

Y4

1033

969  
p.4  
969  
p.4  
969  
p.4  
969  
p.4  
969  
p.4

.Ap 6/2

P 96/3/969/PT. 4

# Senate Hearings

GOVERNMENT

Storage

*Before the Committee on Appropriations*

## PUBLIC WORKS FOR WATER AND POWER RESOURCES DEVELOPMENT AND ATOMIC ENERGY COM- MISSION APPROPRIATIONS

H.R. 17903

90<sup>th</sup> CONGRESS, SECOND SESSION

*Fiscal Year 1969*

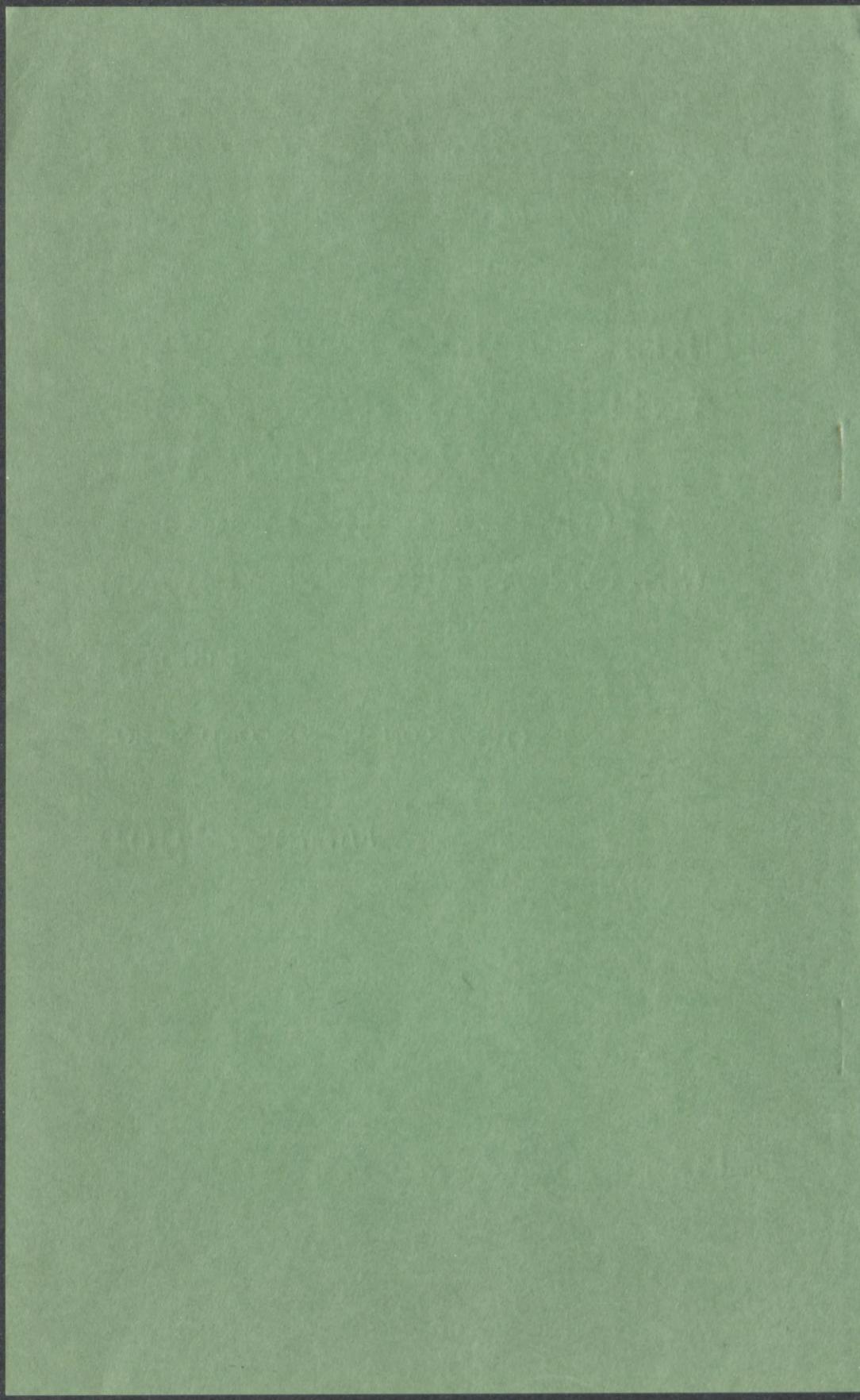
KSU LIBRARIES



A11900 472289 ✓

Part 4

TENNESSEE VALLEY AUTHORITY • ATOMIC ENERGY COMMISSION



**PUBLIC WORKS FOR WATER AND POWER RESOURCES  
DEVELOPMENT AND ATOMIC ENERGY COMMISSION  
APPROPRIATIONS FOR FISCAL YEAR 1969**

---

---

**HEARINGS**  
BEFORE THE  
**SUBCOMMITTEE OF THE**  
**COMMITTEE ON APPROPRIATIONS**  
**UNITED STATES SENATE**

NINETIETH CONGRESS

SECOND SESSION

ON

**H.R. 17903**

AN ACT MAKING APPROPRIATIONS FOR PUBLIC WORKS FOR WATER AND POWER RESOURCES DEVELOPMENT, INCLUDING CERTAIN CIVIL FUNCTIONS ADMINISTERED BY THE DEPARTMENT OF DEFENSE, THE PANAMA CANAL, CERTAIN AGENCIES OF THE DEPARTMENT OF THE INTERIOR, THE ATLANTIC-PACIFIC INTEROCEANIC CANAL STUDY COMMISSION, THE DELAWARE RIVER BASIN COMMISSION, INTERSTATE COMMISSION ON THE POTOMAC RIVER BASIN, THE TENNESSEE VALLEY AUTHORITY, AND THE WATER RESOURCES COUNCIL, AND THE ATOMIC ENERGY COMMISSION, FOR THE FISCAL YEAR ENDING JUNE 30, 1969, AND FOR OTHER PURPOSES

Printed for the use of the Committee on Appropriations



U S. GOVERNMENT PRINTING OFFICE  
WASHINGTON : 1968

SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS

ALLEN J. ELLENDER, Louisiana, *Chairman*

CARL HAYDEN, Arizona  
RICHARD B. RUSSELL, Georgia  
JOHN L. McCLELLAN, Arkansas  
LISTER HILL, Alabama  
WARREN G. MAGNUSON, Washington  
SPESSARD L. HOLLAND, Florida  
JOHN STENNIS, Mississippi  
A. S. MIKE MONRONEY, Oklahoma  
ALAN BIBLE, Nevada  
ROBERT C. BYRD, West Virginia  
JOHN O. PASTORE, Rhode Island  
GALE W. McGEE, Wyoming

THOMAS H. KUCHEL, California  
ROMAN L. HRUSKA, Nebraska  
MILTON R. YOUNG, North Dakota  
KARL E. MUNDT, South Dakota  
MARGARET CHASE SMITH, Maine  
GORDON ALLOTT, Colorado  
CLIFFORD P. CASE, New Jersey

KENNETH J. BOUSQUET, *Clerk to Subcommittee*

---

ARMY CIVIL FUNCTIONS

ENTIRE SUBCOMMITTEE

Ex officio members from Committee on Public Works

JENNINGS RANDOLPH, West Virginia      JOHN SHERMAN COOPER, Kentucky  
STEPHEN M. YOUNG, Ohio

KENNETH J. BOUSQUET, *Clerk*

---

ATOMIC ENERGY COMMISSION—TENNESSEE VALLEY AUTHORITY

LISTER HILL, Alabama, *Chairman*

ALLEN J. ELLENDER, Louisiana  
CARL HAYDEN, Arizona  
RICHARD B. RUSSELL, Georgia  
JOHN STENNIS, Mississippi  
ALAN BIBLE, Nevada  
JOHN O. PASTORE, Rhode Island

THOMAS H. KUCHEL, California  
ROMAN L. HRUSKA, Nebraska  
KARL E. MUNDT, South Dakota  
MARGARET CHASE SMITH, Maine

Also on Atomic Energy items

CLINTON P. ANDERSON, New Mexico      BOURKE B. HICKENLOOPER, Iowa  
ALBERT GORE, Tennessee

EARL COOPER, *Clerk*

HARLEY M. DIRKS, *Assistant Clerk*

---

BUREAU OF RECLAMATION AND INTERIOR POWER ACTIVITIES

CARL HAYDEN, Arizona, *Chairman*

ALLEN J. ELLENDER, Louisiana  
WARREN G. MAGNUSON, Washington  
RICHARD B. RUSSELL, Georgia  
JOHN L. McCLELLAN, Arkansas  
SPESSARD L. HOLLAND, Florida  
ALAN BIBLE, Nevada  
GALE W. McGEE, Wyoming

KARL E. MUNDT, South Dakota  
MILTON R. YOUNG, North Dakota  
GORDON ALLOTT, Colorado  
ROMAN L. HRUSKA, Nebraska  
THOMAS H. KUCHEL, California

PAUL R. EATON, *Clerk*

# PUBLIC WORKS AND ATOMIC ENERGY COMMISSION APPROPRIATIONS FOR FISCAL YEAR 1969

FRIDAY, JUNE 28, 1968

U.S. SENATE,  
SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS,  
*Washington D.C.*

The subcommittee met at 10:05 a.m., in room 1318, New Senate Office Building, Hon. Lister Hill (chairman) presiding.  
Present: Senators Hill, Bible, and Anderson.

## U.S. ATOMIC ENERGY COMMISSION

STATEMENT OF DR. GLENN T. SEABORG, CHAIRMAN  
ACCOMPANIED BY:

JAMES T. RAMEY, COMMISSIONER  
GERALD F. TAPE, COMMISSIONER  
R. E. HOLLINGSWORTH, GENERAL MANAGER  
E. J. BLOCK, DEPUTY GENERAL MANAGER  
JOHN P. ABBADESSA, CONTROLLER  
BERTRAM H. SCHUR, ASSOCIATE GENERAL COUNSEL  
JOHN V. VINCIGUERRA, ASSISTANT GENERAL MANAGER FOR  
ADMINISTRATION  
BRIG. GEN. E. B. GILLER, U.S. AIR FORCE, ASSISTANT GENERAL  
MANAGER FOR MILITARY APPLICATION  
PAUL W. McDANIEL, DIRECTOR, DIVISION OF RESEARCH  
MILTON SHAW, DIRECTOR, DIVISION OF REACTOR DEVELOP-  
MENT AND TECHNOLOGY  
DAVID B. ANTHONY, ASSISTANT DIRECTOR, DIVISION OF MILI-  
TARY APPLICATION  
KENNEDY C. BROOKS, DEPUTY DIRECTOR, DIVISION OF CON-  
STRUCTION  
RAFFORD L. FAULKNER, DIRECTOR, DIVISION OF RAW MATE-  
RIALS  
W. R. VOIGHT, JR., DEPUTY DIRECTOR, DIVISION OF PRODUC-  
TION  
MILTON KLEIN, DIRECTOR, SPACE NUCLEAR SYSTEMS  
VICTOR CORSO, ASSISTANT CONTROLLER FOR BUDGETS  
ROBERT H. BAUER, DEPUTY ASSISTANT CONTROLLER FOR  
BUDGETS

### SUBCOMMITTEE PROCEDURE

Senator HILL. The subcommittee will kindly come to order. Dr. Seaborg, we are pleased to have you here this morning. Mr. Ramey,

Mr. Tape, the Commissioners and members of your staff are also present this morning.

Has everybody been checked for security reasons?

Over the years it has been our practice to have the reporter take down everything, except when you specifically want it left off the record, and then the chairman of the Commission would go over the transcript in order to delete anything that was confidential or secret that should not be printed. We would be happy to have you proceed in your own way.

APPEAL LETTER

I have a letter from Dr. Seaborg to Senator Hayden, dated June 27, 1968, with proposed amendments. The letter and amendments will be inserted in the record at this point.

(The letter and amendments follow:)

U.S. ATOMIC ENERGY COMMISSION,  
Washington, D.C., June 27, 1968.

Hon. CARL HAYDEN,  
Chairman, Committee on Appropriations, U.S. Senate.

DEAR SENATOR HAYDEN: The House of Representatives on June 19, 1968, passed H.R. 17903, a bill making appropriations for public works for water and power resources development, including certain civil functions administered by the Department of Defense, \* \* \* and the Atomic Energy Commission, for the fiscal year ending June 30, 1969, and for other purposes.

As passed by the House, the bill makes certain reductions in the appropriations requested for the atomic energy program. We have made a careful review of the areas affected by the House bill and propose amendments thereto for consideration by your committee.

Enclosed are fifteen copies of the amendments proposed by the Atomic Energy Commission to H.R. 17903, together with the reasons therefor.

Cordially,

GLENN T. SEABORG, *Chairman.*

*Proposed amendments to the public works for water and power resources development and Atomic Energy Commission appropriation bill, 1969; Atomic Energy Commission (H.R. 17903) (as passed by the House of Representatives)*

Estimate submitted to the House:	
Operating expenses -----	\$2, 225, 600, 000
Plant and capital equipment-----	529, 000, 000
Total -----	<u>2, 754, 600, 000</u>
Bill as passed by the House:	
Operating expenses -----	2, 080, 000, 000
Plant and capital equipment-----	456, 600, 000
Total -----	<u>2, 536, 600, 000</u>
Change by House:	
Operating expenses -----	-145, 600, 000
Plant and capital equipment-----	-72, 400, 000
Total -----	<u>-218, 000, 000</u>

PROPOSED AMENDMENTS TO BILL

(1) Page 27, line 1, strike out "\$2,080,000,000" and insert in lieu thereof "\$2,109,300,000."

(2) Page 28, line 13, strike out "\$456,600,000" and insert in lieu thereof "\$464,500,000."

## HOUSE REPORT No. 1549

## ATOMIC ENERGY COMMISSION

*Operating expenses*

Appropriation, 1968 .....	\$2,140,000,000
Budget estimate, 1969 .....	2,225,600,000
Recommended, 1969 .....	2,080,000,000
Comparison:	
Appropriation, 1968 .....	—60,000,000
Budget estimate, 1969 .....	—145,600,000

The net reduction of \$60,000,000 below the 1968 appropriation level consists of (1) an increase of \$167.9 million for the production of nuclear weapons, including the cost of special nuclear materials, to meet the weapons stockpile requirements as approved by the President and to develop and test new weapons systems for the Poseidon and Sentinel systems, and (2) a reduction of \$227.9 million below the 1968 appropriation level of the non-weapons activities of the Commission.

The reduction recommended by the Committee of \$145.6 million below the budget estimate includes \$65.4 million for items deleted in the 1969 Authorization Act (Public Law 90-289, approved April 19, 1968) and additional reductions of \$80.2 million imposed by the Committee based on its review. All of the reductions made in the 1969 estimates are in the non-weapons activities of the Commission. In each instance, the reductions have been made without prejudice to the items, being based on the need to defer and stretchout programs wherever possible because of the serious fiscal situation.

Funds under this heading are distributed as shown in the following table:

Program	Appropriation 1968	Budget estimate, 1969	Committee bill	Committee bill compared with budget estimate
Raw materials .....	\$127,733,000	\$112,470,000	\$105,670,000	—\$6,800,000
Special nuclear materials .....	340,670,000	334,303,000	333,303,000	—1,000,000
Weapons:				
Production, storage, and surveillance .....	244,800,000	270,690,000	270,690,000	
Research and development .....	229,370,000	250,000,000	250,000,000	
Testing of atomic weapons:				
Continental tests .....	128,800,000	156,900,000	156,900,000	
Supplemental test sites .....	64,300,000	104,300,000	104,300,000	
Off continent test readiness .....	19,340,000	20,000,000	20,000,000	
Laboratory participation .....	30,290,000	33,400,000	33,400,000	
Total, testing .....	242,730,000	314,600,000	314,600,000	
Special test detection activities .....	5,550,000	5,500,000	5,500,000	
Total, weapons program .....	722,450,000	840,790,000	840,790,000	
Reactor development:				
Civilian power reactors .....	118,475,000	132,000,000	126,500,000	—5,500,000
Cooperative power reactor demonstration .....	27,183,000	27,658,000	27,658,000	
Euratom .....	2,440,000	2,500,000	2,000,000	—500,000
Merchant ship reactors .....	100,000	100,000		—100,000
Naval propulsion reactors .....	106,700,000	115,300,000	115,300,000	
Space propulsion systems:				
Reactor propulsion (Rover) NERVA .....	35,480,000	39,000,000		—39,000,000
Advanced rocket reactor technology graphite reactors (Phoebus) .....	25,100,000	22,500,000	20,500,000	—2,000,000
Supporting graphite technology .....	520,000	500,000	500,000	
Nuclear rocket development station operations .....	9,400,000	10,000,000	10,000,000	
Total, space propulsion systems .....	70,500,000	72,000,000	31,000,000	—41,000,000
Space electric power development .....	55,540,000	52,650,000	43,500,000	—9,150,000
Terrestrial electric power development .....	7,325,000	6,830,000	4,230,000	—2,600,000
General reactor technology .....	49,000,000	50,000,000	48,000,000	—2,000,000
Advanced systems research and development .....	8,535,000	7,980,000	6,980,000	—1,000,000
Nuclear safety .....	33,305,000	40,400,000	36,000,000	—4,400,000
Operational services .....	3,000,000	2,102,000	2,102,000	
Total, reactor development program .....	482,103,000	509,520,000	443,270,000	—66,250,000

Program	Appropriation 1968	Budget estimate, 1969	Committee bill	Committee bill compared with budget estimate
Physical research:				
High energy physics	\$113,400,000	\$120,400,000	\$118,800,000	-\$1,600,000
Medium energy physics	11,100,000	11,600,000	11,400,000	-200,000
Low energy physics	28,820,000	30,100,000	29,700,000	-400,000
Mathematics and computer research	5,720,000	5,900,000	5,800,000	-100,000
Chemistry research	54,000,000	56,300,000	54,800,000	-1,500,000
Metallurgy and materials research	27,060,000	28,300,000	27,800,000	-500,000
Controlled thermonuclear research	24,900,000	27,400,000	26,800,000	-600,000
Total, physical research program	265,000,000	280,000,000	275,100,000	-4,900,000
Biology and medicine	88,450,000	92,051,000	89,500,000	-2,551,000
Training, education, and information	16,422,000	17,009,000	16,422,000	-587,000
Isotopes development	7,375,000	7,185,000	7,185,000	
Civilian applications of nuclear explosives (Plow-share)	17,965,000	14,500,000	14,500,000	
Communities	6,771,000	6,942,000	6,792,000	-150,000
Program direction and administration	95,313,000	102,885,000	101,385,000	-1,500,000
Security investigations	6,795,000	6,588,000	6,588,000	
Cost of work for others	11,219,000	14,533,000	29,038,000	+14,505,000
Less reduction for foreign travel			-740,000	-740,000
Total program costs funded	2,188,266,000	2,338,776,000	2,268,803,000	-69,973,000
Change in selected resources	7,561,000	55,679,000	13,744,000	-41,935,000
Gross obligations	2,195,827,000	2,394,455,000	2,282,547,000	-111,908,000
Revenues applied	-66,464,000	-99,116,000	-122,808,000	-23,692,000
Net obligations	2,129,363,000	2,295,339,000	2,159,739,000	-135,600,000
Unobligated balance, start of year	-59,110,000	-69,739,000	-79,739,000	-10,000,000
Unobligated balance, end of year	69,739,000			
Transferred to General Services Administration	8,000			
Appropriation	2,140,000,000	2,225,600,000	2,080,000,000	-145,600,000

**Raw Materials.**—The decrease of \$6,800,000 in the budget estimate consists of (1) deletion of \$600,000 for resource investigations which the Committee feels is the responsibility of the Department of the Interior and which should be funded by that agency; and (2) \$6,200,000 for uranium procurement. This reduction is based on the Committee's understanding that there will be some shortfalls in anticipated concentrate deliveries to the Commission.

**Special Nuclear Materials.**—The reduction of \$1,000,000 has been made in process development. The allowance of \$25,499,000 includes an increase of \$2,186,000 over the 1968 level and should be adequate for essential work in fiscal year 1969.

**Reactor Development Program.**—The Committee has recommended a total of \$443,270,000 for the Reactor Development Program, a decrease of \$66,250,000 in the budget estimate, including reductions of \$17,350,000 made in the 1969 Authorization Act.

**Civilian Power Reactors.**—The reduction of \$5,500,000 made in the Civilian Power Reactors Program includes (1) a reduction of \$2,000,000 for the Heavy Water General Program, including \$450,000 deleted in the 1969 Authorization Act. The Committee believes that the Commission can close out this portion of its civilian power research and development activities in the light of the concentrated efforts in other phases of civilian power reactor development; (2) a reduction of \$1,500,000 for the Molten Salt Breeder reactor. The amount allowed \$5,200,000, represents an increase of \$1,000,000 which should provide for urgent expansion requirements of the program in fiscal year 1969; and (3) a reduction of \$2,000,000 made in the 1969 Authorization Act in the Light Water Breeder Reactor program.

**Euratom.**—The Committee has allowed \$2,000,000 for this program, a reduction of \$500,000 in the estimate. The Committee believes that phase out of this program scheduled in fiscal year 1969 can be expedited with the resultant savings.

**Merchant Ship Reactors.**—The Committee has deleted the \$100,000 budgeted for the Merchant Ship Reactors program. Pending definition of a national policy on nuclear power merchant ships, the Committee believes that current work can be absorbed by existing staff.

**Space Propulsion Systems (Rover).**—Because of the action by the House on the NASA authorization bill curtailing the portion of the NERVA nuclear rocket engine development program being conducted by NASA, the Committee has had no alternative but to take comparable action in connection with related funding level for the work programmed by AEC. The Committee has therefore disallowed \$41,000,000 of the budget request, including \$3,000,000 deleted in the 1969 Authorization Act. The Committee has allowed \$31,000,000, \$2,000,000 less than

the budget estimate, for continuing the advanced rocket reactor technology program and the nuclear rocket development station operations.

The Committee has supported to date an adequate funding level for the NERVA Program because of its importance to our future space program and will reconsider its action as appropriate in the future to assure that a balanced program is maintained between the two agencies.

*Space Electric Power Development.*—The reduction of \$9,150,000 in this program includes: (1) \$5,000,000 deleted in the 1969 Authorization Act consisting of \$2,500,000 for the PU-238 Space Generator Development and \$2,500,000 for the advanced reactor technology program; (2) \$3,000,000 for the Large Heat Source (kw) generator including a reduction of \$500,000 made in the 1969 Authorization Act. The recommended budget estimates provide for using isotopes to power a generator for the NAVSAT program. Because of the need to economize, the Committee believes that one major development effort should be adequate to develop technology and therefore recommends that the start of a second development effort be deferred; and (3) a reduction, \$1,150,000 in the estimate for space safety based on the slow-downs and reductions made in a number of other space activities.

*Terrestrial Electric Power Development.*—The Committee has imposed a reduction of \$2,600,000 in this item. The Committee believes that the rate of development for radioisotope power sources for terrestrial applications can be slowed down in view of the funds provided elsewhere in the budget for such power development.

*Nuclear Safety.*—The reduction of \$4,400,000 recommended in the nuclear safety program includes a disallowance of \$3,400,000 made in the 1969 Authorization Act. The amount allowed, \$36,000,000, an increase of \$2,695,000, should be adequate for the needs of the program in fiscal year 1969.

*Physical Research Program.*—The total reduction of \$4,900,000 in the physical research program includes a \$3,000,000 decrease carried in the 1969 Authorization Act. The total amount allowed for the program, \$275,100,000 includes an increase of \$10,100,000 above the 1968 level and should provide for essential additional requirements.

*Program Direction and Administration.*—A reduction of \$1,500,000 has been made in the budget estimate, including \$500,000 reflected in the 1969 Authorization Act. The amount allowed, \$101,385,000, represents an increase of \$6,072,000 above the 1968 appropriation, or 6 percent. As this item has had a history of increases, including \$7,800,000 for the current year, the Committee does not feel that the full budget estimate is warranted in the light of the need for economy.

*Reduction for Foreign Travel.*—The allowance reflects a total reduction of \$740,000 in the estimate for foreign travel, including the \$500,000 made in the 1969 Authorization Act. In light of the Administration's policy for the curtailment of foreign travel, the allowance of \$1,000,000 the estimated level for the current year, should make provision for essential foreign travel requirements in fiscal year 1969.

*Other programs.*—The reductions shown in the table for other programs have all been made in accordance with action taken in the 1969 Authorization Act.

*Changes in Selected Resources.*—The reduction in this item, \$41,935,000, is based on the reductions made in the above programs.

The Committee directs that the funding of the new Safeguards Training Program under the Special Nuclear Materials Program be transferred to the Training, Education, and Information Program and be funded hereafter under the latter program.

#### *Plant and capital equipment*

Appropriation, 1968.....	\$369,133,000
Budget estimate, 1969.....	529,000,000
Recommended, 1969.....	456,600,000
Comparison:	
Appropriation, 1968.....	+87,467,000
Budget estimate, 1969.....	-72,400,000

The net increase of \$87.5 million allowed over the 1968 appropriation includes an increase of \$113.3 million for the weapons program to provide the additional construction and equipment required to meet the additional production capability requirements for the POSEIDON and SENTINEL systems, and a decrease of \$25.8 million in the other plant and capital equipment requirements of the Atomic Energy Commission.

The decrease made in the budget request of \$72.4 million includes reductions of \$24.2 million made in the 1969 Authorization Act and additional reductions total-

ing \$48.2 million made by the Committee. These reductions have been made without prejudice to the items involved but merely reflect the necessity of curtailing expenditures to the greatest extent possible at the present time. The allocation of the reductions made in the budget estimate are indicated in the table below, and include 5 percent reductions in the requests for general plant projects and capital equipment not related to construction. No reductions have been made in the construction and equipment items required for the weapons program. The decreases made in funds for continuing construction of the fast flux test facility and the Meson physics facility are based on anticipated slippage in the construction program.

