the personnel of the National Park Service. I think they are terrific. It doesn't matter where we meet them, they do a splendid job.

Mr. HARTZOG. Thank you very much.

Mrs. HANSEN. The committee thinks you do an excellent job also.

Mr. YATES. I want to supplement what you have said with regard to the park personnel. I was going to add my compliments to the selection of the rangers they have and the high quality of personnel you are able to get for rangers.

Recently on my trip down to the Everglades National Park I was with a young ranger there who apparently had charge of the water trails in the Everglades. He was just an outstanding young man.

My previous trip to Glacier National Park placed me in contact with two or three other rangers and I thought they were outstanding too.

Mr. HARTZOG. Thank you very much.

Mr. CLAWSON. With reference to the TV commercials regarding our historical places, have you been involved in that?

Mr. HARTZOG. We have developed those in connection with the Department of Agriculture and other departments involved.

Mr. CLAWSON. Do they present these as a public service?

Mr. HARTZOG. Yes. We send out about 360 as a part of the domestic travel promotion program.

Mr. CLAWSON. I have seen several of them and I think they are execellently done. I want to compliment you on that as well.

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