The budget estimate included \$25,000,000 to continue planning and initiate construction of the 200 BEV accelerator to be located at Weston, Illinois. The Committee has approved \$7.1 million, a disallowance of \$17,900,000, to make provision only during fiscal year 1969 for continuation of the engineering and design work, including \$4.2 million for the University Research Association (URA) and \$2.9 million for the architect and engineering firms (DUSAF). The allowance, together with carryover funds of \$2.7 million, will make a total of \$9.8 million available for continued planning of the facility. In addition, a total of \$4,100,000, an increase of \$1,450,000, is included under the operating expenses appropriation for continued research and development work. The Committee fully supports the need for the project but does not believe in light of the critical fiscal situation that it is warranted in providing funds to initiate construction at this time of a project with a total estimated cost of \$250,000,000 and involving annual operating costs of about \$60 million upon completion of the facility. The Committee's action is in accordance with the policy followed on the other appropriation items in the bill pertaining to the construction of water and power resource development projects.

A breakdown of the construction and equipment program approved by the Committee in comparison with the budget estimate is indicated in the following table:

Construction project	1969 budget estimate	Recommended in bill	Reduction
Powder metallurgy facility, Savannah River, S.C.	\$700,000	\$700,000	
Waste storage tanks, Savannah River, S.C.	3,500,000	3,500,000	
Equipment test facility, Oak Ridge, Tenn.	3,925,000		<sup>1</sup> - \$3,925,000
Calcined solids storage facility additions, National Reactor Testing Station, Idaho	2,100,000	2,100,000	
Rehabilitation of plutonium processing site, Los Alamos Scientific Laboratory, New Mexico	3,500,000	3,500,000	
Weapons production, development, and test installations	10,000,000	10,000,000	
Hot fuel examination facility, National Reactor Testing Station, Idaho	10,000,000	10,000,000	
Modifications to EBR-II and related facilities, National Reactor Testing Station, Idaho	2,000,000	2,000,000	
Research and development test plants, Project Rover, Los Alamos Scientific Laboratory, New Mexico, and Nevada Test Site, Nevada	1,000,000		-1,000,000
Modifications to reactors	1,000,000	1,000,000	
Conversion of heating plant to natural gas, Argonne National Laboratory, Illinois	525,000		<sup>1</sup> -525,000
Accelerator and reactor additions and modifications, Brookhaven National Laboratory, New York	600,000	600,000	
Accelerator improvements, zero gradient synchrotron, Argonne National Laboratory, Illinois	875,000	875,000	
Accelerator improvements, Lawrence Radiation Laboratory, Berkeley, Calif.	750,000	750,000	
Accelerator improvements, Cambridge and Princeton accelerators	145,000	145,000	
Accelerator improvements, Stanford Linear Accelerator Center, California	630,000	630,000	
Conversion of steamplant to natural gas, Brookhaven National Laboratory, New York	800,000		<sup>1</sup> -800,000
General plant projects	37,010,000	35,160,000	-1,850,000
New weapons production capabilities, various locations	184,500,000	184,500,000	
200-Bev accelerator, Du Page and Kane Counties near Chicago, Ill. (AE only)	25,000,000	7,100,000	-17,900,000
Fast flux test facility	35,000,000	23,000,000	-12,000,000
Environmental test facility, Lawrence Radiation Laboratory, Livermore, Calif.	3,200,000	3,200,000	
Meson physics facility, Los Alamos Scientific Laboratory, New Mexico	26,200,000	18,700,000	-7,500,000
Argonne advanced research reactor, Argonne National Laboratory, Illinois (rescission)		-18,000,000	<sup>1</sup> -18,000,000
Subtotal, construction	352,960,000	289,460,000	-63,500,000
Capital equipment not related to construction	176,040,000	167,140,000	<sup>2</sup> -8,900,000
Total, appropriation request for plant and capital equipment	529,000,000	456,600,000	-72,400,000

<sup>1</sup> Deleted in 1969 authorization act.

<sup>2</sup> Includes \$1,000,000 reduction in 1969 authorization act.

AMENDMENT (1): INCREASE OF \$29,300,000 IN THE APPROPRIATION FOR OPERATING EXPENSES

The Commission requests restoration of \$29,300,000 of the reduction made by the House of Representatives. The following table summarizes the reductions made by the House and the amount requested for restoration.

SUMMARY OF OPERATING EXPENSES

	AEC request	House change	Restoration requested
Raw materials.....	\$112,470,000	-\$6,800,000	
Special nuclear materials.....	334,303,000	-1,000,000	
Weapons.....	840,790,000		
Reactor development.....	509,520,000	-66,250,000	\$22,000,000
Physical research.....	280,000,000	-4,900,000	
Biology and medicine.....	92,051,000	-2,551,000	
Training, education, and information.....	17,009,000	-587,000	
Isotopes development.....	7,185,000		
Civilian applications of nuclear explosives.....	14,500,000		
Communities.....	6,942,000	-150,000	
Program direction and administration.....	102,885,000	-1,500,000	
Security investigations.....	6,588,000		
Cost of work for others.....	14,533,000	+14,505,000	
Reduction in foreign travel.....		-740,000	
Change in selected resources.....	55,679,000	-41,935,000	7,300,000
Revenues and reimbursements from non-Federal sources.....	-99,116,000	-23,692,000	
Unobligated balance brought forward.....	-69,739,000	-10,000,000	
Total.....	2,225,600,000	145,600,000	29,300,000

The reasons for the requested restoration are given below:

SPACE PROPULSION SYSTEMS (PROJECT ROVER)

The Commission is appealing \$22.0 million of the reduction from the President's budget of \$41.0 million in the Nuclear Rocket Program as reported out by the Appropriations Committee and passed by the House. The House reduction would mean immediate termination of all facets of the NERVA program, drastic reductions in the Advanced Reactor Technology program, and complete shutdown of the Nuclear Rocket Development Station.

The effects of this action would be to eliminate the most promising propulsion system from the nation's space program, and it would have the most profound effects on our future capability in space, civilian and possibly military. It would take this nation several years and hundreds of millions of dollars to re-establish this capability once terminated. It would also have a serious impact on the nation's technological strength, since this program is an important element in advancing our technology.

Such action would be inconsistent with the amount authorized for the Rover program in both the AEC and NASA authorization passed by both the House and the Senate. In recognition of this and the importance of the Nuclear Rocket Program to the nation, but at the same time mindful of the serious budget problems we face, we request that \$22.0 million of the \$41.0 million reduction by the House be restored to the Nuclear Rocket Program. This amount would allow us to continue at least a reduced cadre of the NERVA industrial design team and to maintain the reactor test capability at LASL to continue the effort on Peewee 1 and the disassembly of the Phoebus 2A scheduled to be tested in late June. Major layoffs would still have to be made and the NERVA technology testing program curtailed. Some option, however, would exist with this additional funding to continue NERVA reactor development in subsequent budget years. This additional funding would prevent complete shutdown of the industrial contractor's plant facilities and at least keep some of the experienced team proceeding with useful design.

Pertinent to our request for restoration is the language of the House Report which explains that the basis of the House reduction was to take action comparable to the House action on the NASA Authorization Bill which curtailed the portion of the NERVA nuclear rocket engine development program being conducted by NASA. However, the House has accepted the Senate action on the NASA Authorization Bill which provides for the NERVA nuclear rocket engine development program. Also pertinent to our request for restoration is the lan-

guage of the House Report which states that the House Committee has supported to date an adequate funding level for the NERVA Program because of its importance to our future space program and will reconsider its action as appropriate in the future to assure that a balanced program is maintained between the two agencies.

The AEC strongly urges the restoration of this funding of \$22.0 million to a total program operating cost level of \$53.0 million.

#### CHANGES IN SELECTED RESOURCES RELATED TO THE ROVER PROGRAM

An amount of \$7.3 million is required for contractual obligations related to the Rover program operating cost restoration justified above.

#### AMENDMENT (2): INCREASE OF \$7,900,000 IN THE APPROPRIATION FOR PLANT AND CAPITAL EQUIPMENT

The Commission requests restoration of the \$7,900,000 reduction made by the House Appropriations Committee. The following table summarizes the reductions made by the House Appropriations Committee and the requested restoration.

#### SUMMARY OF PLANT AND CAPITAL EQUIPMENT

	AEC request	House change	Restoration requested
Equipment test facility, Oak Ridge, Tenn.....	\$3,925,000	-\$3,925,000	.....
Research and development test plants, Project Rover, Los Alamos Scientific Laboratory, N. Mex., and Nevada Test Site, Nev.....	1,000,000	-1,000,000	.....
Conversion of heating plant to natural gas, Argonne National Laboratory, Ill.....	525,000	-525,000	.....
Conversion of steamplant to natural gas, Brookhaven National Laboratory, N.Y.....	800,000	-800,000	.....
General plant projects.....	37,010,000	-1,850,000	.....
200 Bev accelerator, Du Page and Kane Counties, near Chicago, Ill.....	25,000,000	-17,900,000	\$7,900,000
Fast-flux test facility.....	35,000,000	-12,000,000	.....
Meson physics facility, Los Alamos Scientific Laboratory, N. Mex.....	26,200,000	-7,500,000	.....
Argonne advanced research reactor, Argonne National Laboratory, Ill.....	176,040,000	-18,000,000	.....
All other construction projects.....	223,500,000	.....	.....
Capital equipment not included in construction.....	176,040,000	-8,900,000	.....
Total.....	529,000,000	-72,400,000	7,900,000

The reasons for the requested restoration are given below :

#### 200 BEV ACCELERATOR

The Commission is appealing for the restoration of \$7.9 million and the removal of the restrictive language in the House Report relating to the use of such funds for the 200 Bev Accelerator (Item 68-4-f) proposed for Du Page and Kane Counties, Illinois. This appeal would permit long lead-time procurement and initiation of limited construction efforts in addition to AE work.

Following several years of planning and research and development, funds in the amount of \$7.3 million for architect-engineering work were provided in fiscal year 1968 in anticipation of construction in fiscal year 1969. During 1968 an outstanding team of scientists and engineers has been formed at the National Accelerator Laboratory (NAL). All these efforts have produced an imaginative and economical design for this important national facility.

Restricting this effort to another year of engineering and design will cause a serious disruption in the project. The current need of the project is for procurement of a few long lead-time items and the initiation of construction of just those portions of the accelerator housing which are required for the injection system. A second consecutive year of restriction to engineering and design would lead to serious inefficiencies and increased costs. Moreover, the laboratory has developed a strong affirmative action program for equal employment opportunity which would be compromised if no construction work was started on the project in the coming year.

Earlier this year Congress enacted a partial authorization in the amount of \$25,000,000 for fiscal year 1969 in expectation of full project authorization for fiscal year 1970. Fiscal considerations early in the budgetary process required rescheduling of construction activities originally planned for fiscal year 1969. Mindful of the continued fiscal stringencies and the severe budgetary pressures

on the Congress, the Commission believes a minimum of \$15.0 million of new obligational authority is needed in fiscal year 1969. This level of funding and removal of the engineering and design restriction is essential if this important national scientific effort is to proceed economically in fiscal year 1969. Activities provided with this funding would include continuation of AE work, procurement of engineering equipment and prototype components and long lead-time materials and electrical equipment, initiation of site work, provisions of an AE camp and construction of the injection system housing and central utility plant.

#### PROGRAM AND BUDGET REQUEST

Dr. SEABORG. All right, Mr. Chairman, and members of the committee, the members and staff of the Atomic Energy Commission are pleased to appear before your committee to discuss the AEC's program and budget estimates for fiscal year 1969.

The AEC request for appropriations for fiscal year 1969 totals \$2,754.6 million, of which \$2,225.6 million is for operating expenses and \$529 million for plant and capital equipment. The requested appropriation is about \$245.5 million more than the amount appropriated for fiscal year 1968.

With respect to our requested appropriation, however, I would like to point out the heavy defense orientation of this year's budget. Almost 80 percent of the increase over 1968 appropriations results from increases in weapons operating costs and construction funding. Our weapons and naval reactors operating programs account for over 40 percent of our total operating appropriation request. If one prorates the portion of our five special nuclear materials which will be applied to military purposes, this percentage becomes even greater. Also, planned obligations in fiscal year 1969 for only one construction project—new weapons production capabilities—in the amount of \$184.5 million are more than one-half of our total 1969 appropriation request for new construction funds.

Authorizing legislation approved April 19 would provide for fiscal year 1969 appropriations of about \$2,679.3 million, or \$75.3 million less than the amount requested.

The appropriation bill as passed by the House of Representatives June 19 provides total appropriations of \$2,536.6 million including \$2,080 million for operating expenses and \$456.6 million for plant and capital equipment. This represents a reduction of \$218 million from our appropriation request—\$145.6 million for operating expenses and \$72.4 million for plant and capital equipment.

By letter of June 27 to Senator Hayden, we submitted proposed amendments to the appropriation bill which would restore \$37.2 million of the House reduction—\$29.3 million for operating expenses and \$7.9 million for plant and capital equipment. Before discussing the basis for this proposed restoration, I would like to talk briefly about each of our major programs.

I will start with raw materials.

The raw materials program budget request of \$112.5 million for operating expenses provides for the procurement of about 8,000 tons of uranium concentrates to be obtained exclusively from domestic producers. This estimate reflects a decrease of \$15.3 million from the fiscal year 1968 level. In the second half of the fiscal year the purchase price of concentrates will decline from its present price of \$8 per pound to an average of about \$5.90 per pound. The estimate also in-

cludes an item of \$600,000 to fund selective research and development contracts in resource investigations. However, action by the House Appropriations Committee reflects its belief that the responsibility for continuation of resource investigation effort should be that of the Department of Interior and accordingly eliminates the \$600,000 previously estimated for this work in fiscal year 1969. The House also reduced uranium procurement estimates by \$6.2 million relative to recent indications that deliveries of uranium concentrates will be reduced by approximately 500 tons from the originally estimated 8,000 ton level in fiscal year 1969.

#### SPECIAL NUCLEAR MATERIALS

The fiscal year 1969 budget request for operating expenses for the special nuclear materials program is \$334.3 million, a reduction of \$6.4 million from the fiscal year 1968 estimate. This estimate reflects the costs to operate the Commission's production complex for the production of special nuclear materials for military and civilian programs. Also included in this estimate are funds to purchase plutonium produced in private power reactors, to provide for chemical processing of spent reactor fuels in commercial facilities, and to continue process development efforts directed toward achieving program objectives by safe, efficient and economical operation of the production complex. The estimate also includes about \$2.5 million for safeguards and materials management activities.

The fiscal year 1969 estimates take into account estimated savings in fiscal year 1969 of \$16.5 million resulting from the shutdown of two more production reactors this past February—one at Richland and one at Savannah River. The combined usage of electric power at the Commission's diffusion plants will be reduced to the previously announced level of 2,000 megawatts.

The budget also provides for the operation of the  $UF_6$  feed plant at Paducah to convert production reactor tails to  $UF_6$  for use as feed to the diffusion plants. This is the feed plant that was shut down in January 1964 as a result of the production cutback announced in January 1964.

The special nuclear materials program request under "Plant and capital equipment" totaled \$34.8 million and included a powder metallurgy facility and waste storage tanks at Savannah River for \$700,000 and \$3.5 million, respectively; an equipment test facility at Oak Ridge for \$3.9 million; \$2.1 million for calcined waste storage facility additions at Idaho; \$6.7 million for general plant projects; and \$17.9 million for capital equipment not related to construction. The equipment test facility was not provided for in the House appropriations bill.

#### WEAPONS

The estimated operating costs for the weapons program in fiscal year 1969 are \$840.8 million. This provides for production and surveillance of nuclear weapons to meet presidentially approved stockpile requirements, the conduct of an aggressive research and development program, the continuation of the underground testing program, maintenance of an atmospheric test readiness capability, and cooperation with the Department of Defense in special test detection activities.

The planned program is one which will enable us to continue to meet our responsibilities for the four safeguards related to the limited nuclear test ban treaty.

The fiscal year 1969 estimate represents an increase of \$118.3 million over the estimate for fiscal year 1968, made up of \$25.9 million for production and surveillance activities, \$20.6 million for research and development programs, and \$71.8 million for testing of atomic weapons. The increase in the production estimate is required to support production activities necessary for new weapons required by the DOD. The increase in testing provides \$40 million for the increased activity at the supplemental test sites, with the remainder of the increase needed to provide underground testing in support of the laboratory development effort.

The weapons program request under plant and capital equipment totals \$294.7 million. This includes \$215.4 million for construction projects and \$79.3 million for capital equipment. The amount requested for construction includes \$184.5 million required to provide new facilities for the production of weapons of new and different designs. The capital equipment estimate of \$79.3 million covers the requirements for the laboratories, testing, and the production complex, and include \$20.7 million for computers needed for the increased program activities.

#### REACTOR DEVELOPMENT

The reactor development program operating costs for fiscal year 1969 are estimated at \$509.5 million, which is an increase of \$27.4 million compared to fiscal year 1968. The House-approved appropriation bill reduces the reactor development program request by \$66.2 million. The largest single reduction is \$41 million in the space propulsion (Rover) program. We are appealing restoration of \$22 million to maintain a minimum NERVA engine industrial team capability. In addition, the other reductions are principally in space electric power development, civilian power reactors and related nuclear safety, and terrestrial electric power development.

About half of the \$27.4 million requested increase in operating expenses is related to work being conducted on central station power reactors. The high-priority fast breeder program (FBR) accounts for a \$16.9 million increase to continue to foster industrial participation in the FBR development program through involvement in such areas as: development of specific components; fuel development for the fast flux test facility (FFTF) and fuel fabrication for the experimental breeder reactor II and for critical physics facilities. Other increases related to central station power reactors are principally associated with support of the nuclear power desalting arrangement with the Metropolitan Water District of Southern California. Related to the fast breeder program our fiscal year 1969 construction budget included \$35 million for the FFTF which was fully authorized at \$87.5 million in fiscal year 1968, and for which \$28.5 million has thus far been appropriated. The House appropriation bill reduces fiscal year 1969 funding for the FFTF by \$12 million based on anticipated slippage in the construction program.

The remainder of the reactor development program's operating increase is attributable primarily to the increased development effort

in the naval propulsion reactor program on advanced cores for submarine and destroyer plants; and to the further strengthening of the nuclear safety program through increases for safety support for the fast breeder reactors, demonstration of engineered safety features, procurement of fuel for safety testing facilities, and development of standards, codes, and specifications.

#### PHYSICAL RESEARCH

Basic research in the physical sciences is support through the physical research program. Investigations are conducted in the fields of high-energy physics, medium-energy physics, low-energy physics, mathematics and computers, chemistry, metallurgy and materials, and controlled thermonuclear research. The information gained by research in these areas is fundamental to future technological and engineering advances. Our fiscal year 1969 request for operating expenses was \$280 million, which is an increase of \$15 million, or about 5.7 percent over fiscal year 1968.

About one-half of the proposed increase is for the high-energy physics program, of which about \$2.9 million is required to support the Stanford Linear Accelerator. The remaining high-energy physics increase is principally for research and development activities on the 200-billion-electron-volt accelerator and for continued use of presently operating accelerators—alternating gradient synchrotron, zero gradient synchrotron, Princeton-Pennsylvania accelerator, and the Cambridge electron accelerator.

In medium-energy physics, we are requesting a net increase of \$500,000 primarily attributable to an increase for research and development work on the Los Alamos Meson Physics Facility (LAMPF). Funding of \$26.2 million was requested under the plant and capital equipment budget to continue scheduled construction work on the LAMPF. The House appropriation bill reduces this request by \$7.5 million based on anticipated slippage in construction.

Senator HILL. Do you think there will be that much slippage, Doctor?

Dr. SEABORG. I think there will be approximately that much.

Mr. ABBADESSA. Yes. We will probably require some adjustment in our schedule, but we believe we can live with the figure, Mr. Chairman.

Senator HILL. All right.

Dr. SEABORG. For the controlled thermonuclear research program, we are requesting an increase of \$2.5 million over the \$24.9 million level for fiscal year 1968. The increase is primarily attributable to increases in base program operating funds and fabrication of major new experimental devices.

Smaller increases in low-energy physics, chemistry, metallurgy and materials, and mathematics comprise the balance of the operating program request.

The House Appropriation action reduces operating costs by \$4.9 million leaving a total program increase of \$10.1 million. This will permit continuation of research activities in all categories at essentially the fiscal year 1968 level, except for minimal growth in high energy physics and controlled thermonuclear research.

In addition to the \$7.5 million reduction for LAMPF, the House appropriation action reduces our plant and capital equipment request

by \$17.9 million for the 200 Bev accelerator and restricts our efforts on this project to continuation of design and engineering. We are appealing for restoration of \$7.9 million on the 200 Bev and removal of the aforementioned restriction. I will discuss this in some detail later.

#### BIOLOGY AND MEDICINE

The budget for the biology and medicine program provides for research on the consequences of radiation on man and his environment including the development of useful potentialities of radiation in the life sciences and overcoming the hazards of radiation.

The proposed operating budget of \$92.1 million is \$3.6 million over fiscal year 1968. The House Appropriation Act allows \$2.6 million less than the budget request, resulting in essentially holding the program to the fiscal year 1968 level.

The areas of somatic effects of radiation, environmental radiation studies, molecular and cellular level studies, radiation genetics, radiological and health physics and instrumentation, and cancer research account for the major portion of the increased support in fiscal year 1969. Particular attention will be given to problems associated with the exposure of uranium miners to radiation and to other studies of the long-term effects of low levels of radioactivity.

The proposed capital equipment budget for this program is \$5 million, a decrease of \$1 million below last year's level. No major construction projects are included, but approximately \$1 million is requested for general plant projects.

#### TRAINING, EDUCATION, AND INFORMATION

Our operating budget for training, education, and information activities totals \$17 million, an increase of about \$600,000 over fiscal year 1968. The House appropriation action reduces operating expenses to \$16.4 million, essentially the fiscal year 1968 cost level.

The training and education areas of this program include provisions for specialized courses, fellowships and traineeships, faculty training institutes, use of AEC laboratories for educational purposes, nuclear training equipment grants, nuclear materials assistance for universities, operation of the Puerto Rico Nuclear Center, and assistance to State and local governments in radiation control.

The information activities provide for the communication and dissemination of information about nuclear science and technology to scientists, engineers, teachers and students, and the general public. The objectives of such communication are to increase the effectiveness of Government-sponsored research and development, to promote commercial use of innovations resulting therefrom, to encourage interest and confidence in the peaceful uses of nuclear energy in the United States and abroad, and to stimulate the purchase and use of U.S. nuclear equipment and materials by foreign countries.

The estimated plant and capital equipment obligations for fiscal year 1969 of \$820,000 include \$225,000 for general plant projects at the Puerto Rico Nuclear Center and \$595,000 for capital equipment not related to construction.

## ISOTOPES DEVELOPMENT

The isotopes development program provides for the development and demonstration of radioisotope and radiation technology and applications, and the development of technology for production, separations, purification and encapsulation of radioisotopes. The proposed operating budget is \$7.2 million, a decrease of \$190,000 from fiscal year 1968.

Program emphasis in fiscal year 1969 will be given to nuclear techniques directed to environmental control problems, including water management and pollution waste treatment with radiation. The major projects continuing in fiscal year 1969 will include (1) development of ultrapure fuels for isotopically powered circulatory support systems, (2) development of methods for identifying the origin and determining the fate of atmospheric sulfur pollutants, (3) investigation of the basic properties of thulium-170 as a potential fuel for space nuclear auxiliary power, and (4) systems development for the application of radioisotope decay heat to spacecraft life support needs.

Other areas of program effort to be continued in fiscal year 1969 at approximately the same level of effort include applications of radioisotope tracer and analytical techniques to marine, national security, and aerospace problems and the use of radiation as a source of energy for the production and processing of materials. Development of radioisotope production and materials technology as well as work on the radiation preservation of foods, will continue at a somewhat reduced level.

The proposed capital equipment budget in support of the isotopes development program is estimated at \$1 million for fiscal year 1969. The budget contains no new construction projects for this program.

## PLOWSHARE

To continue the development of our civilian applications of nuclear explosives program, which is also known as Plowshare, we are requesting an operating budget of \$14.5 million. This amount is \$3.5 million less than the fiscal year 1968 estimate of \$18 million.

The fiscal year 1969 estimate of \$14.5 million will permit the program to continue to advance the technological progress achieved in fiscal year 1968 which included the successful execution of three major projects: Gasbuggy, Cabriole, and Buggy I. The estimate includes \$100,000 to conclude Gasbuggy and \$1.4 million to fund the AEC share of two or three other joint underground engineering projects with private industry from among those already proposed.

Nuclear excavation activities aimed at developing a further understanding of cratering phenomenology and a capability to predict accurately the size and shape of craters is estimated at \$7.0 million, or approximately half of the operating budget. We expect to carry out a point charge cratering experiment called Project Schooner, a device experiment, and to continue the cratering technology and explosive development work.

Plowshare scientific experiments estimated at \$500,000 for fiscal year 1969 are designed to study the mechanisms of producing new isotopes and possibly new elements and to allow for further neutron

physics measurements. These experiments are performed in conjunction with nuclear detonations conducted for other purposes.

Capital equipment funds requested to support the Plowshare program in fiscal year 1969 are estimated at \$500,000 and includes initial funds for a specially designed, streamlined and simplified operational equipment system to support those Plowshare projects whose sites are located off the Nevada Test Site. No construction projects are included for this program.

#### COMMUNITY

The operating cost request of \$6.9 million for the community program consisted of \$4.3 million at Los Alamos, N. Mex.—for assistance payments estimated at \$3.2 million and for support of other municipal activities estimated at \$1.1 million—and \$2.6 million for assistance payments to the former AEC communities at Oak Ridge, Tenn., and Richland, Wash. The House appropriations act reduced our request by \$150,000 in accordance with action taken in the 1969 authorization act.

#### PROGRAM DIRECTION AND ADMINISTRATION

Included under this program are the salaries, travel, and other costs of the Federal employees at the Washington headquarters and the field offices engaged in the executive direction, general management, and technical supervision of the atomic energy program. Operating costs for this program in fiscal year 1969 were estimated at \$102.9 million. The House appropriation act reduced operating costs by \$1.5 million. The reduction will be effected mainly by reducing man-years of employment and other contractual services items.

Employment at the end of fiscal year 1969 is projected at 5,952, an increase of 140 employees over the 5,812 planned at the end of fiscal year 1968. The additional positions are required primarily in the weapons, reactor, and regulatory programs and represent those needs that cannot be met through redeployment.

Plant and capital equipment obligations are estimated at \$2,052,000; \$1,812,000 for capital equipment and \$240,000 for modifications and alterations to the existing facilities at the Germantown headquarters.

#### BUDGET REDUCTIONS AND REQUESTED RESTORATIONS

At the opening of this statement I referred to the reductions amounting to \$218 million, made by the House. The reductions consist of \$145.6 million for operating expenses and \$72.4 million for plant and capital equipment.

After a most deliberate consideration of current requirements and in view of the extremely stringent budget situation, we have limited our request for restoration to \$37.2 million—\$29.3 million for operating expenses and \$7.9 million for plant and capital equipment. We would like to emphasize, however, that we still consider the programmatic activities involved in the reductions we are not appealing to be exceedingly worthwhile. The basis for the proposed restorations is set forth in the material transmitted to the committee in support of our proposed amendments to the appropriation bill as enacted by the House.

At this point, I would like to summarize briefly for the committee the items of our appeals.

SPACE PROPULSION SYSTEMS (PROJECT ROVER)

A reduction from the President's budget of \$41 million in the nuclear rocket program as reported out by the Appropriations Committee and passed by the House, would mean immediate termination of all facets of the NERVA program, drastic reductions in the advanced reactor technology program, and complete shutdown of the Nuclear Rocket Development Station.

The effects of this action would be to eliminate the most promising propulsion system for the Nation's space program, and it would have the most profound effects on our future capability in space, civilian and possibly military. It would take this Nation several years and hundreds of millions of dollars to reestablish this capability once terminated. It would also have a serious impact on the Nation's technological strength, since this program is an important element in advancing our technology.

Such action would be inconsistent with the amount authorized for the Rover program in both the AEC and NASA authorizations passed by both the House and the Senate. In recognition of this and the importance of the nuclear rocket program to the Nation, but at the same time mindful of the serious budget problems we face, we request that \$22 million of the \$41 million reduction by the House be restored to the nuclear rocket program. This amount would allow us to continue at least a reduced cadre of the NERVA industrial design team and to maintain the reactor test capability at LASL to continue the effort on Peewee 1 and the disassembly of the Phoebus 2A which was successfully tested on June 26, just the day before yesterday. Major layoffs would still have to be made and the NERVA technology testing program curtailed. Some option, however, would exist with this additional funding to continue NERVA reactor development in subsequent budget years. This additional funding would prevent complete shutdown of the industrial contractor's plant facilities and at least keep some of the experienced team proceeding with useful design.

Pertinent to our request for restoration is the language of the House report which explains that the basis of the House reduction was to take action comparable to the House action on the NASA authorization bill which curtailed the portion of the NERVA nuclear rocket engine development program being conducted by NASA. However, the House has accepted the Senate action on the NASA authorization bill which provides for the NERVA nuclear rocket engine development program. Also pertinent to our request for restoration is the language of the House report which states that the House committee has supported to date an adequate funding level for the NERVA program because of its importance to our future space program and will reconsider its action as appropriate in the future to assure that a balanced program is maintained between the two agencies.

The AEC strongly urges the restoration of this funding of \$22 million to a total program operating cost level of \$53 million.

## CHANGES IN SELECTED RESOURCES RELATED TO THE ROVER PROGRAM

An amount of \$7.3 million is required for contractual obligations related to the Rover program operating cost restoration justified above.

## 200 BEV ACCELERATOR

The Commission is appealing for the restoration of \$7.9 million and for the removal of the restrictive language in the House report relating to the use of such funds for the 200 Bev accelerator (item 68-4-f) proposed for DuPage and Kane Counties, Ill. This appeal would permit long leadtime procurement and initiation of limited construction efforts in addition to AE work.

Following several years of planning and research and development, funds in the amount of \$7.3 million for architect-engineering work were provided in fiscal year 1968 in anticipation of construction in fiscal year 1969. During fiscal year 1968, an outstanding team of scientists and engineers has been formed at the National Accelerator Laboratory (NAL). All these efforts have produced an imaginative and economical design for this important national facility.

Restricting this effort to another year of engineering and design will cause a serious disruption in the project. The current need of the project is for procurement of a few long-leadtime items and the initiation of construction of just those portions of the accelerator housing which are required for the injection system. A second consecutive year of restriction to engineering and design would lead to serious inefficiencies and increased costs. Moreover, the Laboratory has developed a strong affirmative action program for equal employment opportunity which would be compromised if no construction work was started on the project in the coming year.

Earlier this year, Congress enacted a partial authorization in the amount of \$25 million for fiscal year 1969 in expectation of full project authorization for fiscal year 1970. Fiscal considerations early in the budgetary process required rescheduling of construction activities originally planned for fiscal year 1969. Mindful of the continued fiscal stringencies and the severe budgetary pressures on the Congress, the Commission believes a minimum of \$15 million of new obligational authority is needed in fiscal year 1969. This level of funding and removal of the engineering and design restriction is essential if this important national scientific effort is to proceed economically. Activities provided with this funding would include continuation of AE work, procurement of engineering equipment and prototype components, and long-leadtime materials and electrical equipment, initiation of site work, provision of an AE camp and construction of part of the injection system housing and central utility plant.

That concludes my prepared statement, Mr. Chairman. I will be pleased to answer any questions you may have on our programs.

## LETTER FROM SENATOR DIRKSEN

Senator HILL. I think you referred to the 200-billion-electron-volt accelerator, Doctor, and I have a letter here from my friend Senator Everett Dirksen, minority leader of the Senate, in which he says:

DEAR MR. CHAIRMAN: In your deliberations on the appropriation bill for Public Works for Water and Power Resources Development, and the Atomic Energy

Commission, I am hopeful you will consider restoring the full amount in the budget for the 200 Bev accelerator plant, located in Weston, Illinois.

The budget request was for \$25 million, and the House Committee recommendation and the figure in the House-passed bill is \$7.1 million.

The great danger in this cut lies in the fact that the technical personnel and scientists, the highly trained people who must be recruited for a long leadtime project of this kind, might suffer discouragement from this action which would impel them to reconsider employment for the duration of this project.

The President, in his message to the Congress on science policy, emphasized the importance of this type of project in enabling this country to maintain its primacy in this field of scientific research. Out of the sum of \$20 billion a year which we are spending for research and development in this country, a relatively small percentage goes to the fundamental and basic research represented in this project.

I feel, therefore, that a restoration of the budget figure, \$25 million, is very necessary to this important scientific project, and I will deeply appreciate your consideration of my request.

You are asking for not the full amount but part of the restoration; is that right, sir?

Dr. SEABORG. That is right, although we did ask for the appropriations of \$25 million.

Senator HILL. But the House cut you—

Dr. SEABORG. The House cut us to the low level.

Senator HILL. To \$7.1.

Dr. SEABORG. \$7.1, and we feel that the very minimum that would keep the project viable would be \$15 million, an addition of \$7.9, but the \$25 million, of course, was our original estimate.

Senator HILL. That was your original request.

Dr. TAPE. Mr. Chairman, I think Senator Dirksen has stated the case very well. The point about our appeal to you is this: we have looked very, very hard at the fiscal situation. We do know what the House attitude was here; it is reflected in their action, and what we have tried to do is give consideration to all of the factors involved, and indicate to you what we believe is just the very barebones rock-bottom figure.

Senator HILL. The bare minimum.

Dr. TAPE. Bare minimum.

Dr. SEABORG. We also would like to have the change in the language that would give us the flexibility to start these few construction items.

Senator HILL. You have suggested that in your statement.

Dr. SEABORG. Yes.

Dr. TAPE. Yes, that is most important.

#### LARGE HEAT SOURCE GENERATOR

Senator HILL. Thank you. I also have a memorandum here on the heat source generator. It seems your request was for \$3 million to support this program and this amount was reduced by \$500,000 on the authorization side. What about that?

Mr. ABBADESSA. With respect to the large heat source, Mr. Chairman, we requested \$3 million. In authorization process; the Joint Committee reduced it by \$500,000. The Appropriations Committee reduced it by the complete \$3 million.

Senator HILL. Cut the whole thing out.

Mr. ABBADESSA. Yes, sir. So the budget as it stands before this committee has no money in it for the large heat source generator. This is an application—

Senator HILL. When you say the budget, you mean the appropriations bill as passed by the House?

Mr. ABBADESSA. That is correct, sir.

Dr. TAPE. As passed by the House.

Senator HILL. The request of the budget was \$3 million and the House cut out the whole amount.

Mr. ABBADESSA. That is correct.

Senator HILL. Are you asking restoration?

Dr. SEABORG. No, we are not asking restoration.

Senator HILL. You are not asking for restoration?

Dr. SEABORG. No; in view of the stringency of the budget situation, we have limited our request for restoration to two items, Rover and the 200 Bev accelerator.

Senator HILL. There is no request for restoration of this item if I understood your statement.

Dr. SEABORG. Yes, sir.

Dr. TAPE. Mr. Chairman, I would like to add that the absence of requests for restoration is without prejudice because as the chairman indicated in his remarks, the items on which we are not appealing are still in our opinion very worthwhile projects that should be undertaken at some point in time.

But what we did in the space electric power program here was to look at those near term commitments which we have right now and which we feel should move forward with priority. We had to make a decision, unfavorable as it might be, to set other important items aside for the time being.

Senator HILL. Not that you are in favor of this?

Dr. TAPE. It is not a question of not favoring this, we would support it.

Senator HILL. But the tight squeeze and pressure on your budget was such you had to eliminate those programs of a lower priority.

Dr. TAPE. It is a problem. Would you prefer to lose your right arm or your left arm?

Senator HILL. That depends on whether you are a right-handed pitcher or a left-handed pitcher.

Dr. TAPE. That is right, sir.

Dr. SEABORG. Or whether you write with your right hand.

#### WEAPONS TESTS AT NEVADA TEST SITE

Senator HILL. Senator Bible?

Senator BIBLE. Yes; I would like to ask a few questions of Dr. Seaborg.

Preliminarily, I am aware of the items you have appealed and I want to question you a little in detail on your appeal on NERVA I. But before doing that, I wonder, Doctor, how far ahead you develop your program of shots at the Nevada test site.

Dr. SEABORG. In a broad sense, 3 or 4 years.

Senator BIBLE. You are very well aware of one of the shots that caused some problems with certain of our citizens in southern Nevada.

Dr. SEABORG. Yes.

Now, when I say 3 or 4 years, I am talking in terms of the supplemental test site—

Senator BIBLE. I am talking about the—

Dr. SEABORG (continuing). In Nevada, the supplemental test site in Nevada, as well as the NTS.

Senator BIBLE. No, I am talking about NTS. How far ahead is that programed, a year ahead?

Dr. TAPE. What the chairman said in broad terms is 3 or 4 years. What we are saying here is that we know what the weapons development program is apt to be for a long period of time, like 3 or 4 years, and we know generally what the nature of this program will be.

Now, as to the exact event, the exact size of such an event, and timing and so on, we don't know. We have a general schedule about 2 years in advance, and a somewhat more refined schedule, roughly 1 year in advance. So, as you know, as one gets closer to the situation, one has better information.

Senator BIBLE. What was the last shot you had that caused a lot of consternation?

Mr. RAMEY. Boxcar.

Dr. TAPE. Boxcar.

Senator BIBLE. Unfortunately it caused a lot of problems.

Do you have other shots programed in the future that are going to be larger than Boxcar for that same area?

Dr. SEABORG. About the same size, perhaps slightly larger, depending on how they come out; then we proceed on the basis of the evaluation of a previous shot.

Senator BIBLE. I understand.

My only purpose in questioning, Mr. Chairman, is to try to be helpful to the Commission. Some problems developed in connection with the Boxcar shot. It hit the press rather emphatically in big print, and there was great concern it might shake and cause a lot of damage. I am very happy to report that fortunately it did not. Some even envisioned that Boulder Dam would be cracked and that you would have all of the floodwaters going on down the Colorado. Fortunately that didn't happen.

Without probing further as to when you are going to have a shot and how many megatons it is going to be and if it is in the same general area, I would hope that as you get closer to a date when you are going to have the shot, that you would beef up your public relations so that you take the community into your confidence as far as you can do within the limits of national security, so that they are aware of what you are going to attempt to do.

Dr. SEABORG. We are planning to do that.

Dr. TAPE. Senator, I would like to add a word or two on the public relations. I think the performance that was achieved with the Boxcar event speaks very highly for what we did do in terms of advance planning, advance analysis, predictions of what we expected to happen, and so on.

Senator BIBLE. I am not critical of that.

Dr. TAPE. I know you are not, but my point here is that the fact that we did indeed predict the situation, as it came out, is very important and does build public confidence.

Senator BIBLE. Yes.

Dr. TAPE. There was no damage of any kind that we have seen, that can be identified with this shot. We believe the result in itself should help convince the public that indeed we have been doing a very careful job.

Senator BIBLE. And I am convinced you have, too, and sitting on a little different side of the table than you, I react maybe a little faster to the politics involved in it. I think your only problem here was that it was announced so late that almost simultaneously you announced that you were going to have the biggest shot you ever had and then you said, "We are going to have it 2 days from now." It didn't give adequate time, as I saw it, to resolve whatever problems might have been raised.

You attempted to do it through strong assurances after the initial announcement, and in that, you did an excellent job.

Dr. TAPE. We tried to do an excellent job.

Senator BIBLE. But that could have been eliminated, and I suggest that next time if you try to take them into your confidence a little ahead of time, you might avoid a problem. I can surely tell you it kept my phone ringing all night one night and I hope it won't happen again.

#### NASA AUTHORIZATION FOR NERVA

The next question I wanted to ask you about was your statement here on NERVA, Mr. Chairman.

Dr. SEABORG. Yes, sir.

Senator BIBLE. You are aware, of course, that the authorization bill for NASA was passed by the Senate and approved under the able leadership of the great chairman from New Mexico, without a conference with the House. This is pretty hard to accomplish. He just took them such a fine package that the House said, "Boy, this is good and we are going to accept it."

So they did accept it and in that authorization for NASA, as you very well know, there is a line item of \$55 million for NERVA.

The total amount of the authorization was roughly \$4,013 million, which is only about \$5 million more than the amount appropriated by the House Appropriations Committee. I think that figure is \$4,008 million.

Mr. ABADESSA. That is correct, sir.

Senator BIBLE. That has already been passed upon by the House Appropriations Committee and is now before the Public Works Subcommittee and full committee of the Senate, so we have some guidelines and some ceilings and some very clear congressional expressions as far as NERVA is concerned. One is that insofar as the NASA part of it is concerned it should be funded at a \$55 million level and I think that is very clear, very positive. I don't know when the Independent Offices Subcommittee is going to mark up—no date has been set up for the markup in the full committee though I assume it will be reasonably soon. Anyway, it is authorized at \$55 million and is a line item and agreed to by the Senate and the House.

Now, you make a full statement here about Project Rover, and you request a \$22 million restoration.

That would give you—

Dr. SEABORG. A total of \$53 million.

#### AEC SPACE PROPULSION PROGRAM RELATED TO NASA PROGRAM

Senator BIBLE. A total of \$53 million is what it would give you. Now, my question would primarily be as to the amount of funding

which AEC should have to match up with the \$55 million authorized, and hopefully to be appropriated for NASA, to maintain the joint effort.

Dr. SEABORG. Yes; I understand your question.

Our \$53 million would not be in balance with the amount approved by the Senate and the House for NASA. We were deliberately and substantially conservative in this respect. In order to be in balance with the NASA amount we would have to add another \$14 or \$15 million to bring the total up to around \$67 million or \$68 million.

Senator BIBLE. You would have to have something in the range of what, again, Dr. Seaborg?

Dr. SEABORG. \$14 or \$15 million additional added to the \$22 million.

Senator BIBLE. You would have to have an additional 14 or 15 added to the 22.

Dr. SEABORG. That would be an added \$36 or \$37 million to bring the total to \$67 or \$68 million.

Senator BIBLE. An added \$36 or \$37 million, in order to match the \$55 million optimistically and hopefully to be appropriated by the full Independent Offices Committee for NASA.

Dr. SEABORG. That is right.

Senator BIBLE. I would hope that we could, Mr. Chairman, fund it at that level. There seems to be no particular question insofar as the House Appropriations Committee is concerned, and you underscore that in your own statement, as to the value in the future of this particular program. This is a program that should go forward; is that a correct statement?

Dr. SEABORG. Yes, sir.

#### FUNDS REQUIRED TO COMPLETE NERVA DEVELOPMENT

Senator BIBLE. Is it also true that this program has been to date funded jointly at the level of \$1.1 billion or \$1.2 billion?

Dr. SEABORG. That is essentially correct; yes.

Senator BIBLE. Is it also my understanding that in order to complete this particular program that it would take an additional \$500 or \$600 million over a period of 6 or 7 years?

Dr. SEABORG. It, of course, depends on how you define "completion."

Senator BIBLE. I am not talking about the NERVA II. I am talking about the completion of NERVA I, getting at about 75,000 pounds thrust.

Dr. SEABORG. Yes; and getting it through to a flight configuration—\$600 million.

Senator BIBLE. Is that in the ball park?

Dr. SEABORG. Approximately \$600 million.

Senator BIBLE. The purpose of the question is to indicate, as my arithmetic attempted to indicate, that the program is about two-thirds along the way. I think a great case can be made for this engine. I understand from your statement that you have just completed a test on Phoebus 2A, and that it was a successful test.

#### PHOEBUS 2A

Dr. SEABORG. That was very successful. It operated for 10 or 12 minutes at 4,200 megawatts.

Senator BIBLE. Will you translate that into layman's language so as to indicate why that is so successful?

Dr. SEABORG. That is actually a much higher power level than any we had reached before. I think the highest power level that we had reached before this test was approximately 1,500 megawatts.

Dr. TAPE. It is almost a factor of 3 higher.

Senator BIBLE. So I believe you would hail that as a success in your department.

Dr. SEABORG. Yes, sir; a great success.

Dr. TAPE. The time interval that the chairman mentioned was for operation at full power—4,200 megawatts. The total operating time of the test at significant megawatt power was 32 minutes. Indeed, one sees longer periods of operating time readily possible with these systems.

Senator BIBLE. Well, I can recall, Mr. Chairman, that with the first ground test there was some concern as to just how successful it was going to be. I think that exceeded your expectations, and it seems to me each of these subsequent tests that you have had have actually exceeded your expectations. So the point, I believe, is that this may very well be the powerplant of the future insofar as space is concerned. Is that your feeling on it?

Mr. RAMEY. It certainly is, sir. It would provide twice the level of performance—of specific impulse—of even the best of the conventional types of propulsion, and for any missions beyond the Apollo mission the Rover, or the nuclear rocket, is substantially better for missions to the moon where you stay there a longer period of time, for changing orbits around the earth, and for going on various types of planetary shots, both manned and unmanned.

Senator BIBLE. Is there any intelligence available as to what the Soviets have done in this field? They have developed more thrust, haven't they, than the United States?

Mr. RAMEY. In the conventional rockets; yes, sir.

Senator BIBLE. In their conventional rockets?

(Discussion off the record.)

#### ROVER PROGRAM

#### IMPACT OF REDUCTION

Senator BIBLE. Dr. Seaborg, is there any question in your mind of the value of this program and whether it should go forward in as high a possible level of funding to a completion of the project?

Dr. SEABORG. There is no question in my mind at all.

Senator BIBLE. Doctor, if I could just for the record ask you two or three more questions. You say in support of your appeal of \$22 million:

This amount would allow us to continue at least a reduced cadre of the NERVA industrial design team and to maintain the reactor test capability at LASL to continue the effort on Peewee 1 and the disassembly of the Phoebus 2A which was successfully tested on June 26.

And you have just testified about the high success of that test.

Major layoffs would still have to be made and the NERVA technology testing program curtailed.

Would you be a little more explicit as to what major layoffs will occur if this is funded at a \$22 million level rather than at a \$36 or \$37 million level?

MR. ABBADESSA. Senator Bible, our major contractor there is Westinghouse. Our best estimate is that Westinghouse employment of about 800 people will have to be reduced by about 400 people even at the level that we are appealing. It would still be an extremely substantial reduction of about half of their people.

Senator BIBLE. It would be about a 50 percent reduction in employment?

MR. ABBADESSA. That is correct, sir.

MR. RAMEY. And on top of a substantial reduction which has already occurred in the Westinghouse personnel from the previous year.

Senator BIBLE. Now, the NERVA technology program would be curtailed. Would you be a little more definite on that?

MR. KLEIN. We can't say precisely, Senator Bible, what the total effect of this would be because we need to do more work to see how to make most effective use of this funding. But it is clear that we would have to cut out at least one of the two NERVA technology experiments that are planned within the next year and eliminate the testing staff accordingly and it may be necessary that we would have to cut them both out. So even the \$22 million added would involve a major curtailment if not a complete stopping of the technology tests.

Senator BIBLE. Thank you.

Your next sentence says, Dr. Seaborg:

Some option, however, would exist with this additional funding to continue NERVA reactor development in subsequent budget years.

Dr. SEABORG. Yes. The point we are making there is that we would continue a minimum cadre of personnel with our contractor and keep the reactor development station going in part, and in these very crucial areas, therefore, be able to resume and carry on at a more sensible level. Whereas, if we cut clear back we would have to start all over again. Everything would be closed out, and we would have to start with a new contractor or the same contractor and rehire our base personnel, reopen the nuclear rocket development station, and so forth.

But we could keep some of these going at a minimum viable level if you added the \$22 million.

Senator BIBLE. At \$22 million you would—

Dr. SEABORG. If you added—the \$53 million level.

Senator BIBLE. I mean the \$53 million level.

Dr. SEABORG. Yes.

Senator BIBLE. The House allowed you these other items on advanced rocket reactor technology and supporting graphite technology and nuclear rocket development operation stations. They allowed those.

Dr. SEABORG. They cut out \$41 million.

Senator BIBLE. Correct.

Dr. SEABORG. Yes.

Senator BIBLE. Well, if you were to go at this reduced level, which is the one you are appealing, and you are saying it shouldn't be leveled out at \$22 million, what type of a stretchout would you have in this program, assuming approximately the same level of funding in future years? Does this stretch it out 2 years, 3 years, 4 years?

Mr. RAMEY. I think this would assume, I think a level that we are— by adding the \$22 million, is in the hope that it would increase in the future years. I think if we stayed at this approximate same level it would not be a viable program, Senator Bible. For a couple of years we could go at that level, but unless it then started up again we would— it just wouldn't make sense so I would certainly see a delay of 2 or 3 years.

Senator BIBLE. Dr. Seaborg, would you care to make an additional comment?

Dr. SEABORG. It would just depend on how fast we went up.

Senator BIBLE. I understand.

My question is that if it is kept at the same level what would happen to your program, and I understood Mr. Ramey to say it would not be a viable program. Why wouldn't it be viable if you kept it at a \$54 million level?

Dr. SEABORG. We would be below the level at which we could carry on the tests that are required to make the stepwise developments of the nuclear rocket.

Senator BIBLE. I see. Did you have any further comment, Mr. Klein?

Mr. KLEIN. I would only amplify that at this level, as Dr. Seaborg has indicated, the attempt would be to at least sustain a relatively small cadre and make some useful progress.

It would not at all be an integrated type reactor development and test program, however.

#### CONSTRUCTION

Senator BIBLE. I would like to ask just one further question of you, Dr. Seaborg. Our staff man has called my attention to the fact that on the summary of plant and capital equipment you requested a million dollars for research and development test plants, Project Rover, Los Alamos Scientific Lab. N. Mex., and Nevada Test Site, Nevada. You requested a million. The House eliminated that completely. No restoration was requested. What is the end effect of that?

Dr. SEABORG. Well, I think these other restorations are so important, so much more important, in comparison with that—

Senator BIBLE. I see.

Dr. SEABORG (continuing). That we could get along without that.

Senator BIBLE. Very well.

Thank you very much, Mr. Chairman.

#### STATEMENT OF SENATOR CANNON

Senator HILL. At this point in the record we will place the statement of Senator Cannon of Nevada. He is also concerned about the funding level on the nuclear rocket propulsion program.

(The statement follows:)

Mr. Chairman, I appreciate the opportunity you have afforded me to make this brief statement in connection with the FY 1969 Appropriations Bill for the Atomic Energy Commission. My purpose is to lay before the subcommittee a plea that the Senate Appropriations Committee increase the amount recommended for Nuclear Rocket Propulsion. It is urgent that the Senate amend the House bill to reflect the full amount earlier authorized for this critical program—\$69 million. There are few actions we might take this year which would better help avoid a crisis in our national space program in the next few years. Any less than the funds authorized for the AEC could seriously jeopardize the entire

nuclear rocket program, and indeed, the viability of our future national space effort.

The appropriations recommended for the AEC in the House bill, as the Committee knows, would delete all funds for NERVA. The \$31 million left in the bill would not even permit a continuance of technology work in the program. I must say, that cancellation of this program now would mean surrendering vital space activities to other nations who are more aggressively engaged in space exploration than the United States. This will have a tremendous impact on our future national security.

Permit me to call the subcommittee's attention to a number of statements in recent public documents which I think point up the importance of this program: During three days of testimony before the Senate Committee on Aeronautical and Space Sciences, Mr. Webb, the Administrator of NASA, stated, "It is *extremely* important for the United States to proceed with the development of nuclear rocket propulsion . . . no other means of propulsion holds promise of providing so unique and efficient, but so flexible, a capability.

During the same hearings, Dr. Wernher von Braun, Director of the Marshall Space Flight Center, said "The nuclear rocket is a vital key to our future space exploration capability and versatility. I would have great concern for the long future of our space program without this kind of propulsion capability."

Our distinguished colleague from New Mexico, the Chairman of the Senate Committee on Aeronautical and Space Sciences said at the beginning of three days of hearings on the nuclear rocket program, "To abandon NERVA I know is to abandon it for the future since a substantial lead time is required before it could be flown."

In its report authorizing appropriations for the Atomic Energy Commission, the Joint Committee on Atomic Energy said, ". . . without the development of the nuclear rocket engine, it is not possible to project a viable space program based on a significant step-wise advancement in propulsion capability. Deferral is not possible without encouraging certain irreversible penalties which will be very costly to this nation in the long run."

The question is, why should a program which has shown such outstanding technical success, about which the experts agree there is a great need and an assured use in future military and civilian space missions, be in such jeopardy?

We must consider these consequences *today*. If the nuclear rocket engine program is allowed to die, we will immediately be 8 years behind the USSR, based on our own estimates of lead time. If this occurs, I expect the USSR will drive home its new advantage and deprive us of many of our options, freely to engage in space exploration.

We cannot put off the engine development program. As the key to our recovery in 1958 was the development of chemical rocket systems, I am convinced that today the key to our future technological security lies in the nuclear rocket engine.

In closing, let me very briefly review the situation with which we are faced.

The authorization for nuclear propulsion this year as recommended by the Joint Committee on Atomic Energy was \$69 million. In the House, this bill was passed by the overwhelming vote of 381 to 14. It was likewise passed by a large majority in a voice vote on the floor of the Senate.

With respect to the appropriation, the House reduced funds to \$31 million with the following explanation: "Because of the action by the House on the NASA Authorization Bill curtailing the portion of the NERVA nuclear rocket engine development program being conducted by NASA, the Committee has had no alternative but to take comparable action in connection with related funding level for the work program by the AEC."

In the meantime, the House of Representatives by a unanimous vote chose to concur in amendments to the NASA Authorization Bill, restoring the NASA nuclear rocket program to \$55 million. Thus, the circumstances which existed at the time of the Appropriations Committee action on the AEC portion of the Public Works Bill, changes the basis upon which the Committee arrived at its decision.

In anticipation of this possibility, the Committee report stated, "The Committee has supported to date an adequate funding level for the NERVA program because of its importance to our future space program and will *reconsider* its action as appropriate in the future to assure that a balanced program is maintained between the two agencies."

In spite of strong pressures to hold the line on funding, this year, there is a strong, underlying realization of the great importance and the high priority of

the nuclear rocket program to the future security of this nation. I strongly urge my colleagues to consider this situation and hope that you will conclude, as I have, that the nuclear rocket engine development program must receive our support this year. It is unfortunate, but there can be no delaying or deferring, for to do so, will effect its cancellation. The nation cannot afford this sacrifice.

Again, Mr. Chairman, thank you for this opportunity.

200-BEV ACCELERATOR

LETTER FROM REPRESENTATIVE PRICE

Senator HILL. Senator Anderson?

Senator ANDERSON. In the first place I have a letter dated June 28, 1968, that was transmitted from Congressman Price on the 200-Bev accelerator. I ask to have it in the record. I want to offer this on his behalf in the record.

I would also like to say I very strongly endorse the views expressed in Congressman Price's letter and in the report he submitted with his letter, and I think I should say that—

Senator HILL. Were you here to hear Dr. Seaborg's explanation?

Senator ANDERSON. Yes.

Senator HILL. We will have that letter placed in the record.

(The letter follows:)

CONGRESS OF THE UNITED STATES,  
JOINT COMMITTEE ON ATOMIC ENERGY,  
*Washington, D.C., June 28, 1968.*

HON. LISTER HILL,  
*Chairman, Atomic Energy Commission-TVA Subcommittee of the Subcommittee on Public Works, Committee on Appropriations, U.S. Senate, Washington, D.C.*

DEAR MR. CHAIRMAN: As you may know, when the Public Works-Atomic Energy Commission fiscal year 1969 appropriations bill (H.R. 17903) was considered in the House of Representatives on June 19, 1968, I informed my colleagues that I planned to ask the staff of my Subcommittee on Research, Development, and Radiation to review the probable effects upon the National Accelerator Laboratory of H.R. 17903 as reported by the House Appropriations Committee. I also indicated that the report of the staff would be forwarded for their consideration to my Joint Committee colleagues in the Senate who are members or ex-officio members of the Senate Committee on Appropriations, and to Chairman Kirwan and the other members of the Subcommittee on Public Works of the House Committee on Appropriations. As the ranking member of the AEC-TVA unit of the Public Works Subcommittee of the Senate Committee on Appropriations, I thought you also would be interested in receiving a copy of the report.

The Subcommittee staff has now completed its review. The report thereon, a copy of which is enclosed herewith, is based on detailed discussions with the scientific and engineering staff of the National Accelerator Laboratory. The report stresses the adverse effect on the project of the preclusion of certain limited but critical construction activities and the extent of the reduction in funds for FY 1969. According to the report, the most serious specific effects of the House action are these: (1) Disruption of the closely interlocked design and construction schedule of this highly technical facility with resultant inefficiency and increased costs up to \$10 million; (2) probable loss of key staff members; and (3) further delay in recapturing the energy lead in high energy physics, long held by the United States but now held by the U.S.S.R. Another related consequence which the staff has noted and which gives me great personal concern is the serious damage that will result to already initiated training programs designed to improve employment opportunities on the project for members of minority groups.

The Subcommittee on Research, Development, and Radiation has reviewed the staff report and is in full agreement with the appraisal of the impact of such action on this major national facility. When one considers all of the his-

tory and factors relating to this project, it becomes clear that at least a minimal construction program should be undertaken during FY 1969.

In transmitting this report to you there are several considerations which I particularly would like to commend to your attention. First, the project has been under active consideration by the Atomic Energy Commission since early 1963 when the Lawrence Radiation Laboratory began an extensive design study on an accelerator in the 150-300 Bev range. Then came the March 1965 hearings before my Subcommittee, the long and careful process of selecting the site and the establishment of the initial design group at Oak Brook, Illinois, under Dr. R. R. Wilson. The Laboratory has just completed a full year of design work on the facility. All of the above has taken 5 years. The Laboratory is now ready to proceed with a full program and, in my earnest opinion, should be permitted to undertake at least a minimal program involving additional design work, a small amount of crucial construction, and some long-lead-time component procurement.

Second, the project is of major national and international importance in the field of fundamental science and will return the energy lead in this important field to the United States.

Finally, I should like to emphasize that a staff of uniquely qualified and motivated scientists has been carefully assembled and is ready to move ahead now. The retention of these people with a meaningful and efficient use of their talents is critical to the success of this project. In order to retain them, it is essential to permit at least limited construction in FY 1969.

I am confident that you will give the enclosed report your serious consideration in connection with further review of the AEC's FY 1969 appropriations legislation.

Sincerely yours,

MELVIN PRICE,

*Chairman, Subcommittee on Research, Development, and Radiation.*

Enclosure: JCAE Staff Report.

#### JCAE STAFF ANALYSIS

#### 200 Bev Accelerator—Effect of House Appropriations Committee Action

(Reduction FY 1969 Funding from \$25 million to \$7.1 million and restricting work to A-E only)

#### *Background*

In March 1965 the Subcommittee on Research, Development and Radiation of the Joint Committee on Atomic Energy held a week-long series of hearings on the whole field of high energy physics. These hearings included an extensive review of the report "High Energy Physics Program: Report on National Policy and Background Information," which had been prepared by the Atomic Energy Commission and other Federal agencies with a program interest, in response to a request of the Joint Committee. It was the consensus of these hearings that high energy physics was of great importance to the scientific leadership of the nation and the next step most needed to be taken in this field was the construction of an accelerator in the 200-Bev range. A design study which had been in progress at Lawrence Radiation Laboratory (LRL) since 1963 had already developed the technical and scientific groundwork for such a machine.

A national search was made for a site for such a machine in 1965 and 1966. A select committee appointed by the National Academy of Sciences reviewed all proposals meeting the basic criteria and forwarded their recommendation of the six best sites to the Atomic Energy Commission for final consideration. The Commission, after some ninety-nine meetings during 1965-1966 on this matter, selected a site in DuPage and Kane Counties, Illinois.

For budgetary reasons the project scope was reduced by the Administration in the President's 1968 budget request for project authorization. Senator Pastore, Chairman of the Joint Committee on Atomic Energy, in 1967 assigned the Subcommittee on Research, Development, and Radiation to review the reduced scope as well as the management proposed for this facility. Additional hearings were held in February 1967, and in April 1967 the Subcommittee recommended that the project should not be reduced in scope. During this period the Director for the proposed national laboratory had been selected—Dr. Robert R. Wilson, then at Cornell University. The Committee has met with Dr. Wilson on a number of occasions and has the greatest respect for his ability and talent to lead the team

necessary to design and construct this unique facility for fundamental physics research.

The Subcommittee and the full Joint Committee concluded that the 200-Bev accelerator should not be reduced in its initial scope, but should instead be built with a full-scope design intensity of  $3 \times 10^{13}$  protons per pulse as had been originally contemplated. Furthermore the Committee recommended that the AEC give careful study to the possibility of building into the machine an additional capability, i.e., the option of going to an even higher energy than 200 Bev. In connection with the AEC's FY 1968 budget the Congress authorized and appropriated funds in the amount of \$7,333,000 for design of the project.

During the Joint Committee's authorization hearings on the AEC FY 1969 Budget, the Committee was pleased to hear that Dr. Wilson and his key staff had not only carried out the Committee's request that this machine be designed to meet its original intensity goal but had also managed to incorporate into the design an option to go to a higher energy at some later date. It should be stressed that Dr. Wilson has accomplished both of these objectives essentially within the budgetary restrictions that had been established for the reduced-scope facility—some \$60 million less than the original estimated cost of the project. It is important to note that Dr. Wilson, in doing so, was following both the Executive Branch guidance and the Congressional recommendations.

Meanwhile, in the summer of 1967, the National Accelerator Laboratory (NAL), managed by Universities Research Association (URA), had launched a year of intensive design. NAL and the architect-engineer consortium DUSAF<sup>1</sup> moved into temporary quarters in an office building on Oak Brook, Illinois, and, under the leadership of Dr. Wilson, set about establishing the working design of the Laboratory.

The year of design effort resulted in a project with a total estimated cost of \$243.6 million with construction to be completed in FY 1973. The scheduled call for new obligated authority of \$77 million in FY 1969 with estimated FY 1969 costs of \$25 million.

Due to budgetary pressures, a strong effort was made within the Executive Branch to reduce FY 1969 project costs. Dr. Wilson responded by rearranging the construction schedule of the facility; but it became clear that, owing to the highly technical nature of the Laboratory and the need to build some components early in the construction cycle in order to test others later, a severe economic penalty would be paid for postponing the commencement of construction of those essential components and their housings. Consequently, Dr. Wilson chose to begin only those items in FY 1969 and to delay construction starts on the more conventional support buildings and facilities until later years. This decision implied that little or no on-site laboratory or office space for the NAL staff would become available until late in the construction schedule. To meet this problem plans were developed to house the staff in an AE camp consisting of the existing frame houses of the Village of Weston and a few temporary buildings. These plans, while assuring that money will be saved, do require expenditures of construction funds in FY 1969.

With these accommodations to the restrictive fiscal climate, Dr. Wilson was able to reduce planned FY 1969 obligations from \$77 million to \$25 million while maintaining a viable project. However, as a result of this reduction in planned FY 1969 obligations, the total estimated project cost necessarily increased by \$6.7 million to the currently estimated project cost of \$250 million.

During the course of FY 1968, a year of design was completed and several other efforts took shape in preparation for beginning construction in FY 1969.

Dr. Wilson has succeeded in assembling an excellent staff of high-energy-accelerator physicists and engineers. Many of these research scientists were attracted by the efficiency and expeditiousness of the construction schedule and consequent promise of early research results as well as by the ingenuity of the design. It is clear to the Subcommittee staff that there is no overabundance of these scientists; it is equally clear that they were drawn to the 200-Bev project in substantial part by Dr. Wilson's reputation for building high-performance accelerators rapidly, economically and efficiently. (A list of the principal NAL staff members appears in Appendix A.)

Also during FY 1968, the State of Illinois began acquiring the site property in the expectation that construction would begin in October 1968. At present,

<sup>1</sup> DUSAF—Daniel, Mann, Johnson & Mendenhall, The Office of Max O. Urbahn, Architects, Seelye Stevenson Value and Knecht, Inc., George A. Fuller Co.

the State has negotiated the purchase of 102 of the 105 houses in the Village of Weston at a cost to the State of approximately \$1.7 million.

Another important development during FY 1968 has been the initiation by the laboratory, with the full support and encouragement of the AEC, of a strong affirmative action program to improve employment opportunities for members of minority groups. Pre-apprenticeship and apprentice programs are presently in being.

Also noteworthy is the fact that the U.S.S.R. has, during this last year, brought into operation a new accelerator which is now running at 84 Bev, an energy about two and a half times higher than that of the highest energy accelerator in the U.S. or anywhere else.

In the June 14, 1968 report of the House Committee on Appropriations (H. Rept. 1549) on H.R. 17903, the AEC's FY 1969 appropriations bill, the Committee, while recommending disallowance of \$17,900,000 of the \$25,000,000 requested during fiscal year 1969 for the project, went on to state that it "... fully supports the need for the project. ..." As these words amply indicate, the Appropriations Committee had no intention of causing any termination of the facility or slowing it down unduly.

On June 19, 1968, during House consideration of the FY 1969 Public Works-AEC Appropriation Bill, Chairman Price of the Subcommittee on Research, Development, and Radiation and other members indicated their concern with the potentially serious adverse consequences of the restrictions imposed on this project. At that time Chairman Price indicated that he had instructed the staff of his Subcommittee to review the effect of these restrictions on the project and to report to him on this matter. Copies of this report were to be made available to the relevant committees of the Congress for their further consideration.

#### *Effects of House Action*

The Subcommittee staff has reviewed with the scientists and technical personnel responsible for the design of the 200-Bev accelerator facility the effects of the House bill on the project. In the course of this review it has become quite clear that major inefficiencies to the project would result from the restriction of activities solely to AE work in FY 1969. These inefficiencies will cause significant increases in the total costs of the accelerator estimated to be as high as \$10 million.

The NAL staff members are highly trained scientists who have committed their careers to research. They have been attracted to the 200-Bev project on the basis of an efficient, challenging schedule leading to early research results. To continue for a second year the restriction to AE work alone on this project would be wasteful of their distinctive talents and highly discouraging to them. The lack of any concrete indication that this project is in fact going to move forward into the construction stage will unquestionably have a demoralizing effect upon them. The Subcommittee staff has therefore concluded that there would be a very real danger of losing key technical personnel under the provisions of the House bill. Without question their loss would jeopardize the entire project.

The 200-Bev machine is a complex scientific instrument comprising four successive accelerators. The economy of the design is intimately dependent upon an efficient, well-paced schedule employing closely interlocked engineering and construction efforts to arrive at an up-to-date facility. The disruption of this schedule would result in project cost increases due both to escalation and to inefficiencies. Design and development work has proceeded to the point where construction of facilities critical to succeeding phases of the project can now be started. Experimental data from these initial facilities is needed to provide firm technical guidance for succeeding phases. The delay in construction of the initial facilities will defer the availability of critical experimental data and will require an increase in analytical work and extend project effort in general. No reduction in FY 1969 expenditures (as contrasted with obligations) is anticipated as a result of the House action, while the increase in estimated project cost is approximately \$10,000,000. This increase reflects a slippage of the completion date of about one year.

The scientists and engineers directly involved in the project have indicated to the Subcommittee staff that it is extremely important that the project proceed with a balanced effort among all three important phases: design, initiation of the most critical construction items, and procurement of long-lead-time components. The injection system, for example, must be started early to assure its availability

for the testing of other critical accelerator components. The principal laboratory staff is fully aware of the serious fiscal crisis faced by the nation and, in discussions with the Subcommittee staff, was asked to develop an austere program consistent with these somewhat opposing requirements.

During the past year, a program has been underway to train a number of Negro and other individuals in the use of heavy construction equipment. If no construction is permitted at the site in FY 1969, the promising start that has been made in improving employment opportunities for members of minority groups will be retarded.

The Subcommittee staff, after consulting with the laboratory and the AEC and completing its own deliberations<sup>1</sup> concludes that in order to insure the viability of the project it is necessary that the restriction to AE only work be removed and that \$20 million in obligational authority (an increase of \$12.9 million over the amount recommended by the House Appropriations Committee) be approved for FY 1969.

The detail setting forth the austere program recommended is as follows:

[Dollars in thousands]

(1) Salaries, wages, services (NAL & AEM)-----	\$7, 400
Subtotal -----	<u>7, 400</u>
(2) Procurement of engineering equipment, prototype components and long-leadtime materials-----	1, 500
Contingency on (2)-----	300
Subtotal -----	<u>1, 800</u>
(3) Long-leadtime electric utility equipment-----	1, 600
(4) Development of AE camp-----	700
(5) Injection system housing and associated facilities-----	8, 700
(6) Site work-----	700
Contingency on (3) through (6)-----	1, 800
Subtotal -----	<u>13, 500</u>
Total -----	<u><sup>1</sup>22, 700</u>

<sup>1</sup>This figure includes \$2.7 million in obligational authority carried over from the AEC's fiscal year 1968 appropriation.

It is the Subcommittee staff's firm belief that the FY 1969 obligational authority recommended above without restriction to design use only would permit the National Accelerator Laboratory to progress in an admittedly austere but nevertheless meaningful fashion; by the same token, anything substantially less will jeopardize this important national facility.

#### APPENDIX A.—NATIONAL ACCELERATOR LABORATORY

##### PRINCIPAL STAFF MEMBERS

Robert R. Wilson, Director. B. 3/4/14. B.A. (1936), Ph. D. (1940), Berkeley under E. O. Lawrence. 1940-43 head of Princeton University atomic energy project. 1943-46 directed Cyclotron Group, Los Alamos Laboratory of the Manhattan Project. 1947 Harvard University—cyclotron design. 1948-1967 Director, Laboratory of Nuclear Studies, Cornell University engaged in the design and construction of a series of accelerators culminating with the 10 BeV electron synchrotron.

Edwin L. Goldwasser, Deputy Director. B. 3/9/19. B. A. (1940) Harvard University, Ph. D. (1950) University of California, Berkeley. 1951-67 Assistant Professor, Associate Professor and Professor of Physics, University of Illinois, Urbana. Member, Board of Directors, Midwestern Universities Research Association (MURA); University of Illinois delegate to the Argonne Universities

<sup>1</sup>In this connection see App. B hereto letter report from President of URA dated June 14, 1968.

Association and member of the High Energy Physics Board Committee; member of the General Advisory Committee, USAEC; Chairman, Division of Physical Sciences, National Research Council.

M. Stanley Livingston, Associate Director. B. 5/5/05. A. B. Pomona College (1926), Ph. D. University of California, Berkeley (1941). 1938-1956, Massachusetts Institute of Technology, design and development of 16 MeV cyclotron, and 3 BeV cosmotron and other accelerators at BNL. 1956-1967, Director, Cambridge Electron Accelerator. Co-inventor of the Alternating-gradient Principle on which all large circular accelerators are based.

Francis T. Cole, Assistant Director for Technical Affairs. B. 10/6/25. B. A. Oberlin 1947, Ph. D. Cornell (1953). 1953-1964 Midwestern Universities Research Association (MURA), development and construction of fixed-field alternating gradient accelerators. 1964-67 Lawrence Radiation Laboratory, Berkeley, design of 200 BeV accelerator and Omnitron. Editor of design studies for each accelerator.

Donald R. Getz, Assistant Director. B. 2/20/30. B. A. (1956), M. S. (1959) University of Chicago. 1959 to 1965, Assistant to Associate Director for High Energy Physics, Argonne National Laboratory; 1965-1967 Administrative Officer for Special Scientific Programs, University of Chicago; Staff Consultant, Argonne Universities Association Board of Trustees Committee on High Energy Physics.

Thomas L. Collins, Accelerator Division Associate Director and Head, Engineering Services. B. 3/27/21. B. A. (1942), M. A. (1943), Ph. D. (1950), University of British Columbia. 1957-68 Assistant Director, Cambridge Electron Accelerator.

Miguel Awschalom, Radiation Physics Section Head. B. 12/20/27. B. A. Rutgers (1950), Ph. D. Rochester (1955). 1955-57 Louisiana State University. 1957-68 Princeton-Penn Accelerator, Head, Health Physics Group. Member AEC Advisory Panel on Accelerator Radiation Safety.

Quenton A. Kerns, R. F. Section Head. B. 6/16/24. B. A. University of California, Berkeley, 1951. 1942-1967 Lawrence Radiation Laboratory, Berkeley, r.f. accelerator systems for 184" cyclotron, Bevatron, 200 BeV study group.

Alfred W. Maschke, Beam Targeting Section Head. B. 11/14/32. A.B. (1956) Yankton, University of Nebraska 1956-61. 1961-67, Brookhaven National Laboratory AGS Deputy Division Head and Acting Operations Manager.

A. Lincoln Read, Research Facilities Section Acting Head. B. Sc. (1957), Ph. D. (1960) University College, London. 1960-65 Brookhaven National Laboratory AGS. 1965-67 Assistant Professor of Physics, Cornell University, and consultant BNL-AGS Division.

Frank C. Shoemaker, Main Ring Section Head. A. B. Whitman College (1943), Ph. D. University of Wisconsin (1949). 1949-1951 Massachusetts Institute of Technology. 1951-68, Professor of Physics, Princeton University and Associate Director, Princeton-Pennsylvania Accelerator.

Lee C. Teng, Accelerator Theory Section Head. M.S. (1948), Ph. D. (1951) University of Chicago. 1955-67 Argonne National Laboratory ZGS becoming Director of the Particle Accelerator Division in 1962.

Donald E. Young, Linac Section Head. B. 6/13/22. B.A. (1946) Ripon College, Ph. D. (1959) Minnesota, 1960. Professor of Nuclear Engineering University of Wisconsin and staff member, Midwestern Universities Research Association. Consultant, Argonne National Laboratory ZGS.

Z. J. J. Stekly, Director Superconductivity and Cryogenic Operations. B. 10/11/33. S.M. (1955), Sc.D. (1959) Massachusetts Institute of Technology. 1956-1960 Dynatech, Inc. 1960-1968 AVCO-Everett Research Laboratory.

Philip V. Livdahl, Experimental Planning and Operations. B. 2/1/23. B.A. (1948) St. Olaf College, M.S. (1952) University of Washington. 1953-1957, Lawrence Radiation Laboratory, Berkeley, California. 1957-1967 Argonne National Laboratory ZGS.

Lloyd Smith, Senior Accelerator Physicist. B. 2/28/22. B.A. (1943) University of Illinois, Ph. D. (1946) Ohio State University. 1946-1948 University of Chicago. 1948-1950 Lawrence Radiation Laboratory, Berkeley, California. 1950-1952 Carnegie Institute of Technology, Pittsburgh, Pennsylvania. 1952-1967 Lawrence Radiation Laboratory, Berkeley, California.

Stanley C. Snowden, Senior Accelerator Physicist. B. 3/19/18. B.S. (1940) Massachusetts Institute of Technology, Ph. D. (1943) California Institute of Technology. 1943-1946 California Institute of Technology. 1946-1949 University of Wisconsin. 1949-1959 Bartol Research Foundation. 1959-1967 Midwestern

Universities Research Association (MURA). 1967—Professor of Nuclear Engineering, University of Wisconsin.

Kennard Williams, Equal Opportunity and Community Relations Officer. B. 7/29/22. 1948–1963 Heinz Veterans Hospital, Chicago. 1963–1967 Veterans Administration Hospital, Chicago, Personal Property Management Administration. 1967 DuPage County Branch NAACP, President.

UNIVERSITIES RESEARCH ASSOCIATION, INC.,  
Washington, D.C., June 14, 1968.

Mr. JOHN T. CONWAY,  
*Executive Director, Joint Committee on Atomic Energy,*  
*U.S. Capitol, Washington, D.C.*

DEAR MR. CONWAY: I have been told there is a danger that the House Appropriations Committee may insert the words "for architect-engineering only" in the appropriation bill for the 200 BeV accelerator. I am convinced that these words would have a disastrous effect upon the project and I would appreciate your doing everything possible to have them eliminated.

There are a number of reasons for which this limitation would be especially harmful to this particular project. These include the following:

A. The technical nature of the project is such that the urgent current need is for the procurement and test of certain of the long-lead-time items and for the construction of portions of the accelerator which must be placed in operation early so that they may be used in testing other components. Likewise, construction is required at an early date of the part of the tunnel that will house these portions of the accelerator.

B. The efficiency and economy of the work would be seriously impaired by the restriction on expenditure to architect-engineering. We know from experience that the difficulties are real and not imagined; even during the present year this limitation has caused real problems to the orderly and efficient development of the project. If this artificial restriction is continued an additional year it will lead to major inefficiencies and increased costs.

C. Dr. Wilson has been successful in assembling around him an outstanding team of scientists and engineers at the National Accelerator Laboratory. He and they came to the project, as they have emphasized before, on the basis that the accelerator was now really going to be built. They are now prepared to move forward to construction and would feel that they would be wasting their time if their work were totally limited to architect-engineering. One of the greatest attractions to these scientists has been the imaginative and economical design and the determination of the Laboratory to produce a scientifically exciting machine at a low cost and in a short time period. With the reduced efficiency and the increased time scale and cost caused by a restriction to architect-engineering only, there is a real danger we will lose some of the most valuable members of the Laboratory including the Director, Dr. Wilson, who takes particular professional pride in directing rapid, economical and efficient projects. If the present highly effective team is dispersed by interruption or excessive delays in the project, it will be more difficult after an initial false start to reassemble a comparable team.

D. The limitation to architect-engineering only is incompatible with the reprogramming that has been done to accommodate the severe budget reductions contemplated for next year. As you know, the original laboratory request was for \$77 million for next fiscal year. When this was reduced to \$25 million the laboratory undertook a major rescheduling of its planned operations to minimize the harmful effects of the reduction. One of the most effective steps was a postponement by several years of the start of the central laboratory building and a plan to utilize the vacant existing houses on the site instead of renting more expensive space during the accelerator construction period. Although this plan significantly reduces the total cost and diminishes the delays caused by the budget cut, it does require some prompt expenditure of construction funds for suitably modifying and supplementing the existing houses.

E. The start of the accelerator construction is correlated to the acquisition of the site. To prevent the site acquisition from being the bottleneck following the passage of the accelerator construction authorization bill by Congress this year, the State of Illinois in good faith has already started acquiring the site.

F. The delays that have already occurred in the accelerator project make it difficult to catch up with the now successfully operating Russian 70 BeV accelerator. However, with the design improvements last year that make possible on option later to increase the energy from 200 to 400 BeV, the accelerator, despite the past delays, will be still the right machine at the right time. Every effort should be made from now on to follow a time schedule which will retain for the accelerator the added value that comes from timeliness.

G. The Canadian National Research Council has already appropriated \$35,000 for a study of means by which the Canadian government might contribute financially to the accelerator, perhaps by supplying an additional experimental area from Canadian funds. The added discouragement and uncertainty of a U.S. delay in starting the accelerator construction will markedly diminish the chances of obtaining a major contribution from Canada.

H. In many respects the accelerator is more a continuation of an old project than the start of a new one. The initial hearings by the Joint Committee on Atomic Energy on the desirability of such an accelerator took place in 1965, the laboratory site was selected in 1966, and detailed architect-engineering was authorized and funded by Congress in 1967. The limitation of the first year's funds to architect-engineering provided an opportunity for an additional Congressional review of the design. It will be unfortunate if this added design review unintentionally places the accelerator in the category of a new project and thereby leads to an additional delay.

In view of the above I earnest hope that you and the Joint Committee members will make every effort to remove the restriction to architect-engineering in the accelerator appropriation.

Sincerely yours,

NORMAN F. RAMSEY,  
*President.*

#### BUDGET REQUEST AND HOUSE ACTION

Senator ANDERSON. I note that the report submitted by Congressman Mel Price recommends that at least \$20 million in obligational authority be approved for the 200-Bev accelerator for fiscal year 1969. Do you have any thoughts on that, Dr. Tape?

Dr. TAPE. Senator Anderson, you will recall that the President's budget requested \$25 million for appropriations for the 200-Bev accelerator. That sum of money was calculated to allow the construction program to go forward in a timely fashion and in a most effective way, while still taking account of the severe fiscal constraints, especially fiscal year 1969 expenditures. The House restricted the construction funds for this project to use for architect-engineering work only and severely limited their amount. A restriction to AE only would be very detrimental for the project. Considering only the cut in funds to \$7.1 million proposed by the House, the program would be delayed by about 1 year and have a concomitant increase of about \$10 million in project construction costs. Mr. Price's proposal for a \$20 million obligational authority will, if granted, permit the most crucial schedule determining construction starts and long leadtime procurements to proceed, with very little or no increase in overall construction costs for the project.

LETTER FROM CLARENCE MITCHELL, DIRECTOR, WASHINGTON BUREAU, NATIONAL ASSOCIATION FOR THE ADVANCEMENT OF COLORED PEOPLE IN SUPPORT OF ACCELERATOR

Senator ANDERSON. Senator Pastore is tied up on another appropriation bill and was not able to be present this morning. He asked me to submit to the subcommittee for inclusion in the record a copy of a letter dated June 21, 1968, to him from Mr. Clarence Mitchell, director, Washington Bureau of the National Association for the Advancement of Colored People, in support of the 200-Bev accelerator and Senator Pastore's response of June 25.

(The letter follows:)

NATIONAL ASSOCIATION FOR THE ADVANCEMENT OF COLORED PEOPLE,

*New York, N.Y., June 21, 1968.*

HON. JOHN O. PASTORE,  
U.S. Senate,  
Washington, D.C.

DEAR SENATOR PASTORE: Last year you gave us a hearing on our complaints of housing discrimination in the area selected for the National Accelerator Laboratory at Weston, Illinois. This year it is a pleasure to report that your fair and sympathetic interest in seeking a solution has helped to create the kind of cooperation that makes it possible for us to urge that the Senate increase the 1969 appropriation authorized by the House for the Weston project.

After some inquiries among House members and responsible citizens both in and outside of government, I understand that there is a real danger that the project will not be able to offer employment to other than professional and scientific personnel because of House restrictions on how the appropriation of \$7.5 million may be used. We urge that these restrictions be removed by the Senate. It has been suggested also that an additional \$7.5 million be added to the amount approved by the House, making the total \$15 million. Under all the circumstances, the request for a total of \$15 million appears reasonable and worthy of support. It would also be approximately \$9 million less than the amount requested in the budget.

Our organization and many others advocate greater priorities for programs and expenditures that will help eradicate problems of the poor and underprivileged. Fortunately, there is a program at the Weston site which is addressed to bringing untrained young people from areas of poverty into useful employment. Mr. Kennard Williams, who is on the staff at the Accelerator Laboratory, has developed a significant program of training young men to operate earth moving equipment. He has informed me that the graduating class, which will be certified on Tuesday, June 25, includes Negroes, Indians and white young people who had no previous skills. They come from areas where poverty and lack of opportunity are acute. Mr. Williams, who is a Negro himself, reports that he has had full cooperation of the Operating Engineers on this particular program and, upon graduation, the trainees will be employed as equipment operators making four dollars an hour.

I regret that not all of the skilled trades in the area are open to colored persons, but with continued effort on the part of Mr. Williams and full implementation of existing fair employment laws it should be possible to expand the present program into other job areas. Unfortunately, the language in the House appropriation would prevent continuation of the present training program and prevent expansion into other job areas as well.

Finally, I am happy to report to you that I was invited to speak at a dinner meeting in the Weston area recently. On that occasion awards were given to those who had helped obtain passage of a workable fair housing ordinance. In addition, of course, Title VIII of the 1968 Civil Rights Act and the June 17 United States Supreme Court decision applying the 1866 Civil Rights law (*Jones v. Mayer Company*) now give the kind of assurances on fair housing that we did not have last year.

It is also important to note that, although there is a good beginning at Weston, there are still enormous problems in housing, training and employment that must be overcome. I respectfully suggest that, if the Senate removes the restrictions and increases the House appropriation, you remind all concerned that the possibility of improving opportunity for the deprived as well as advancement in science should continue to be a part of the mission at Weston.

Sincerely yours,

CLARENCE MITCHELL,  
*Director, Washington Bureau.*

JUNE 25, 1968.

MR. CLARENCE MITCHELL,  
*Director, Washington Bureau, National Association for the Advancement of Colored People, Washington, D.C.*

DEAR MR. MITCHELL: I appreciate very much your letter of June 21 and your advice with respect to developments surrounding the construction at the National Accelerator Laboratory at Weston, Illinois. I was very happy to read that the

situation has improved and you can count on my continued interest in providing equal opportunities to all Americans employed at this Weston project.

With best wishes, I am

Sincerely yours,

JOHN O. PASTORE,  
U.S. Senator.

---

#### NUCLEAR ROCKET PROGRAM

Senator ANDERSON. I only want to say I have had a great deal of experience with the Atomic Energy Commission, and I would very strongly trust the Atomic Energy Commission in what it says. For example, it has done excellent work on the nuclear rocket project. Just a day or so ago we had some nuclear rocket reactor tests out in Nevada. They were far better than we had a right to believe—extremely fine tests. I would like to include at this point in the record a copy of the report AEC issued on June 26, 1968, on this test:

(The press release follows:)

[Press release of U.S. Atomic Energy Commission]

#### PHOEBUS 2A SUCCESSFULLY TESTED AT HIGH POWER

The most powerful nuclear rocket reactor yet developed was successfully ground-tested today (June 26) at the Nuclear Rocket Development Station in Nevada.

Designated Phoebus 2A, the experimental reactor was the twelfth Los Alamos Scientific Laboratory-designed and developed nuclear rocket reactor to be tested since the first of the Kiwi series in July 1959. These tests were part of the nuclear rocket program—a joint Atomic Energy Commission/National Aeronautics and Space Administration program to develop the technology of nuclear-powered rockets capable of extensive space exploration.

In today's test the Phoebus 2A reactor was operated for a total of about 32 minutes at significant power, about 12 of which were at a power level above 4,000 megawatts. The peak power reached was about 4,200 megawatts. The test was terminated in a planned fashion when the limits set by available propellant and water were reached. This power level is greater than that achieved by any previous rocket reactor or any power reactor. The power density in the reactor exceeded that necessary for the 75,000-pound thrust NERVA (Nuclear Engine for Rocket Vehicle Application) nuclear rocket.

The primary objective of today's test was to obtain data on this advanced reactor at intermediate and high power levels, high power density, and high temperature operation. Included were experiments conducted to get data on a new method of reactor control using the liquid hydrogen in the core to regulate the fission process.

Los Alamos Scientific Laboratory is operated by the University of California for the AEC. The nuclear rocket program is directed by the joint AEC/NASA Space Nuclear Propulsion Office.

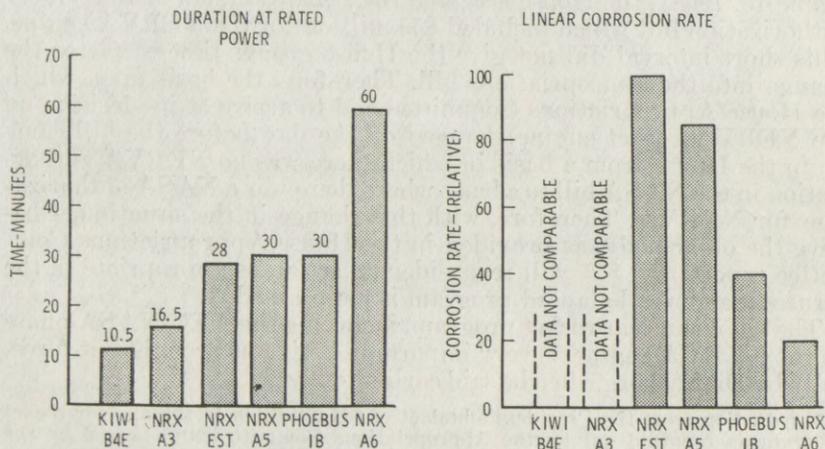
#### GOALS AND ACHIEVEMENTS

Senator ANDERSON. This has been typical of this program, it has constantly set long range goals and wound up by achieving these goals in impressive fashion. I was very impressed by the testimony presented to the Committee on Space Sciences and Aeronautics as to the achievements in the nuclear rocket program in the past few years. They set out to demonstrate all the various elements of technology that go into a nuclear rocket engine so that each step could be taken against a background of understanding and accomplishment. The successful test of the Phoebus-2A reactor just 2 days ago marked the latest accomplishment. It is another of a long series of successful tests in this program

with 10 different reactors which I think must be some sort of record for a program of experimental development. It seems to me that this kind of successful performance is what it takes to achieve high reliability in space. I think this rocket engine will play an important role in our space program because of this high reliability as well as because of the high performance which it has consistently demonstrated.

I would also like to mention that for several years there were many who felt that the nuclear rocket would not be successful because they thought the fuel elements, which are the key to success in any nuclear program, could never be made to operate for the durations required for a development program. We were shown a chart indicating that the last two reactors each demonstrated a factor of two improvement in fuel element quality and endurance over the one previously. I am told that more improvements are in sight. (The chart follows:)

### DURATIONS AND CORROSION RATES IN REACTOR TESTS



NASA NPO68-1271  
1-26-68

### HOUSE ACTION

Senator ANDERSON. Recent action by the House on the nuclear rocket program in the AEC appropriations bill places the NERVA or Nuclear Engine for Rocket Vehicle Applications portion of the nuclear rocket program in serious trouble. The House on June 19 knocked out all of the funds asked for by the AEC for the NERVA program by cutting the AEC's request by \$41 million, from \$72 million to \$31 million. I would like to invite the members' attention to the circumstances which existed at the time the House Appropriations Committee reported out the AEC appropriations bill.

On June 14, 1968, when the House reported out the Public Works bill which contains the AEC fiscal year 1969 appropriations—Report No. 1549, accompanying H.R. 17903—no agreement had been reached between the House and Senate on the NASA authorization bill. One of the areas of disagreement was relative to the NERVA portion of the

nuclear rocket program. The House had voted to knock out the NERVA project while the Senate, in accordance with the recommendations of my Senate Space Committee, voted to include a total of \$55 million for the nuclear rocket program, \$40 million of which was directly for NERVA.

APPROPRIATIONS COMMITTEE REPORT

The House Appropriations Committee stated in its report that it had no alternative to dropping the NERVA portion of the nuclear rocket program since the House had previously voted to eliminate funds for the NASA portion of the NERVA project. The committee went on to say on page 83 of its report that the NERVA engine development has been supported to date "because of its importance to our future space program and will reconsider its action as appropriate in the future to assure that a balanced program is maintained \* \* \*."

On the day before the House passed the AEC appropriations bill (June 19, 1968), the House accepted the Senate version of the NASA authorization bill which included \$55 million for the NERVA engine. This short interval did not give the House groups time to factor the change into the appropriations bill. Therefore, the basis upon which the House Appropriations Committee had to arrive at its decision on the NERVA rocket engine changed on the day before the bill came up in the House from a basis in which there was no NERVA authorization in the NASA bill to a basis where there was a NASA authorization for NERVA. Therefore, with this change in the situation, I believe the other body, as provided in the House Appropriations Committee report: "\* \* \* will reconsider its action as appropriate in the future to assure a balanced program is maintained \* \* \*"

The whole nuclear rocket program, including the AEC-NASA phase on the NERVA engine, is very important. This was brought out forcefully by Dr. Seaborg when he said earlier today:

A reduction from the President's budget of \$41.0 million in the nuclear rocket program as reported out by the Appropriations Committee and passed by the House, would mean immediate termination of all facets of the NERVA program, drastic reductions in the Advanced Reactor Technology Program, and complete shutdown of the nuclear rocket development station.

The effects of this action would be to eliminate the most promising propulsion system from the nation's space program, and it would have the most profound effects on our future capability in space, civilian and possibly military. It would take this nation several years and hundreds of millions of dollars to re-establish this capability once terminated. It would also have a serious impact on the nation's technological strength, since this program is an important element in advancing our technology.

Such action would be inconsistent with the amount authorized for the Rover program in both the AEC and NASA authorizations passed by both the House and the Senate. In recognition of this and the importance of the nuclear rocket program to the nation, but at the same time mindful of the serious budget problems we face, we request that \$22.0 million of the \$41.0 million reduction by the House be restored to the nuclear rocket program.

RESTORATION REQUEST

I concur with Dr. Seaborg's statement except in respect to his recommended restoration of \$22 million. The \$22 million for NERVA would leave the overall nuclear rocket program \$19 million under what

the AEC originally asked for and \$16 million under what was authorized by the Congress. In addition, as brought out by Senator Bible earlier today in his examination of Chairman Seaborg, the \$22 million for NERVA does not put AEC's portion of the program in balance with the portion of the nuclear rocket program supported by NASA for which the Congress authorized \$55 million. As stated by Chairman Seaborg in his response to Senator Bible, \$14 million or \$15 million more would be needed to get the AEC program in balance with that authorized for NASA. This factor added to my evaluation of the testimony presented earlier, which is to the effect that the \$22 million will just provide for a holding level of effort predominated by overhead expenditures, in my opinion, justifies increasing the \$22 million by \$14 million for a total of \$36 million to be added to the AEC bill.

#### EFFECT OF PROPOSED REDUCTION

I would like to add one other point which earlier testimony brings out. This point concerns the effect of the reduction of NERVA effort to \$22 million. The testimony given by Chairman Seaborg and Commissioner Ramey clearly points out that the \$22 million NERVA effort will drastically reduce critical scientific talent on the program, a capability which has been built up at considerable Government expense and one which has already been reduced.

I would certainly hope that the committee would see fit to correct this situation in the bill we finally report out. I share the previously expressed views of Senator Bible earlier that the Senate Independent Offices Subcommittee will probably follow through to come up to the \$55 million NASA authorization passed by the Congress late last month.

#### ROCKET PROGRAM REQUESTS AND AUTHORIZATIONS

Mr. Chairman, since there are such a number of authorization actions on the nuclear rocket program, I would like to insert in the record at this point a summary of requests and authorizations which the staff has prepared.

I spent some time with the people at the Atomic Energy Commission and at NASA as well as the Los Alamos Scientific Laboratory and the principal industrial contractors. I merely want to say I have great confidence in all of these organizations and I hope the committee has as much confidence as I have in this fine work that they have done on the nuclear rocket engine. It is a wonderful group of organizations.

(The summary follows:)

#### ROVER—ATOMIC ENERGY COMMISSION

[In millions of dollars]

Subject	AEC 1969 request	Congressional authorization	House appropriations	AEC restoration request
Nerva.....	39	37.2	0	22
Advanced rocket.....	23	22	21	
Rocket development station.....	10	9.8	10	
Total.....	72	69	31	
Construction.....	1	1	0	

## NASA

[In millions of dollars]

Subject	NASA 1969 request	Congressional authorization
Nerva.....	41	(1)
SRT.....	15	(1)
Rocket development station.....	4	(1)
Total.....	60	1 55

<sup>1</sup> The Senate did not provide a breakdown on NASA for 1969.

Senator HILL. Any other questions?

Senator ANDERSON. No. I would like to say I think it is very vital we do not stop this activity that is going on so well. They are doing a fine job and the Commission has done excellent work, and I trust them a long way in their operation.

Senator HILL. Any other questions?

Senator ANDERSON. No.

#### RADIOISOTOPE POWERED ENGINE FOR HEART PUMP

Senator HILL. Mr. Ramey, as we know in the last several months, we have seen a lot in the papers about heart transplants. Could you tell us something of the status of the AEC's artificial heart program?

Mr. RAMEY. Senator Hill, the Commission has had in the past and up again through fiscal 1968 a program for the development of heart assist engines. These are little isotope-powered heat sources that will run a little pump for an entire artificial heart transplant. From what we have gathered from our associates in the NIH and that heart program, and this is a cooperative venture, there is a very important role which these artificial hearts will play in the whole picture of substitute measures for certain types of heart disease. This is not to say that transplants do not have their role, but they do have a number of legal and other types of problems associated with them.

Senator HILL. Yes, sir.

Mr. RAMEY. In this program that we have developed, we have made contracts with four industrial organizations for four different conceptual designs of implantable radioisotopic engines to power these devices. We believe that the resulting designs clearly indicate the possibly successful types of engines.

Unfortunately due to the budget stringency picture we have gone forward with a request for funds for fiscal year 1969 and were not able to make it.

Senator HILL. How much did you ask for?

Mr. RAMEY. I believe it was in the range of a million dollars, \$800,000, in that range. This information, of course, was gleaned from us by the Joint Committee during the authorization process, and the Joint Committee on its initiative, in the AEC authorization bill, inserted this authorization for the Commission to continue in fiscal year 1969 with this ongoing program, looking to the development of prototype devices for an artificial heart. This was enacted in the AEC's author-

ization bill, but unfortunately funding for this was not provided by the House.

Senator HILL. Did they give you a budget estimate for it? Did you get a budget estimate for it?

Mr. RAMEY. Yes, sir, we provided a budget estimate of \$800,000 supporting the Joint Committee authorization.

Senator ANDERSON. You asked for \$1.6 million.

Mr. RAMEY. Yes, sir.

Senator ANDERSON. And got \$800,000.

Senator HILL. You mean the House cut it out, Doctor, and did not give you that?

Mr. RAMEY. That is right.

Senator HILL. So you have nothing in the bill.

Mr. RAMEY. That is right. The only funding we have is for the fuels development and fabrication of heat sources. Some of the work on the heat sources would be applicable to the small energy devices for the pump. I think that is at the level of \$500,000.

Senator HILL. \$800,000 was knocked out completely by the House?

Mr. RAMEY. That is right. We, of course, believe this is an important program for the future, and the \$800,000 was a very modest amount that the Joint Committee put in. This might have enabled us to continue maybe all four of these devices looking to the further prototype development. This will just put that part of the program in cold storage. Then at some future date perhaps the program should be resumed again.

Senator HILL. Unless something is done, this completely ends it for the time being.

Mr. RAMEY. Yes, sir; on this type of development.

Senator HILL. I happen to know some very distinguished cardiac—heart surgeons who I think have more faith in an artificial heart than they do in this matter of a heart transplant. There are many unanswered questions on the heart transplant. I do not recall exactly how many heart transplants there have been, but a majority of them are no longer on this earth; they have left us.

Dr. SEABORG. Well, I have said on a number of occasions that I think this use of radioactive isotopes to power an artificial heart is one of the most important and dramatic peaceful uses of nuclear energy that we could possibly have.

Senator ANDERSON. As a member of the cardiac club, I say that is all so true.

Senator HILL. They have a little piece of machinery they put in now, but they have to go back in and take it out and put a new one in at least every 2 years. In fact, they put one in Mr. Justice Douglas.

#### PACEMAKER

Dr. SEABORG. That is the Pacemaker.

Senator HILL. It is the Pacemaker. I do not think it is comparable to what we are talking about here.

Dr. SEABORG. No. It is a different development, but also isotopic power may play a role. We are also developing isotopic power to furnish

the electrical energy required in this case, so that you would not have to go in every few years to replace the batteries.

Senator HILL. You would not have to go in as often. You would not have to undergo that ordeal.

Dr. SEABORG. That is right.

Senator HILL. Senator Bible, any further questions?

Senator BIBLE. No further questions, Mr. Chairman. Thank you.

Senator HILL. Senator Anderson, you have been the progenitor of this whole atomic energy program.

Senator ANDERSON. I have such faith in the people who are doing the work now and I have seen a good many people who have been associated with this work. But this Commission has done an excellent job and certainly ought to be given the greatest possible freedom for expression and greatest possible funds for its use.

#### SUMMARY OF APPEAL ITEMS

Dr. TAPE. Mr. Chairman, Senator Anderson has really put his finger on a very vital point here when he said he has faith in the people. He also pointed out initially that the two projects we are talking about on appeal are highly complex, technical projects in which the success is dependent upon the people who can really do the job, and their having the flexibility and our backing to bring the project off. What we are really appealing for at this time are some additional funds in this year of fiscal difficulty, but in an area in which those small additional funds will really provide for this flexibility, and some language in the appropriations act which would permit that flexibility to make the greatest use of the funds we are able to provide. Senator Anderson has put his finger right on the issue in this particular appeal.

Senator HILL. As you know, as I say, he was a progenitor. [Laughter.]

Senator ANDERSON. I was not sure it was the correct word.

Senator HILL. That means the daddy.

Dr. SEABORG. Before we close, I would also like to—

Senator HILL. Go ahead, Doctor.

Dr. SEABORG. I would like to emphasize the importance we attach to this additional funding for the 200 Bev accelerator. If we do not receive this, there will be a serious disruption of the project, and in terms of plain dollars and cents, it will increase the cost of the project very substantially. Interestingly enough, the increase in obligations that we are asking for will not lead to any increase in expenditures for the fiscal year 1969, which is, of course, what we are also interested in, and I think that should be emphasized. This will not lead to any increase in expenditures so we would not be saving anything in this critical period but increasing the cost of the project substantially and risking the disruption of it, and the loss of the tremendous team that we have gathered together for this.

Senator HILL. You have made a very good point here, Doctor, very good.

Any further questions?

Senator ANDERSON. I do hope you will read this letter from Mr.

Price that is in the record very carefully again because he subscribes to this point of view. The House of Representatives have been very kind to this sort of work and have carefully examined it and have been sort of a guarantor that the work will be done well.

Dr. SEABORG. Yes, I have read this, and I think that it is an excellent job in covering the salient points as to why we need the additional obligation and what the consequences of not receiving it would be.

Senator HILL. Could be.

Dr. SEABORG. I believe it is going to be part of the record.

Senator HILL. The letter has been placed in the record.

(The letter appears on p. 27.)

Senator HILL. Anything else now you think we should have?

Dr. SEABORG. No, sir. Thank you very much.

Senator HILL. Is there anything else you can suggest?

Mr. RAMEY. No, sir.

#### JUSTIFICATIONS

Senator HILL. At this point in the record we will include additional and supplemental justifications regarding the Atomic Energy Commission's budget request.

(The justification follows:)

#### JUSTIFICATION

##### GENERAL STATEMENT FOR OPERATING EXPENSES

###### *Estimate of appropriation*

The budget estimates for Operating Expenses for fiscal year 1969 provide for total obligations of \$2,394,445,000 to be funded by (1) a new appropriation of \$2,225,600,000, (2) the utilization of an unobligated balance of \$69,739,000 estimated to be available at the end of fiscal year 1968, and (3) an estimated \$99,116,000 to be received as revenues from non-Federal sources during the fiscal year.

###### *Estimates of costs and obligations*

The budget estimates for this appropriation are stated in terms of accrued costs for each of the AEC's operating programs. "Accrued costs" denotes the actual application of labor materials and services to the program during the year, but excludes depreciation of facilities used in the operations. The AEC does, however, maintain accounts for depreciation for the purpose of determining total costs of production and for use in establishing prices for services rendered or products sold to others.

The costs of operation are reconciled to the total obligations to be incurred during the year by estimating the build-up or decrease during the year of the resources that are to be applied to future years' operations. These estimates are included in the section titled, "Increase or Decrease in Selected Resources" and include inventories and undelivered orders.

From total obligations are deducted the revenues estimated to be obtained from non-Federal sources in order to arrive at the amount of appropriations required. These revenues are obtained from AEC-owned community and housing operations, from the sale of products, from services performed for others, and from other miscellaneous sources. These revenues are identified and summarized under the tab "Revenues Applied".

The following table summarizes the accrued costs for each program, and the total obligations for 1967, 1968, and 1969. The detailed justifications present the programs in the same order as they appear on this summary table.

## SUMMARY OF ACCRUED OPERATING COSTS BY PROGRAM RECONCILED TO NET OBLIGATIONS

	Actual, fiscal year 1967	Estimate, fiscal year 1968	Estimate, fiscal year 1969
<b>Accrued costs by program:</b>			
Raw materials .....	\$161,893,637	\$127,733,000	\$112,470,000
Special nuclear materials .....	349,302,531	340,670,000	334,303,000
Weapons .....	661,132,729	722,450,000	840,790,000
Reactor development .....	455,019,468	482,103,000	509,520,000
Physical research .....	253,398,920	265,000,000	280,000,000
Biology and medicine .....	85,747,442	88,450,000	92,051,000
Training, education, and information .....	15,947,747	16,422,000	17,009,000
Isotopes development .....	6,880,565	7,375,000	7,185,000
Civilian applications of nuclear explosives .....	12,852,846	17,965,000	14,500,000
Community .....	9,347,955	6,771,000	6,942,000
Program direction and administration .....	87,512,110	95,313,000	102,885,000
Security investigations .....	6,250,088	6,795,000	6,588,000
Cost of work for others .....	24,448,390	11,219,000	14,533,000
Adjustment to prior year costs .....	-1,936,310		
<b>Total, accrued program costs .....</b>	<b>2,127,798,118</b>	<b>2,188,266,000</b>	<b>2,338,776,000</b>
Increase or decrease in selected resources .....	3,231,100	7,561,232	55,679,000
<b>Total obligations for operating expenses .....</b>	<b>2,131,029,218</b>	<b>2,195,827,232</b>	<b>2,394,455,000</b>
Less revenues applied .....	-97,088,745	-66,464,000	-99,116,000
<b>Net obligations (financed by appropriated funds) .....</b>	<b>\$2,033,940,473</b>	<b>\$2,129,363,232</b>	<b>\$2,295,339,000</b>

*Financing of obligations*

The financing of the estimated total obligations of \$2,394,455,000 proposed in the budget estimates for 1969, together with comparable data for 1967 and 1968, is summarized in the following table:

## SUMMARY OF FINANCING

	Actual, fiscal year 1967	Estimate, fiscal year 1968	Estimate, fiscal year 1969
<b>Funds available for obligations:</b>			
Unobligated balance, beginning of year .....	\$170,217,438	\$59,110,507	\$69,739,000
Appropriation .....	1,923,000,000	2,140,000,000	2,225,600,000
Transfer to other accounts .....	-166,458	-8,275	
Revenues received from non-Federal sources .....	97,088,745	66,464,000	99,116,000
<b>Total, funds available for obligation .....</b>	<b>2,190,139,725</b>	<b>2,265,566,232</b>	<b>2,394,455,000</b>
Less unobligated balance, end of year .....	59,110,507	69,739,000	
<b>Total obligations incurred .....</b>	<b>2,131,029,218</b>	<b>2,195,827,232</b>	<b>2,394,455,000</b>

*Expenditures for operating expenses*

Expenditures from the "Operating Expenses" appropriation for 1969 are estimated at \$2,136,000,000. The estimated amounts available for expenditure in 1967, 1968, and 1969, the expenditures for each year, and the remaining unexpended balances are shown in the following table:

## EXPENDITURE ANALYSIS

	Actual, fiscal year 1967	Estimate, fiscal year 1968	Estimate, fiscal year 1969
<b>Funds available for expenditure:</b>			
Unexpended balance, beginning of year:			
Obligated .....	\$932,989,643	\$963,520,569	\$1,070,883,801
Unobligated balance .....	170,217,438	59,110,507	69,739,000
New appropriation .....	1,923,000,000	2,140,000,000	2,225,600,000
Transfer to other accounts .....	-166,458	-8,275	
<b>Total funds available for expenditure .....</b>	<b>3,026,040,623</b>	<b>3,162,622,801</b>	<b>3,366,222,801</b>
Less expenditures .....	2,003,409,547	2,022,000,000	2,136,000,000
<b>Unexpended balance, end of year:</b>			
Obligated .....	963,520,569	1,070,883,801	1,230,222,801
Unobligated balance .....	59,110,507	69,739,000	
<b>Unexpended balance, end of year .....</b>	<b>1,022,631,076</b>	<b>1,140,622,801</b>	<b>1,230,222,801</b>

## HIGHLIGHTS OF OPERATING PROGRAMS

There follows a brief description of each of the programs set forth in the summary on page GS-2.

1. *Raw Materials Program.*—Operating costs for the raw materials program are estimated at \$112.5 million in 1969, compared with 1968 estimated costs of \$127.7 million and 1967 actual costs of \$161.9 million. The 1969 program estimates provide for the continued procurement of uranium concentrates and activities related to resource investigations. The deliveries of uranium concentrates are from domestic sources and reflect the completion of deliveries deferred during the CY 1963-1966 period. Deliveries during the last half of the fiscal year are from the additional material which the AEC agreed to purchase in CY 1969-1970 pursuant to the domestic stretchout program announced in 1962.

2. *Special Nuclear Materials Program.*—Operating costs for the special nuclear materials program are estimated at \$334.3 million in 1969, compared with 1968 estimated costs of \$340.7 million and 1967 actual costs of \$349.3 million. Special nuclear materials are produced to meet weapons production schedules and requirements for other programs. Uranium concentrates are processed into feed materials from which plutonium and other products are produced in the reactors at Richland, Washington, and Savannah River, South Carolina, and the isotope uranium-235 is extracted in plants at Oak Ridge, Tennessee, Paducah, Kentucky, and Portsmouth, Ohio. The 1969 estimates provide for the enrichment of feed supplied from the private sector pursuant to Sec. 161v of the Atomic Energy Act of 1954, as amended, and for which revenues resulting from charges for separative work are budgeted under the Revenues Applied Program. The 1969 estimates also reflect full year savings of \$16.5 million related to the shutdown, in February 1968, of a production reactor at Richland and one at Savannah River. Work will continue on process improvements to assure continuity and safety of operations, more economical methods of production, and more timely development of new production processes with increased emphasis in 1969 on the production of enriched uranium.

3. *Weapons Program.*—Operating costs for the weapons program are estimated at \$840.8 million in 1969, compared with 1968 estimated costs of \$722.4 million and 1967 actual costs of \$661.1 million. The weapons program encompasses the production of atomic weapons; the maintenance of stockpiled weapons in a state of constant readiness; the design, development and underground testing of new weapons types; maintenance of a readiness capability to resume atmospheric testing; and participation with the Department of Defense in the development of test detection methods. The 1969 estimates include increases for the production of new weapons systems and increased emphasis on the development and testing of new weapons types.

4. *Reactor Development Program.*—Operating costs for the reactor development program are estimated at \$509.5 million in 1969 compared with 1968 estimated costs of \$482.1 million and 1967 actual costs of \$455.0 million. Emphasis will continue to be placed on advancing power reactor technology in order to achieve large scale generation of economic electrical energy and conservation of natural resources from atomic reactors. In particular, the development program on liquid metal cooled fast breeder reactors will increase substantially to support the plan leading to an economic fast breeder nuclear power plant. Special attention will be given also to the timely development and use of nuclear energy for desalting sea water, including support of the large dual-purpose nuclear power desalting plant to be constructed by the Metropolitan Water District of Southern California. Cooperative endeavors will be continued between the Commission and industrial groups, as well as with the European Atomic Energy Community (EURATOM) and Canada.

The estimates provide for research and development in advanced systems and technology, and in nuclear safety with particular emphasis directed toward engineered safety features.

Development of nuclear reactors for propulsion of naval vessels will be continued. The NERVA technology program test activities will be completed and the definition and design of a NERVA engine will be underway, including component fabrication and testing; development of advanced fuels and graphite reactor concepts will also continue. Radioisotope power sources and reactors are also being developed to meet power requirements for remote areas, and to provide electric power and heat for satellites.

Operation of test facilities and experimental reactors will be continued at the National Reactor Testing Station in Idaho, and at other locations.

5. *Physical Research Program.*—Operating costs for the physical research program are estimated at \$280.0 million in 1969 compared with 1968 estimated costs of \$265.0 million and 1967 actual costs of \$253.4 million. The physical research program consists of theoretical and experimental investigations required to support the Commission's immediate and long-range research objectives. The phenomena dealt with are at the forward boundaries of scientific knowledge. Unusual materials are employed and their nuclear, as well as their chemical and physical properties, must be determined. The temperatures and radiation densities at which these materials are used are outside the range of previous experience in industrial technology. Advances achieved in the past can be traced back to similar laboratory investigations. The Commission serves as the executive agent for the nation's high energy physics program. Also included in the estimates for this program are funds for the Ernest O. Lawrence awards, \$25,000.

6. *Biology and Medicine Program.*—Operating costs for the biology and medicine program are estimated at \$92.1 million for 1969, compared with estimated costs of \$88.5 million in 1968 and actual costs of \$85.7 million in 1967. Emphasis will continue to be placed on research directed toward the protection of the health and safety of atomic energy plant workers, uranium miners, and the general populace from the hazards of atomic energy operations. The upper-air sampling program and research on chemical toxicity will be continued at approximately the current level of effort. There will be a continuing research effort in beneficial applications of radiation and radioisotopes in medicine, agriculture, and in cancer research. Close liaison will continue to be maintained with other agencies performing functions interrelated with AEC biomedical interests. Research is carried on by AEC laboratories, universities and other independent institutions.

7. *Training, Education and Information Program.*—Operating costs for the training, education and information program are estimated at \$17.0 million in 1969 compared to 1968 estimated costs of \$16.4 million and 1967 actual costs of \$15.9 million. Primary program emphasis will be placed on broadening the base of nuclear technology. Program efforts are directed toward provision of assistance to colleges and universities in establishing nuclear curricula; provision of assistance to states for training in radiation control; operation of the Puerto Rico Nuclear Center; conduct of specialized courses; administration of cooperative programs between universities and AEC laboratories; offering of graduate fellowships in the nuclear energy field, including a traineeship program; presenting nuclear science demonstrations and exhibits; and development and dissemination of information.

8. *Isotopes Development Program.*—Operating costs for the isotopes development program are estimated at \$7.2 million in 1969 compared to 1968 estimated costs of \$7.4 million and 1967 actual costs of \$6.9 million. The program consists of research and development activities required to accelerate realization of the potentially vast uses of radioisotopes and radiation technology. Primary emphasis will be placed on development of fuels for a circulatory support system, technology development and radiation processing applications, and on research and development related to environmental pollution. Work will continue on radiation preservation of foods and radioisotope production and materials development. Much of this work is carried out in cooperation with industry and other Government agencies.

9. *Civilian Applications of Nuclear Explosives Program.*—Operating costs for the civilian applications of nuclear explosives program (Plowshare) are estimated at \$14.5 million for 1969 compared to estimated costs of \$18.0 million in 1968 and actual costs of \$12.9 million in 1967. The program provides for the investigation and development of peaceful uses for nuclear explosives. The 1969 estimates provide for research and development aimed at a fundamental understanding of nuclear explosive design and explosion phenomenology and the development and testing of cleaner devices for use in nuclear excavation projects; a cratering experiment to extend the development of excavation technology; work on special nuclear explosives for producing transuranium elements; and development of nuclear technology capable of being used in the recovery of natural resources.

10. *Community Program.*—Operating costs for the community program are estimated at \$6.9 million in 1969, as compared with estimated costs in 1968 of \$6.8 million and 1967 actual costs of \$9.3 million. The 1969 estimate provides \$5.8 million for assistance payments to the former AEC communities of Oak Ridge, Tennessee, Richland, Washington, and Los Alamos, New Mexico, in accordance with the Atomic Energy Community Act of 1955, as amended. The estimate also

provides for \$1.1 million in costs at Los Alamos principally for community administration, fire protection and continued maintenance and operation of certain real estate properties which have not been sold. Operating revenues for Los Alamos related to these real estate properties and budgeted under the revenues applied program are estimated at \$0.5 million in 1969.

11. *Program Direction and Administration.*—Operating costs for program direction and administration are estimated at \$102.9 million in 1969 compared to 1968 estimated costs of \$95.3 million and 1967 actual costs of \$87.5 million. An increase in staff of 140 employees is budgeted for 1969 under this program. Estimates for program direction and administration cover the salary costs and other expenses of Commission personnel engaged in general management, executive direction, and technical supervision of program operations; the negotiation and administration of contracts; other related administrative activities; and the discharge of safeguards and regulatory functions.

12. *Security Investigations.*—Cost of investigations performed by the Civil Service Commission and the Federal Bureau of Investigation, at the request of the Commission, of persons to be employed on work involving access to restricted data, under the provisions of the Atomic Energy Act of 1954, as amended, in 1969 are estimated at \$6.6 million compared with 1968 estimated costs of \$6.8 million and 1967 actual costs of \$6.3 million.

13. *Cost of Work for Others Program.*—Cost of work for others is estimated to be \$14.5 million in 1969, compared to 1968 estimated costs of \$11.2 million and actual costs of \$24.5 million in 1967. This program includes costs incurred by the Commission in furnishing materials and services to industrial organizations and other private parties apart from those which it provides normally for its own basic program. The costs are incurred only upon the request of others. Charges are made for these materials and services and the revenues derived are included under "Revenues Applied."

14. *Increase or Decrease in Selected Resources.*—This program covers change in inventory stocks held by AEC and its contractors, collateral funds, and goods and services on order under contract. The appropriation requirements for these items are based on the changes in balances from the previous fiscal year. Balances at the end of 1969 are estimated at \$957.5 million, as compared with \$901.9 million at the end of 1968, or an increase of \$55.6 million in 1969. Balances at the end of 1967 were \$894.3 million.

15. *Revenues Applied.*—This program includes income from sale and lease of products and from services rendered, revenues from communities, and other miscellaneous income items. These revenues are applied against Atomic Energy Commission appropriation requirements. Revenues are estimated at \$99.1 million for 1969, compared to an estimate of \$66.5 million for 1968 and actual revenues in 1967 of \$97.1 million. The FY 1969 estimate includes an amount of \$27.0 million related to charges for separative work in providing uranium enrichment services to the private sector pursuant to Sec. 161v of the Atomic Energy Act of 1954, as amended.

#### EXPLANATION OF PROPOSED LANGUAGE CHANGES—OPERATING EXPENSES

The proposed change in language is indicated as follows: language enclosed in brackets indicates proposed deletion; language in *italic* indicates proposed insertion.

1. "[~~\$2,140,000,000~~] *\$2,225,600,000* and any moneys (except sums received from disposal of property under the Atomic Energy Community Act of 1955, as amended (42 U.S.C. 2301)) received by the Commission, notwithstanding the provisions of section 3617 of the Revised Statutes (31 U.S.C. 484), to remain available until expended."

This change reflects the FY 1969 appropriation amount.

#### EXPLANATION OF PROPOSED LANGUAGE CHANGES—GENERAL PROVISIONS

The proposed changes in the language for the administrative provisions are described below. Language enclosed in brackets indicates proposed deletions; language in *italic* indicates proposed insertions.

1. [Any appropriation available to the Atomic Energy Commission may initially be used subject to limitation in this Act during the current fiscal year to finance the procurement of materials, services, or other costs which are a part of work or activities for which funds have been provided in any other appropriation available to the Commission: *Provided*, That appropriate transfers or adjust-

ments between such appropriations shall subsequently be made for such costs on the basis of actual application determined in accordance with generally accepted accounting principles.]

This paragraph is deleted as the passage of P.L. 89-473 approved June 29, 1966 makes this provision no longer necessary.

FISCAL YEAR 1969 BUDGET ESTIMATES—ALL PROGRAMS, AEC DIRECT EMPLOYMENT

	Actual, fiscal year 1967	Estimate, fiscal year 1968	Estimate, fiscal year 1969
Number of regular full-time civilian employees at the end of fiscal year:			
1. AEC operating expenses.....	7,005	7,168	7,308
2. AEC trust fund (WPPSS).....	2	2	2
3. Advances and reimbursements:			
Interoceanic Canal Commission.....	6	5	5
Total.....	7,013	7,175	7,315
Number of temporary, part-time and intermittent employees at the end of fiscal year (operating expenses).....	493	490	490
Total, all employees at the end of fiscal year.....	7,506	7,665	7,805
Average number of regular full-time civilian employees:			
1. AEC operating expenses.....	6,977	7,052	7,214
2. AEC trust fund (WPPSS).....	2	2	2
3. Advances and reimbursements:			
Interoceanic Canal Commission.....	7	6	5
All other.....	4		
Total.....	6,990	7,060	7,221
Total personal services costs:			
1. AEC operating expenses.....	82,544,619	87,143,000	92,110,000
2. AEC trust fund (WPPSS).....	25,855	27,000	27,000
3. Advances and reimbursements:			
Interoceanic Canal Commission.....	125,064	127,000	96,000
All other.....	61,924		
Total, advances and reimbursements.....	186,988	127,000	96,000
Total.....	82,757,462	87,297,000	92,233,000

It is the basic policy of the Commission to conduct the atomic energy program through contractors to the greatest practical extent. The following functions are performed by AEC employees under the AEC Operating Expenses category within the basic policy: (1) program planning and direction, contract negotiation, liaison with contractors and inspection of contractor products; (2) the discharge of regulatory functions; (3) administration of industrial development and international cooperation activities; (4) the discharge of safeguards activities; (5) security measures including screening of personnel, protection of documents and property, guarding of security shipments and patrolling of sites where contractor guard service is not provided; (6) operation of the New Brunswick Laboratory and New York Health and Safety Laboratory; (7) operation of the fire department for the Weapons facilities at Los Alamos; (8) operation of health and safety activities at the National Reactor Testing Station in Idaho; (9) accounting, auditing, property management, and personnel services, assuring adequate controls by AEC offices and contractors; (10) control and dissemination of scientific and technical information; (11) provision of supporting services at the AEC Headquarters and field offices; (12) on-site inspection of unirradiated scrap reprocessors.

In addition, AEC employees perform personal services in connection with the AEC—Washington Public Power Supply System (WPPSS) contract which provides for sale of by-product energy from the Richland New Production Reactor. The cost of employees performing this work is fully compensated by WPPSS.

The estimates provide for AEC employees, who are performing nuclear operations studies in connection with the Atlantic-Pacific Inter-oceanic Canal Study, in accordance with Public Law 88-609 dated September 22, 1964. The costs of this work will be reimbursed by the Inter-oceanic Canal Commission.

The FY 1969 estimate reflects an increase of 140 permanent full-time employees over the June 30, 1968, end strength of 7,175. All of the staffing increases are in the Program Direction and Administration areas and are discussed in the narrative justification for this program.

Year-end strengths and average employment for permanent full-time employees and total personal services costs of the various programs under AEC Operating Expenses are shown in the table on the next page.

## COMPARISON OF EMPLOYMENT AND PERSONAL SERVICES COSTS

Program	Actual, fiscal year 1967			Estimate, fiscal year 1968			Estimate, fiscal year 1969		
	Employment		Costs (in thousands)	Employment		Costs (in thousands)	Employment		Costs (in thousands)
	End strength	Average full time		End strength	Average full time		End strength	Average full time	
Special nuclear materials.....	119	121	\$1,265	118	117	\$1,254	118	116	\$1,232
Weapons.....	672	710	6,732	644	658	6,350	644	646	6,483
Reactor development.....	228	233	2,081	228	227	2,145	228	228	2,221
Biology and medicine.....	98	94	1,165	106	102	1,271	106	105	1,360
Training, education and information.....	234	232	1,372	235	234	2,126	235	235	2,237
Community.....	27	47	453	25	25	246	25	25	255
Subtotal.....	1,378	1,437	13,669	1,356	1,363	13,402	1,356	1,355	13,853
Program direction and administration.....	5,629	5,546	68,964	5,814	5,691	73,768	5,954	5,861	78,284
Less:									
Personnel assigned to trust fund (WPPSS).....	-2	-2	-26	-2	-2	-27	-2	-2	-27
Advances and reimbursements—All other.....		-4	-62						
Net program direction and administration.....	5,627	5,540	68,876	5,812	5,689	73,741	5,952	5,859	78,257
Grand total, AEC operating expenses.....	7,005	6,977	82,545	7,168	7,052	87,143	7,308	7,214	92,110

## HIGHLIGHT STATEMENT

## ADVANCES FOR NON-FEDERAL PROJECTS

Section 112 of Public Law 87-701 (AEC authorization act for fiscal year 1963) approved September 26, 1962, provides, under certain conditions, for the sale of steam from the Hanford New Production Reactor. Section 112(c) provides as follows:

"All expenses of modifications of the Hanford New Production Reactor made at the request of a non-Federal entity, and all expenses of constructing and operating the electric energy generating and transmission facilities at the New Production Reactor, shall be borne by such non-Federal entity."

Under these provisions the non-Federal entity, Washington Public Power Supply System, advances funds to the Federal government for all expenses for construction and operation incurred in connection with the sale of steam and generation of power. There has been established by the Treasury Department a trust fund to which all such advances made by the power supply system are credited and are then made available to the AEC for carrying out the work involved. The power supply system advances monies to the trust fund on the basis of a forecast of requirements made by the AEC. Under the proposed plan Washington Public Power Supply System is contracting directly for the necessary generating facilities and the amounts advanced to the trust fund are to cover all AEC expenses related to inter-connecting facilities between the reactor and generating facilities and for the reimbursement of any other expenses which AEC may incur in carrying out the arrangement.

Estimates of advances to be used for this purpose are \$391,000 for fiscal year 1968 and \$338,000 for fiscal year 1969.

Senator HILL. At the conclusion of this hearing we will place in the record additional correspondence the committee has received on AEC matters.

(The correspondence follows:)

200 BEV ACCELERATOR

THE UNIVERSITY OF CHICAGO,  
OFFICE OF THE PRESIDENT,  
Chicago, Ill., June 26, 1968.

HON. CARL HAYDEN,  
U.S. Senate,  
Washington, D.C.

DEAR SENATOR HAYDEN: I enclose a copy of a memorandum from Dr. Norman Ramsey, President of Universities Research Association, Inc., regarding the 200 Billion Electron Volt accelerator to be built near Weston, Illinois.

Through our scientists connected with the Argonne National Laboratory, operated and managed by The University of Chicago, and with the Weston accelerator, I am familiar with the problems Doctor Ramsey outlines and am convinced his deep concern about the proposed slow-down and delay in construction is fully justified.

Such a delay will have most serious consequences to the progress of high energy physics as well as to the leadership role of this nation in that important area of science. His opinion is, I know from personal experience, widely shared among those most familiar with the project and its national and international significance.

I am confident that you, as a member of the Atomic Energy Subcommittee of the Subcommittee on Public Works of the Senate Appropriations Committee will fully appreciate the gravity of the proposed delay, and will do all you can to urge appropriate corrective action.

Sincerely,

GEORGE W. BEADLE.

PROBLEMS FROM LIMITING ACCELERATOR FUNDS TO ENGINEERING  
AND DESIGN

The report of the House Appropriations Committee concerning the 200 BeV accelerator has just been released. Two aspects of this report are cause for grave

concern. One is the drastic cut in the recommended sum of money, and the other is the restriction to engineering and design work. Since the first problem will be discussed elsewhere, the present memorandum is limited to the second.

There are a number of reasons for which a limitation to engineering and design would be especially harmful to this particular project. These include the following:

A. The technical nature of the project is such that the urgent current need is for the procurement and test of a few long-lead-time items and for the construction of certain portions of the accelerator which must be placed in operation early so that they may be used in testing other critical components. Likewise, construction is required at an early date of the part of the tunnel that will house these portions of the accelerator.

B. The efficiency and economy of the work would be seriously impaired by a restriction to engineering and design. We know from experience that the difficulties are real and not imagined; even during the present year this limitation has caused real problems to the orderly and efficient development of the project. If this artificial restriction is continued an additional year it will lead to major inefficiencies and increased costs.

C. Dr. Wilson has been successful in assembling around him an outstanding team of scientists and engineers at the National Accelerator Laboratory. As he and they have emphasized before, they came to the project on the basis that the accelerator was now really going to be built. They are now prepared to move forward to construction and would feel that they would be wasting their time if their work were totally limited to engineering and design. One of the greatest attractions to these scientists and engineers has been the imaginative and economical design and the determination of the Laboratory to produce a scientifically exciting machine at a low cost and in a short time period. With the reduced efficiency and the increased time scale and cost caused by a restriction to engineering and design, there is a real danger we will lose some of the most valuable members of the Laboratory including the Director, Dr. Wilson, who takes particular professional pride in directing rapid, economical and efficient projects. If the present highly effective team is dispersed by interruption or excessive delays in the project, it will be difficult after an initial false start to assemble again a comparable team.

D. The limitation to engineering and design is incompatible with the reprogramming that has been done to accommodate the severe budget reductions contemplated for next year. As you know, the original laboratory request was for \$77 million for next fiscal year. When this was reduced to \$25 million the laboratory undertook a major rescheduling of its planned operations to minimize the harmful effects of the reduction. One of the most effective steps was a postponement by several years of the start of the central laboratory building and a plan to utilize the vacant existing houses on the site instead of renting more extensive space during the accelerator construction period. Although this plan significantly reduces the total cost and diminishes the delays caused by the budget cut, it does require some prompt expenditures of construction funds for suitably modifying and supplementing the existing buildings to house the design and development activities.

E. The Laboratory has developed a strong affirmative action program under its Equal Opportunity and Community Relations Officer, Mr. Kennard Williams. One of the most effective actions has been a program to improve the employment opportunity of minority groups in local trade unions by encouraging the establishment of pre-apprenticeship training programs by unions in the construction trades. A ten week program initially for forty-four disadvantaged minority group young men is now being successfully run by Operating Engineers Local 150 on land supplied by the Atomic Energy Commission. The incentive for the program has been the construction work associated with the 200 BeV accelerator; if no construction projects materialize next year from the project, it will be difficult to convince the unions that the effort was worthwhile and that the programs should be continued. Furthermore, such a result will make it more difficult in the future to launch successfully other badly needed affirmative action programs.

F. The start of the accelerator construction is correlated to the acquisition of the site. To prevent the site acquisition from being the bottleneck following the passage of the accelerator construction authorization bill by Congress this year, the State of Illinois in good faith has already started acquiring the site.

G. Excessive delays not only increase the cost of an accelerator but also diminish its scientific value. The Russian accelerator, now successfully operating at 70 BeV, already has a long head start, which is fortunately compensated by

the recent design improvements in the U.S. accelerator which provide the option of a later increase of energy to 400 BeV or higher. However, it is urgent that excessive additional delays be avoided to assure that the U.S. accelerator continues to have the great added value of being the right instrument at the right time.

H. The Canadian National Research Council has already appropriated \$35,000 for a study of means by which the Canadian government might contribute financially to the accelerator, perhaps by supplying an additional experimental area from Canadian funds. The added discouragement and uncertainty of a U.S. delay in starting the accelerator construction will markedly diminish the chances of obtaining a major contribution from Canada.

I. In many respects the accelerator is more a continuation of an old project than the start of a new one. The initial hearings by the Joint Committee on Atomic Energy on the desirability of the accelerator took place in 1965, the laboratory site was selected in 1966, and detailed architect-engineering was authorized and funded by Congress in 1967. The limitation of the first year's funds to architect-engineering provided an opportunity for an additional Congressional review of the design. It will be unfortunate if this added design review unintentionally places the accelerator in the category of a new project and thereby leads to an additional delay.

NORMAN F. RAMSEY,  
*President, Universities Research Association, Inc.*

NORTHWESTERN UNIVERSITY,  
*Evanston, Ill., June 26, 1968.*

Senator CARL HAYDEN,  
*Senate Office Building,  
Washington, D.C.*

DEAR SENATOR HAYDEN: Northwestern University is deeply concerned with the recent action of the House of Representatives in reducing the funds available for the development of the National Accelerator Laboratory at Weston to \$7.1 million for FY 1969 and limiting the authorization to engineering and design work. This represents less than 10 per cent of the support originally requested by the Laboratory and only a little more than one fourth of the amount recommended by the Bureau of the Budget. The cut by the Bureau of the Budget was severe and great efforts were made to reprogram the project to live within this great restraint. The subsequent cut by the House and the limitations imposed on expenditures places the entire undertaking in serious jeopardy.

We have all been very impressed with the effectiveness and determination with which Dr. Wilson and the excellent staff he has recruited have moved forward with the design of the machine. It is fortunate that a group of the ability represented in the staff could have been recruited in such a short time. Unfortunately many of the scientists and engineers are on temporary leaves of absence from positions of responsibility in their Universities. Their willingness to devote time and effort to the accelerator was certainly influenced by the prospects of being involved in a rapid and efficient program. Many of the outstanding staff will not be interested in participating in a long drawn out undertaking. As a consequence we will probably lose individuals with great stature and competence, so vital to the project. By the very nature of things it would be difficult, if not impossible, to attract a staff of similar caliber in the years ahead.

Unless funds can be made available for construction of the injector so that planned tests of other components can go forward with a reasonable time schedule, the entire project may be in serious jeopardy. This would be a serious blow to the position of the United States in the world scientific community.

I hope that the Atomic Energy Subcommittee will restore funds for FY 1969 to the level of \$25 million.

Cordially,

J. ROSCOE MILLER,  
*President.*

SUBCOMMITTEE RECESS

Senator HILL. Are there any further questions. If not, the subcommittee will recess until 2:15 p.m. today when we will consider the Tennessee Valley Authority.

(Whereupon, at 11:20 a.m., the subcommittee recessed to reconvene at 2:15 p.m. on the same day.)

(AFTERNOON SESSION, 2:15 O'CLOCK, FRIDAY, JUNE 28, 1968)

## TENNESSEE VALLEY AUTHORITY

STATEMENT OF AUBREY J. WAGNER, CHAIRMAN OF THE BOARD  
ACCOMPANIED BY:

FRANK E. SMITH, DIRECTOR

L. J. VAN MOL, GENERAL MANAGER

E. P. ERICSON, ASSISTANT TO THE GENERAL MANAGER  
(BUDGET AND PLANNING)

ROBERT H. MARQUIS, GENERAL COUNSEL

LEWIS B. NELSON, MANAGER OF AGRICULTURAL AND CHEMICAL DEVELOPMENT

JACOB D. VREELAND, WASHINGTON REPRESENTATIVE

G. O. WESSENAUER, MANAGER OF POWER

Senator HILL. The subcommittee will kindly come to order. Mr. Wagner, Chairman of the Tennessee Valley Authority, we will be happy to have you proceed.

Mr. WAGNER. Thank you, Senator. Mr. Smith and I are pleased to be with you this afternoon.

Mr. Don McBride, the third member of our Board, unfortunately could not be here, but he asked me to give to you this message.

Senator HILL. He says he stands squarely behind you and Director Smith?

Mr. WAGNER. That is right.

Senator HILL. You tell him we are happy to have this message.

(The message follows:)

JUNE 28, 1968.

HON. LISTER HILL,  
U.S. Senate.

Regret very much am unable to attend appropriation hearings today. I fully endorse the statements that will be made by my colleagues relative to appropriation needs for our operation here. Because of your personal acquaintance with some of our problems I am sure that you will be sympathetic to the requests that are submitted to you by Chairman Wagner this afternoon.

DON McBRIDE,  
Director, TVA.

### THIRTY-FIFTH ANNIVERSARY: ACCOMPLISHMENTS

Mr. WAGNER. Thank you. As you know, Senator, this year marks TVA's 35th anniversary.

I am sure you will recall as we do that you were in on the beginning of it. Today the Tennessee Valley region testifies to the fulfillment of promises made by the Congress in 1933 that a whole river system could be developed for the benefits of navigation, flood control, and power; that idle World War I munitions plants could be put to the service of the American farmer; and that the unified development of resources could promote the social and economic improvement of the people of

the Tennessee Valley. The past 35 years have been years of challenge, of problems solved, of lessons learned, and of goals accomplished.

Perhaps the single most significant fact that I can report to you is that we have finally reached a point where outmigration from the Valley has stopped. The people who in years past could not find employment there and who went to the industrial cities of the North looking for jobs, for which they were quite often not qualified and consequently contributed to what is now the urban crisis—these people are now finding jobs in the Tennessee Valley, so that we are no longer from that area feeding this problem of the large cities.

#### RESOURCE MANAGEMENT IMPERATIVE

A great deal has been done and a great deal remains to be done. While we have been identifying and moving forward in solving the problems of one generation, a new generation of resource management problems has been growing. The problems of TVA's first 35 years have been problems of resource development, and we continue to work on such problems very actively.

Today, however, we find ourselves also facing growing problems of resource management. We must give increasing attention to problems of resource use lest through improvidence or failure of foresight what has been gained is damaged or destroyed. If we are not alert to the danger, our growth, our material progress, and our affluence may jeopardize the important progress we are making in building the region's resource base.

#### WATER AND RELATED LAND

The reservoirs impounded on the Tennessee River system provide water of good quality and in abundance. It is one of the region's great assets. Cities and industries have used this resource in their rapid growth. But the wastes they create can, unless properly handled, be a threat to the water quality upon which both present and future development in large measure depend.

These reservoirs also are extensively used for recreation. The pressure put upon them and their shorelines by boaters, fishermen, campers, and picnickers is increasingly heavy. This use, too, poses new challenges to our management of the water and related land resources already developed and in our planning for future developments.

#### COOPERATIVE PLANNING ACTIVITIES

These challenges of resource management are being met in cooperative planning activities with the people and their local and State agencies as to our existing reservoirs, as to those under construction—as provided in the appropriation request before you—and as to future developments now being investigated.

The basic problem is to insure that, as the pace of economic growth quickens, the resource base which sustains that growth is not allowed to deteriorate. We must find ways to improve the environment, not befool it.

#### ELECTRIC POWER OPERATION AND AIR POLLUTION

Our electric power operation offers another example. Its roots are in the pioneering multipurpose development of the Tennessee River

system. It has continued to pioneer in finding the ways in which large electric power systems must operate in consideration of the total environment.

The Tennessee Valley region today is the Nation's leading area for electric home heating. Electrically heated homes reduce the atmospheric pollution in our cities. But the extraction of dust and other pollutants from the stack gases at our large steamplants poses new problems.

We began research in air pollution control in 1949 when we started the construction of our first large steamplant. Since that time we have by all reasonable means sought to assure that ground level concentrations of stack emissions are within acceptable limits. During fiscal year 1969 alone we expect to spend over \$9 million to install electrostatic precipitators at operating steamplants to improve air quality. And we are conducting research, on our own and in cooperation with the U.S. Public Health Service, to find ways to remove sulfur dioxide from stack gases.

#### COORDINATION OF REGIONAL DEVELOPMENT PROGRAMS

In our work today we find there are many new agencies—Federal, State, and local—concerned in some manner in the regional development process. Here again there is a potential problem—how to integrate the efforts of these agencies, how to bring their contributions to bear at the right time and in the best manner on the problems we still face.

#### OLIVER SPRINGS DEVELOPMENT

One example of an integrated approach to local development is the case of Oliver Springs, Tenn. This small coal-mining town has been the victim of repeated floods from an uncontrolled creek. Beginning with the decision to do something after severe flooding last July, the city resolved with us to undertake a communitywide improvement program. This will require the efforts of the city, adjoining counties, the State and its agencies, area railroads, and Federal agencies. TVA will construct a wider and deeper channel for the creek, to reduce the frequency of flooding. We will also provide other technical assistance and we are working with the city to secure a carefully scheduled, fully coordinated, cooperative approach toward the solution of a host of major community problems, of which flood control is but one.

#### BUDGET REQUEST

TVA's appropriation request this year is \$50,250,000. This is \$10,750,000 below the amount appropriated by the Congress for fiscal year 1968—a decrease of nearly 18 percent. This means that current construction projects—Tims Ford and Tellico in Tennessee and Bear Creek in Alabama—will be delayed and their expected benefits will be deferred. Other projects important to the welfare of the region are not being undertaken at this time. Costs will rise, reflecting rising costs of goods and services, the loss of efficiency that accompanies the stretch-out of construction schedules, and the necessity in some cases to resort to more expensive ways of performing a given task.

Perhaps most serious, Mr. Chairman, is the fact that modernization of production facilities at the National Fertilizer Development Center at Muscle Shoals, Ala., will continue at a critically low level, with no new major facilities of the kinds necessary to fulfill the mission of the National Fertilizer Development Center. This is a point of major concern to us.

Mr. Chairman, this is a very brief statement as to the situation in the Tennessee Valley. We will be glad to respond to any questions you may have.

MODERNIZATION OF FERTILIZER FACILITIES, MUSCLE SHOALS, ALA.

Senator HILL. Of course you well know these fertilizer plants were begun under section 124 of the National Defense Act of 1916. That was before we became involved in World War I. It has been there through all these years. At different times you have taken some steps toward modernization. This occurred since World War I and some steps were taken since World War II. Now what is going to be the effect of this reduction in the appropriation request so far as the modernization job is concerned?

Mr. WAGNER. Well, the modernization job is not complete, Senator, and this will slow down the modernization job. This is particularly critical because as you know, this is a program basically of research and development in the field of chemical fertilizers, and the very nature of this kind of a program demands that equipment be new and modern, and that the best available be there.

We have, as you indicated, been engaged in a major modernization program, particularly in recent years. Since 1960, for instance, we have added a new and modern electric furnace for the production of elemental phosphorus used in fertilizer and in munitions work. We have added new phosphoric and nitric acid production facilities. We are currently replacing a switch house and major electrical equipment that has been in use since World War I.

Senator HILL. Since World War I?

Mr. WAGNER. Yes, sir; that is correct. It is badly out of date, and it is being replaced now, with some work being done in the current fiscal year and with some additional funds being provided in the 1969 budget. Also a considerable amount of the work in most recent years has been directed toward further control of the pollution of the air and of the water.

Senator HILL. That is a major problem today.

Mr. WAGNER. Yes, sir; it is, and while we felt a few years ago that this plant's operation did meet the current standards, we became convinced that something more must be done about it. Since 1962 we have engaged in a number of the kinds of projects which would clean up both our liquid and gaseous discharges.

Since 1962, for instance, about 70 percent of the dust and other pollutants that have been going into the air have been eliminated and, with work now underway, this figure will be 88 percent in 1970. Eighty-five percent of the pollutants that had gone into the water are now being removed, and this will be 90 percent in 1970.

The modernization also, Mr. Chairman, has helped our operating costs. Improvements that have been made in the last 4 years are saving

us about \$800,000 per year in operating costs, and the improvements now underway will save another \$800,000 per year. But as I indicated earlier, the modernization is not complete.

For example, the ammonia plant that we are using, and this is a basic feature of any fertilizer production facility, is a World War II plant, and it needs modernization. If this were done, there would be additional savings in operating costs of a half million dollars per year, and other benefits.

We need to add a plant to manufacture urea, a form of nitrogen needed in newer fertilizers, and a plant to use urea in combination with other elements to make urea ammonium phosphate, which is the first combination fertilizer that should be made with urea.

#### MANUFACTURE OF CHEMICALS AND MATERIALS FOR DEFENSE PURPOSES

Senator HILL. As I said, these plants were built originally under the National Defense Act of 1916. Are these plants being used for any national defense purposes now, and, if so, in what way?

Mr. WAGNER. Yes, sir, they are; and they have been used extensively. As you indicate, the TVA Act says that these plant facilities shall be used for production for national defense as well as for improvement and modernization of fertilizers.

Senator HILL. That is right.

Mr. WAGNER. This is possible because both phosphorous and nitrogen are key elements in the manufacture of fertilizer, and they are key elements in the production of munitions, so that when you have research facilities and a research staff who are competent in these two elements, the results are useful both for munitions and for fertilizer production.

In World War II, for example, about 60 percent of the elemental phosphorus that was used by our Armed Forces was produced in this plant. In addition to this, considerable amounts of ammonium nitrate and other chemicals were produced. For example, this was in the period when, you will recall, we were turning from natural rubber to synthetic rubber for tires, and a substantial part of the calcium carbide which was needed for synthetic rubber production for our Armed Forces vehicles and others was produced at this plant. In all, over 400,000 tons of chemicals and chemical materials were supplied for defense purposes in World War II. And in addition to that, more than 100,000 tons of fertilizer for lend-lease shipments.

Again in the Korean war the plant was used for defense purposes. For a time all of the phosphorus that was used by our Armed Forces in the Korean conflict came from this plant. And currently and in recent years we have been providing generally in the neighborhood of 15,000 to 30,000 tons of materials per year for defense purposes.

#### ARMY MUNITIONS FACILITY

In addition to this, as you know, Senator Hill, there is a munitions facility on the reservation at Muscle Shoals built for the Army, a munitions facility called the Phosphate Development Works. Some of the materials that have been used in manufacturing the product there were furnished by TVA. The phosphorus was furnished. The plant was operated by TVA and it is backed by TVA research,

staff research and staff competence. In fact at one time about half of our research staff was engaged in work for the Phosphate Development Works project.

So TVA's chemical plant has performed important defense functions and it continues to perform them. It can perform them, of course, only as we are able to keep it modern and in condition for efficient operation.

Senator HILL. Its defense performance functions today are important. This is the longest war we have ever been in.

Mr. WAGNER. That is correct.

Senator HILL. Is it performing those functions today?

Mr. WAGNER. Yes, sir. We are supplying munitions materials today.

Senator HILL. For the Army, Navy, and Air Force, is that correct?

Mr. WAGNER. To the military establishment.

#### CHEMICAL FACILITIES: ORIGINAL BUDGET REQUEST

Senator HILL. How much did you request in the budget for your chemical facilities?

Mr. WAGNER. Our request of the Bureau of the Budget for this category was \$13,086,000, compared to \$2,650,000, which is in the budget now before you.

Senator HILL. You cut down \$10.5 million?

Mr. WAGNER. Our request was cut by that amount. That is correct. Nearly \$11 million.

#### EFFECT OF BUDGET BUREAU REDUCTION

Senator HILL. What would you have done if you had been provided this larger amount?

Mr. WAGNER. One of the first things we would have done was to begin the modernization of the ammonia plant. This, as I mentioned earlier, is a World War II facility which now shows signs of wear and which is out of date in many respects.

We would also have begun the construction of a plant to make urea, a nitrogenous fertilizer element which we do not have and which is needed to make advances in the fertilizer field; and we would have used some of the money to begin construction of a plant to make urea-ammonium phosphate, the finished fertilizer using urea.

There are also some other facilities that we would have installed, but those three are the principal ones.

Senator HILL. Are they the most essential elements in your proposal?

#### AMMONIA PLANT MODERNIZATION

Mr. WAGNER. Yes, they are. If you will turn to the ammonia plant, for instance, it is a World War II plant. Many parts are wearing out. Maintenance costs are high, and operation is somewhat uncertain. Portions of the plant are obsolete and our operating costs are consequently high, and there is a greater loss of ammonia to the atmosphere than we should have, which of course represents not only a financial cost but a pollution problem.

As I may have indicated earlier, modernization of this plant could save us about \$500,000 a year in operating costs. This particular fea-

ture of modernization would cost less than \$6.5 million, and with a \$500,000 a year saving, it would be really a pretty good investment.

#### PRODUCTION OF UREA FOR MANUFACTURE OF UREA AMMONIUM PHOSPHATE

The second essential part of this modernization, and I think these really all go together, the second one I would mention, is the plant to produce urea. It is tied in with the ammonia plant modernization, because the production of urea requires a pure carbon dioxide in the process, and this would be available as a byproduct of the modernized ammonia plant. The present one does not produce carbon dioxide of pure enough quality to be used.

The urea then would be used in the manufacture of urea-ammonium phosphate, and this is the third facility that we would build. This is a major development of TVA's fertilizer research program, and we believe that urea-ammonium phosphate is as bright a star on the fertilizer horizon as triple superphosphate, Senator Hill, Senator Stennis, and Senator Ellender, was in the early days of TVA.

Senator HILL. In the early days?

Mr. WAGNER. When triple superphosphate was the watchword.

#### FERTILIZER FOR RICE

Mr. SMITH. It has the most immediate application to rice.

Mr. WAGNER. That is true. It is a fertilizer of very high concentration, about 60 percent plant food compared with 37 percent on the average in the United States, and this reduces shipping costs. It saves shipping space. It takes less labor to apply it. And, incidentally, its manufacturing cost is about 10 percent below that of comparable products.

As Mr. Smith says, it is a superior fertilizer for rice for many reasons. It is completely water soluble, and it has agronomic properties that I am probably not competent to describe in detail, but our agronomists and others who have tested this material say that it is superior in those respects. It has been tested by the International Rice Institute, and it has been tested in the rice-growing States of the United States.

Those are the most important elements of these proposed facilities, Senator Hill.

#### MINIMUM 1969 FUNDING OF WORK

Senator HILL. Keeping in mind its usefulness toward our national defense, the production of fertilizer, and the air and water pollution control, what is the minimum amount of money that you would need to start work on those important facilities?

Mr. WAGNER. The minimum amount of money that we should have to get started, and this includes only the three facilities that I have just mentioned, would be about \$3 million in this year, Senator. This would permit limited commitments to be made in the acquisition of major long-leadtime equipment to go into the plant.

We would estimate that from 24 to 30 months from the time that we place these orders, we should be able to have the facilities in operation. Now as you know, that does not mean we would have assured production.

## UREA-AMMONIUM PHOSPHATE PLANT

This is an experimental plant. This material has never been made by this process before. I am speaking of urea-ammonium phosphate. One of the reasons to build this plant is to test out results which have proven satisfactory in pilot plants, but to test them out in a production scale plant, to see that as you scale up, there aren't process bugs that develop. Usually there are some which have to be eliminated, but within 24 to 30 months we would begin operating. It would probably take some time after that to shake the plant down, and then there would be the problem of securing wider scale testing and introduction of the fertilizer material.

If it proves to be as good as we are confident it will, then we would hope that private fertilizer manufacturers, using our patented process—and our patents are available without charge, as you know—would build other plants, and they could begin supplying the needs for this fertilizer both in the United States and worldwide. We believe that urea-ammonium phosphate could be very important in the rice-eating countries of the world to help solve their food shortage problems.

## PROGRAM NATIONAL DEFENSE ASPECTS

Senator HILL. In all of this modernization effort, it would become more helpful to our defense posture, isn't that correct?

Mr. WAGNER. Yes, sir. This is a total chemical plant. Any facility which enables us to improve our production of nitrogen, nitrogen compounds, phosphorus, and its compounds would be useful in defense. Perhaps equally important is that as we probe into new fields of knowledge, our research staff, which we believe is the best in the world in this field, uncovers new secrets and new information that develops new uses for chemicals both in munitions and defense activities, and in the production of new fertilizers.

It is important to provide a basis for these highly competent research personnel to continue exploration of this kind of knowledge, and the cost, of course in the scale of things today, is small.

Senator HILL. Is there anything you would like to add, Mr. Smith?

Mr. SMITH. No, I just endorse what has been said.

Senator HILL. You would say amen?

Mr. SMITH. Amen.

Senator HILL. Any questions, Senator Ellender?

Senator ELLENDER. A few.

Senator HILL. Please proceed.

## HOUSE ALLOWANCE

Senator ELLENDER. Did the House recommend your full budget estimate?

Mr. WAGNER. No, sir. Our full budget request was for \$50,250,000. The House eliminated \$50,000, designated for the purchase of 40 new automobiles.

Senator ELLENDER. The \$50,000 is the only thing they denied?

Mr. WAGNER. That is correct. I believe that their report said they recognized that we had already been cut 18 percent from last year, and they felt that that was enough of a reduction.

## TIMS FORD AND TELLICO DAMS

Senator ELLENDER. The \$10.8 million reduction from last year's appropriation—did you close shop on the Tims Ford and Tellico Dams or are you still proceeding?

Mr. WAGNER. We are still proceeding.

Senator ELLENDER. How much have you requested this year for those two facilities?

Mr. WAGNER. In this budget?

Senator ELLENDER. Yes.

Mr. WAGNER. For Tellico—

Senator ELLENDER. Where would that appear in your justification?

Mr. WAGNER. It is on page 3, Senator, the foldout page, about six or eight lines down. You will see Tellico Dam and Reservoir, for which the request this year is \$7,907,000. For Tims Ford it is \$7,892,000.

Senator ELLENDER. Have you curtailed work on these projects?

Mr. WAGNER. Oh, yes. This reduction defers the completion of the Tellico Dam by a year beyond what we had hoped for, and it had already been deferred a year, and the Tims Ford Dam is delayed an additional 6 months, I believe.

Senator ELLENDER. Did you ask for more?

Mr. WAGNER. Yes, sir; we did.

Senator ELLENDER. And it was denied?

Mr. WAGNER. That is correct.

## NICKAJACK DAM AND RESERVOIR

Senator ELLENDER. How about Nickajack Dam and Reservoir?

Mr. WAGNER. Nickajack is essentially completed. The reservoir has been filled and the amount you see here, \$438,000, is simply for some cleanup.

## LAND BETWEEN THE LAKES

Senator ELLENDER. How much are you asking for the purchase of property on Land Between the Lakes?

Mr. WAGNER. That is in the middle of that page.

Senator ELLENDER. I see it, yes.

Mr. WAGNER. The amount in total is \$5,090,000. That is not all for land purchase. The amount for land acquisition is \$3,750,000, and that would complete the acquisition of land for that project.

Senator ELLENDER. You mean for the entire acreage?

Mr. WAGNER. Yes, sir.

## TOTAL LAND ACQUISITION COST

Senator ELLENDER. What will the total cost be for the entire acquisition?

Mr. WAGNER. The total cost, let me find the sheet, Senator. The total cost for land is estimated at \$28,600,000 now.

Senator ELLENDER. How much have you spent to date?

Mr. WAGNER. As of June 21 this year we had contracted for \$24,519,000 worth of land, leaving \$4,081,000 worth to be bought.

Senator ELLENDER. The \$24 million has already been provided to you?

Mr. WAGNER. Yes, sir.

Senator ELLENDER. You expect to conclude the purchase of this land if we allow the \$5,090,000?

Mr. WAGNER. That is correct.

Senator ELLENDER. You said there was another item included in that sum?

#### AREA FACILITIES AND DEMONSTRATION OF NEW PROGRAMS

Mr. WAGNER. There are several. There is a small amount in there for the development of facilities for the use of people who are coming there. This area is already very popular.

Senator ELLENDER. How much does that amount to?

Mr. WAGNER. About \$790,000.

Senator ELLENDER. When do you propose to turn this project over to the Park Service?

Mr. WAGNER. There are no plans for this, Senator.

Senator ELLENDER. I thought there were.

Mr. WAGNER. No specific plans, no, sir. We have said that we will develop this project, and operate it for several years. We are trying some programs that we believe to be new programs in that area. We have said that when we have had an opportunity to test and demonstrate them, we would turn the operation over to someone else.

Now it might be the Park Service.

#### CONSERVATION EDUCATION AND PARTICIPATION

Senator ELLENDER. What kind of programs do you contemplate that other parks do not provide?

Mr. WAGNER. There is a major Conservation Education Center in the area. We have already started it, Senator, with funds that have been appropriated to us. Let me back up just a moment to say that one of the reasons we were interested in developing this project is because we believe that with the time upon us when most of our people live in cities and work in offices and factories and shops, that unless there are deliberate attempts made for them to find out the importance of conservation programs, and to learn of their dependence on the land, the time will come when we may not have the broad public interest in conservation that we must maintain to sustain the resources on which we live.

And so while many people come there just to camp, we make arrangements for them while they are there to see good forestry practices followed, to see fish and wildlife, waterfowl refuges, to help if they would like with reforestation programs, to observe the effects of erosion and of erosion control methods.

In one area of about 5,000 acres within the total area, we have provided facilities where teachers can, and do, bring classes of school-children to live in the area and to spend perhaps a week, or more if they can, studying in the out of doors. We are getting most enthusiastic responses from teachers and parents and students who have been there.

These are some of the features that we have been interested in trying out.

## APPROPRIATION FUNDING AND USER CHARGES

Senator ELLENDER. Do you expect that program will be self-sustaining, or do you expect to come before the Congress for more money, in order to carry this work on?

Mr. WAGNER. We would expect that it would require appropriations to operate the project, just as do the national parks and other areas. The students who come to the Conservation Education Center make partial payment for that. They get their meals there and they pay for those. But in general, no; it is not proposed that this would be a financially self-sustaining operation.

Senator ELLENDER. Are there any charges made to visit the park?

Mr. WAGNER. There are charges for the use of camping facilities and that sort of thing, and for boat launching arrangements. There is at present no entrance charge to the area because all the land has not been acquired, but when it has been acquired we will have to face that issue and if we follow the general pattern, I suppose there would be an entrance charge made.

## UTILIZATION OF USER CHARGES: LAND AND WATER CONSERVATION FUND

Senator ELLENDER. What becomes of the money you collect?

Mr. WAGNER. The recreation user charges go to the land and water conservation fund. The receipts for meals that the children pay for do not.

Senator ELLENDER. The funds go to the conservation fund that was created by Congress?

Mr. WAGNER. Yes, sir; that is correct.

## FERTILIZER REVENUES: OPERATION OF PRODUCTION FACILITY

Senator ELLENDER. In respect to your fertilizer and munitions development, that program has been in operation ever since TVA began, has it not?

Mr. WAGNER. Yes, sir; it was provided for in the basic act.

Senator ELLENDER. How much of the production of these facilities is sold?

Mr. WAGNER. Almost all of it is sold, Senator, but it is usually sold at somewhat less than its cost. You may recall that our practice is to produce new and experimental types of materials, and then as an incentive to get farmers to use them, or to get fertilizer producers to try them out in the mixes that they are making, we provide a price concession of a few dollars a ton. But we do receive revenues in the neighborhood of \$22 million a year. I do not know what precise amount is shown in this.

Senator ELLENDER. From your fertilizer sales?

Mr. WAGNER. Yes; and that money is used as permitted by the TVA Act in the operation of our production facilities. The estimated—

Senator ELLENDER. What page is that on in your justification?

Mr. ERICSON. Page 9.

Senator ELLENDER. I notice on page 7 that the estimate for 1969 is \$29,664,000. What does that represent? Is that the money you anticipate collecting?

Mr. WAGNER. That is the total operating cost of the program, including all research activities, and the figure includes application of both appropriations and the revenues from the sale of fertilizers. On page 9 we show that the revenues anticipated from the sale of fertilizers are \$22,469,000.

Senator ELLENDER. A deficit of \$7 million?

Mr. WAGNER. Yes, sir; you understand this is a basic research program and experimental program. It is not intended to be self-supporting.

#### SALES OF ELECTRIC POWER

Senator ELLENDER. Yes; I understand that. Now, how much electricity does TVA sell, in round figures?

Mr. WAGNER. 80 billion kilowatt hours.

Senator ELLENDER. 80 billion?

Mr. WAGNER. Yes, sir; per year.

Senator ELLENDER. How much of that is sold to the Government, do you know?

Mr. WAGNER. Mr. Wessenauer can perhaps answer that.

Mr. WESSENAUER. At the present time it is less than 25 billion kw.

Senator ELLENDER. 25 billion?

Mr. WESSENAUER. Yes, sir.

#### STEAM AND HYDROELECTRIC GENERATION PERCENTAGES

Senator ELLENDER. Now, how much of that is generated from steam, what percentage?

Mr. WESSENAUER. About three-quarters of the total, sir.

Senator ELLENDER. 75 percent?

Mr. WESSENAUER. Right.

Senator ELLENDER. You evidently went down a little bit. Are you producing more from falling water—hydroelectric power?

Mr. WESSENAUER. Yes, sir. The other 25 percent comes from hydroelectric power.

Senator ELLENDER. I thought some time ago that the figure was around 20 percent that was produced from hydroelectric power. Have you installed new facilities?

Mr. WESSENAUER. It can vary from year to year, Senator, depending on the extent of the rainfall in a given year. I will give you the precise figures. For fiscal year 1967 we produced 17.7 billion kilowatt-hours from hydroelectric generation, 68.1 billion from steam electric, and we had interchange and receipts from other utilities of 1.9 billion, making a total of 87.8 billion kilowatt-hours.

Senator ELLENDER. Would you say that it ranges between 20 and 25 percent?

Mr. WESSENAUER. As time goes along, Senator, the percentage of hydro will be less.

Senator ELLENDER. I understand that.

Mr. WESSENAUER. Because practically all of the load growth is being met from thermal electrical stations.

Senator ELLENDER. That is because you are constructing more steamplants?

Mr. WESSENAUER. That is correct, sir.

## POWER CONSTRUCTION PROGRAM

Senator ELLENDER. What is your present obligation for steamplants?

Mr. WESSENAUER. We have under construction five major steam units. Two of those are nuclear units in North Alabama. There is a steam electric unit being added at our Paradise Plant in Kentucky, and we have a coal-burning station just getting started with two units on the Cumberland River in Tennessee. In addition we have placed orders for three more nuclear units, very recently in the case of two of them. So we have eight units underway in various degrees. The Paradise unit is the one that will come into service first next fall—a year from now, I mean.

Senator ELLENDER. On these nuclear plants, do you pay the full value or the full cost to the Government?

Mr. WAGNER. There is no subsidy in these; no sir. These stand on their own feet.

Senator ELLENDER. With the nuclear plants that have been sold to cities and are on a more or less trial basis, there is a certain amount of subsidy allowed. But you do not get any?

Mr. WAGNER. There is none of that in these; no, sir.

Senator ELLENDER. And you pay the full cost?

Mr. WAGNER. That is correct.

Senator ELLENDER. That is the cost of the plant to the Government. Now I notice—

Mr. WESSENAUER. I think we ought to be clear, Senator. We buy the equipment from the private manufacturers.

Senator ELLENDER. I understand, but the energizing material of course—

Mr. WESSENAUER. The fuel we will use and the fact that it has to be enriched at some of the plants at Oak Ridge is included in what we pay the manufacturers.

Senator ELLENDER. That is what I had in mind of course.

Mr. WESSENAUER. We pay the regular charges for that, yes.

## PAYMENTS TO TREASURY

Senator ELLENDER. I notice on page 7 of your justifications that the payments to the Treasury, \$62,020,000, is applied on account?

Mr. WAGNER. It is on account of the power program. The 1959 amendment provided that we should pay each year a return on the appropriation investment in the power system, and also pay amounts each year in repayment of each investment. Repayments were to start at \$10 million per year.

Senator ELLENDER. You mean before you issued your own bonds?

Mr. WAGNER. This was in the 1959 legislation that preceded our issuance of revenue bonds, yes, sir.

## REPAYMENT OF APPROPRIATION INVESTMENT AND DIVIDEND PAYMENT ON APPROPRIATION

Senator ELLENDER. So that the amount of \$62,020,000 is a repayment to the Government?

Mr. WAGNER. \$15 million of it is a repayment to the Government of the appropriations, and \$47 million of it is payment of a dividend

on the appropriations. We are currently required to pay into the Treasury each year \$15 million a year in repayment of the appropriations investment, to reduce it, and then a return on—

Senator ELLENDER. Let us be specific. Let us take the \$50 million you are requesting this year. Are you telling us of that amount you pay back \$15 million?

Mr. WAGNER. No, sir; the \$50 million that we are asking for is for principally other programs.

Senator ELLENDER. I understand that.

Mr. WAGNER. At the time the amendment was passed in 1959, there was about \$1,200 million that had been appropriated for power, and had not been repaid.

Senator ELLENDER. That is hydroelectric?

Mr. WAGNER. That is for hydro and steam both.

Mr. SMITH. It included the hydro.

Mr. WAGNER. Yes, it included both, and we currently are paying back \$15 million a year. That will go to \$20 million a year in another 2 years and will continue until \$1 billion has been paid back.

Senator ELLENDER. Was that to be amortized over a period?

#### 1969 DIVIDEND PAYMENT INCREASE

Mr. WAGNER. It amounts to about 50 years, Senator. We will have repaid \$1 billion of the \$1,200 million. Each year we pay in addition a return on the part that has not been paid back. You may call it interest if you like. We call it a dividend, because the Federal Government owns the system. That payment is calculated at the average cost of money to the Federal Government on all of its marketable obligations at the end of the preceding year.

Now, in 1969 I have some good news for you, bad news for us. The figure for the total Treasury payment will be not \$62 million but somewhere between \$67 and \$68 million.

Senator ELLENDER. Does that show you are more prosperous?

Mr. WAGNER. It shows that the interest rates have gone up. You see we have to pay the rate that will exist on June 30 this month.

#### REPAYMENT OF APPROPRIATION INVESTMENT

Senator ELLENDER. Let us go back to this amount now. The \$1,200 million is money that was made available to you by the Government to construct both steam and hydroelectric plants?

Mr. WAGNER. That is correct.

Senator ELLENDER. How much of that amount have you paid back?

Mr. WAGNER. We will have paid back \$110 million under this arrangement through fiscal year 1969. Now, prior to 1959, we had paid back additional amounts of the appropriations investments amounting to better than \$250 million.

Senator HILL. What is the sum total you paid back?

Senator ELLENDER. To what extent has this \$1,200 million been reduced?

Mr. WAGNER. \$110 million.

## DIVIDEND PAYMENT

Senator ELLENDER. So that on \$1,090 million remaining you are paying a dividend of how much? You say it is a dividend; I say it is interest. It should be interest.

Mr. WAGNER. It will be about \$52 or \$53 million during the 1969 fiscal year.

Senator ELLENDER. Do you figure that this payment is on the going rate of interest?

Mr. WAGNER. Yes, sir. It will be calculated and that figure will be supplied to us by the Treasury after June 30. It is about 4¾ percent, I believe, at the present time.

## REPAYMENT OF APPROPRIATION INVESTMENT

Senator ELLENDER. So that by repaying this you are reducing the original investment?

Mr. WAGNER. Yes, sir. That is what the \$110 million is.

Senator ELLENDER. That is what has been paid.

Mr. WAGNER. And we are reducing it currently by \$15 million a year, and I believe after 1970 it is \$20 million a year until we have reduced the total amount.

Senator ELLENDER. You mean paid it all out?

Mr. WAGNER. One billion dollars is what we have to pay back. The law requires us to pay back \$1 billion of the \$1,200 million. So that within 50 years—do you follow me?

Senator ELLENDER. No; I do not.

## STATUTORY REQUIREMENT AND GOVERNMENT OWNERSHIP

Mr. WAGNER. The law requires that we repay the appropriations investment at these specified rates, which will shortly become \$20 million a year, until we have repaid a total of \$1 billion. At that time there will remain an unrepaid investment by the Federal Government of a couple of hundred million dollars in the system. But the Federal Government will still own it lock, stock and barrel, and by then it will be worth I do not know how many billion dollars. It is a pretty good investment, Senator.

## SALES OF POWER BONDS

Senator ELLENDER. I realize that. Now aside from the amounts you owe the Government, what is the value of bonds you have sold?

Mr. WAGNER. I think Mr. Wessenaueer has that figure.

Mr. WESSENAUER. Let me just double-check it.

Senator ELLENDER. And I presume these bonds are sold on the market?

Mr. WAGNER. Sold on the market.

Senator ELLENDER. Guaranteed by TVA?

Mr. WAGNER. Yes, sir; guaranteed by our revenues. They are not guaranteed by the Federal Government.

Senator ELLENDER. And they are not tax-exempt bonds?

Mr. WAGNER. That is correct, Senator.

Senator ELLENDER. While he is looking that up, is the amortization of the bonds and the interest thereon included in the \$62,020,000 you have listed under payments to the Treasury?

Mr. WESSENAUER. No, sir.

Senator ELLENDER. They are separate?

Mr. WESSENAUER. They are separate.

Senator ELLENDER. Where does that appear, the total amount that you have outstanding, other than the Federal Government, and the total amount of interest and amortization you are paying each year? Have you got that anywhere in the justifications?

Mr. WESSENAUER. Senator, we had borrowed as of last June 30, that is a year ago, \$517 million, and the budget materials before you show at the present time it is about \$130 million more than that.

Senator ELLENDER. So that is—

Mr. WESSENAUER. About \$645 million I believe at present time.

Senator ELLENDER. That \$130 million is for the construction of facilities?

Mr. WESSENAUER. New facilities during the past year, yes, sir.

Senator ELLENDER. I see.

So that your entire bond issue then will aggregate \$647 million in round figures.

Mr. WESSENAUER. That is right.

Senator ELLENDER. Now how much of that are you required to retire? When you sell your bonds, I presume that they are for a certain period of time?

Mr. WESSENAUER. We have sold our long-term bonds, Senator, on a 25-year term basis.

Senator ELLENDER. Yes, and on the open market?

Mr. WESSENAUER. On the open market, yes, sir.

Senator ELLENDER. With a guarantee from the revenues only?

Mr. WESSENAUER. Guaranteed only by the revenues.

Senator ELLENDER. And of course you make provisions to have enough to pay back on the \$1.2 billion that you owe?

Mr. WESSENAUER. Oh, yes, sir.

Senator ELLENDER. All of that is calculated?

Mr. WESSENAUER. That is right, sir.

Senator ELLENDER. And I presume that your rate per kilowatt hour is based on that?

Mr. WESSENAUER. It includes all of those charges; yes, sir.

#### INCREASES IN POWER WHOLESALE RATES

Senator ELLENDER. To what extent have you been reducing or increasing the rate charges? Has the rate been stable?

Mr. WESSENAUER. You mean the power wholesale rates?

Senator ELLENDER. Yes.

Mr. WESSENAUER. A year ago, Senator, we did increase the rates.

Senator ELLENDER. I see. That was to meet your current obligations?

Mr. WESSENAUER. That is right, sir. We recognized two things. One was that the cost of money has been increasing as everyone has recognized, both the money we borrow in the market, and of course the interest payments as you call them on the \$1.2 billion went up as the

Federal Government had to pay higher costs for the money it has been borrowing.

Senator ELLENDER. Yes.

Mr. WESSENAUER. So both of those factors have caused an increase in our costs so far as our money is concerned. And we have also been facing rising costs of labor and fuel, and those were all recognized a year ago when the TVA increased its wholesale rates.

Senator ELLENDER. I presume you would conclude that you are current?

Mr. WESSENAUER. Yes, sir.

Senator ELLENDER. But you are obligated to pay to the bondholders and you are obligated to pay to the Government?

Mr. WESSENAUER. Yes, sir; we meet all the requirements set out in the act and all of the requirements that have been made by way of commitments to the bondholders.

#### BUDGET REQUEST AND 1967 AND 1968 APPROPRIATIONS

Senator ELLENDER. I understand. Of the \$50,250,000 that we may appropriate this year, how much of that is to be repaid to the Government?

Mr. WESSENAUER. None of that is to be repaid under any of these payment provisions we have been discussing.

Senator ELLENDER. So that the Government is now appropriating each year whatever additional funds TVA requires. For instance, in 1967 you received \$63,700,000, and in 1968 you received \$61 million. This year you are asking for \$50,250,000, and all of that money is to carry on work such as building these dams?

Mr. WAGNER. That is correct.

Senator ELLENDER. Including administration costs?

Mr. WAGNER. That is correct.

Senator ELLENDER. And the experiments you are carrying on in fertilizer research and development?

Mr. WAGNER. That is right.

Senator ELLENDER. Including some additional programs?

#### OPERATION OF NAVIGATION AND FLOOD CONTROL PROGRAMS: OLIVER SPRINGS COOPERATIVE DEVELOPMENT

Mr. WAGNER. Operation of navigation and flood control programs.

Senator ELLENDER. That is what I was coming to. I wonder to what extent do you go into that field? For instance, I noticed in your statement here that you are involved in a joint effort with Oliver Springs, Tenn.?

Mr. WAGNER. Yes.

Senator ELLENDER. How much of that did you provide, and where did you get the funds with which to furnish your share?

Mr. WAGNER. Well, our major part of that job, Senator, is the widening and deepening of a channel through the town, which would help to control flooding, and there is a half million dollars in the 1969 appropriation request for that. The project in total will cost TVA \$1,700,000.

Senator ELLENDER. Is that within the TVA area?

Mr. WAGNER. Yes; it is. This is within the area of TVA's responsibility for flood control.

Senator ELLENDER. Why do you undertake that responsibility on your own?

Mr. WAGNER. Well, it is a flood control problem, and we have flood control responsibility in the Tennessee Valley.

Senator ELLENDER. Are there any projects within the TVA area as we call it, and designated on this map, that are carried on by the Corps of Engineers?

Mr. WAGNER. The Corps of Engineers has in times gone by constructed one or two small projects not as extensive as this, but channel clearing projects, things like that.

Senator ELLENDER. Have they currently done any work?

Mr. WAGNER. They have done very little recently.

Senator ELLENDER. As of late you have taken it over, is that it?

Mr. WAGNER. We have done the job; yes.

Senator ELLENDER. Do you get anything from the Bureau of Reclamation or from the Interior Department?

Mr. WAGNER. No, sir; not in this area.

Senator ELLENDER. So that all of your revenues then come from what you obtain now from Congress, and from the sale of electricity?

Mr. WAGNER. And the sale of fertilizer.

Senator ELLENDER. Plus the fertilizer.

Mr. WAGNER. That is right; but the flood control program is supported wholly by appropriations.

Senator ELLENDER. Yes; I understand.

#### BENEFITS DERIVED FROM SIMULTANEOUS UNDERTAKINGS

Mr. WAGNER. You mentioned the integrated feature of this Oliver Springs project. What we are trying to do here is to see to it that this flood control project makes a major contribution in the redevelopment and rebuilding of this community. There was a plan, for instance, on the part of the State highway department to relocate a highway through this town. Well, if the construction of the highway and the construction of the new floodway are fitted together, you can do both jobs by moving less earth than you can if you did them separately.

In addition to that, there are some low-lying areas that flood often, where the housing is distinctly substandard, and the city had plans for housing improvement. Those can be fitted into this, too, so that some of the low-lying areas will be filled with material that is taken out of the channel to make them more free of flooding, and then the houses, when they are built there, will be flood-free.

This is a small town, and it has no sewer system. They have plans for one, and they will go ahead with their plans for sewer installation, tying it in with this new redevelopment plan.

Senator ELLENDER. Are they getting funds from the OEO?

Mr. WAGNER. They are getting them from a number of parts of the Government.

Senator ELLENDER. Yes.

Mr. WAGNER. If we tie all of these plans together, you see—

Senator ELLENDER. I understand.

Mr. WAGNER. You end up with a better result and perhaps at a saving of 25 or 30 percent.

## LOCAL OBLIGATION

Senator ELLENDER. You say that before you are through with this project, that you will have spent \$1,700,000. How much will the local people spend, not what they get from the Government, but on their own?

Mr. WAGNER. I do not believe I have that figure, Senator, but it will be substantial.

Senator ELLENDER. You do impose a certain obligation on them?

Mr. WAGNER. Yes, sir.

Senator ELLENDER. Before you undertake the contract?

Mr. WAGNER. We do; yes, sir. They would provide right-of-way and arrange for maintenance of the flood control project in the standard way. In addition to that, though—

Senator ELLENDER. I presume that is the same standard that applies to public works or the Corps of Engineers?

Mr. WAGNER. Yes, sir. Very close. In addition to that the businessmen in the community will do some major remodeling on their stores, offices, and shops in the town. This will hardly appear as a part of the accounting, but it represents a genuine cost to them, and it is their contribution to the rebuilding and remodeling of their city.

## PROVISION AT COST OF MUNITIONS MATERIALS TO GOVERNMENT

Senator ELLENDER. What do you do with respect to munitions? You have that included here. Do you experiment or do you make any that are salable or usable by the Government?

Mr. WAGNER. Generally what we do is to provide materials that the Government uses in munitions, and I suppose our principal contribution there is elemental phosphorus, which as you know is used in tracers and incendiaries, and so on.

Senator ELLENDER. Is that sent to a facility operated by the Government?

Mr. NELSON. Yes, sir; it is sent to various arsenals around the country.

Senator ELLENDER. I know you have several in Virginia and Tennessee.

Mr. WAGNER. There are other materials besides that, but that is the principal one. Nitric acid, ammonia, phosphoric acid. Also I mentioned this Phosphate Development Works, which is a facility that is in standby now, but it is a munitions facility of the Army, and we have operated it to manufacture for them an ingredient which they send to another plant and further process it.

Senator ELLENDER. To what extent are you repaid by the Government for that service?

Mr. WAGNER. We are paid for it at our cost.

Senator ELLENDER. At your cost?

Mr. WAGNER. Yes, sir.

Senator HILL. At the actual cost?

Mr. WAGNER. Yes, sir.

Senator ELLENDER. That is included in the \$29,664,000 that you have allocated for fertilizer and munitions development?

Mr. WAGNER. Yes, sir; it is included in the receipts figure, and the cost of producing it is in our cost figure, that is correct.

Senator ELLENDER. Mr. Chairman, I think that is about all I have at this time.

Senator HILL. Is there anything you would like to add, Mr. Chairman?

Mr. WAGNER. There is nothing that I can think of, gentlemen. We appreciate the opportunity to tell you our story.

LAND BETWEEN THE LAKES: FINAL ACQUISITION FUNDING AND PROJECT DEMONSTRATION

Senator ELLENDER. This is the last request you will make for land acquisition on the Land Between the Lakes project?

Mr. WAGNER. For land acquisition, that is correct, I hope.

Senator ELLENDER. I hope we can return that to the proper authority before long.

Mr. WAGNER. We would like to see what we can learn there. Let me say that before we undertook this project we discussed it with the Interior Department, with Secretary Udall, and you may recall that it was at his recommendation that TVA developed this. The Secretary studied it and recommended to President Kennedy that TVA develop the project, and after we have given it a good try—

Senator ELLENDER. I am in agreement with that. I supported it all through this period.

Mr. WAGNER. I understand.

STEAMPLANT CONSTRUCTIONS

Senator ELLENDER. And as you know, I supported TVA from its inception, except when you expanded and used taxpayers money to build these steamplants. That is when we parted company.

Mr. WAGNER. But now we are paying it back with interest.

Senator ELLENDER. I know, but what I fear is that other areas are going to demand the same thing, and the Government is going to expend many, many millions of dollars.

Mr. WAGNER. One of the interesting things, if I may take just another minute, is that when most of these plants were built, with the use of this \$1.2 billion, if the Government borrowed the money, it borrowed it at 2 or 3 percent, and it is now being repaid at very close to 5 percent.

Senator ELLENDER. That was in the contract, I presume?

Mr. WAGNER. We are not complaining. It is just one of the facts of life, Senator.

Senator ELLENDER. I wish you could make more money so as to decrease our national debt now. We owe only \$352 billion today, and it requires \$16 billion annually merely to pay the interest on our debt.

Mr. WAGNER. Well, we help a little bit.

Senator ELLENDER. With the accent on "little."

Senator HILL. You are helping some, aren't you?

Mr. WAGNER. Yes, sir; we are.

Senator HILL. Is there anything you would like to add?

ENCOMIUMS FOR SENATOR HILL

Mr. SMITH. I would like to say that this is the last TVA appropriation hearing that Senator Hill is going to hear, due to his un-

foreseen decision to retire. Certainly there have been very few comparable things in the history of the American Government in the way of an individual leadership in the Congress in behalf of a region like this.

Senator HILL. Thank you, and when I leave the Senate I am bequeathing my responsibilities to my friend from Louisiana.

Mr. WAGNER. Senator, I would like to echo those sentiments. Your interest in the region and the things you have done for it are reflected in many ways. You can see it in the rural countryside; you can see it in the new industries in the cities; you can see it in the development of the waterfront; and while it is not directly related to your interest in TVA, every time I go through one of our towns and see a Hill-Burton hospital and know the good it is doing, it is a reminder to me of the great contribution that you have made to the people in the region.

Senator HILL. Thank you, sir. Mr. Wagner, you and Mr. Smith are most generous and I deeply appreciate your kind and generous words. Remember now you are my legatee to carry on Senator Ellender.

Senator ELLENDER. I can echo all you gentlemen have said. I have been working alongside Senator Hill and listening. I was in the Senate a little while before he was.

Senator HILL. One year.

Senator ELLENDER. Yes.

Mr. SMITH. He is likely to be here twice as long as you have been.

Senator HILL. I think so. He does not get any older. Every day he seems to get younger.

(Discussion off the record.)

#### JUSTIFICATIONS

Senator HILL. Thank you, gentlemen. And thank you for your kind remarks. At this point in the record we will include certain portions of your justifications.

(The justification follows:)

The Tennessee Valley Authority is a corporation wholly owned by the Federal Government. It is an independent agency under a Board of Directors responsible to the President and the Congress. It was created by the Congress in 1933 for the unified conservation and development of the resources of the Tennessee Valley. TVA is charged with the responsibility for developing the Tennessee River and for providing a low-cost supply of electric power to the Tennessee Valley region; for chemical research, the introduction of experimental fertilizers useful in agriculture, and production of related materials needed for national defense; and for aiding, in the national interest, the comprehensive resource development and economic growth of the Tennessee Valley region in cooperation with the states and their subdivisions and agencies.

Summaries of the budget program described on the following pages are as follows:

	1967 actual	1968 estimate	1969 estimate
Appropriations (new obligational authority).....	\$63,700,000	\$61,000,000	\$50,250,000
Expenditures (accrued):			
Appropriations.....	62,346,189	71,480,794	53,591,000
Power proceeds and borrowings.....	407,159,048	462,463,000	520,827,000
Nonpower proceeds.....	28,610,209	27,543,000	25,638,000
Total expenditures.....	498,115,446	561,486,794	600,056,000
Payments to the Treasury.....	62,126,684	61,865,450	62,020,000

## BUDGET SUMMARY, ALL FUNDS (FOR FISCAL YEARS ENDING JUNE 30, 1967, 1968, AND 1969)

## OBLIGATION BASIS

	1967 actual	1968 estimate	1969 estimate
<b>CAPITAL OUTLAY OBLIGATIONS</b>			
Water resources development:			
Navigation facilities.....	\$835,710	\$60,000	\$22,000
Oliver Springs flood control facilities.....			500,000
Other flood control facilities.....	1,647,128	322,000	55,000
Upper French Broad multipurpose water control system.....			250,000
Bear Creek multipurpose water control system.....	1,009,807	2,545,000	3,200,000
Nickajack Dam and Reservoir.....	11,709,730	5,502,000	438,000
Tellico Dam and Reservoir.....	4,093,068	5,787,000	7,907,000
Tims Ford Dam and Reservoir.....	11,531,949	8,520,000	7,892,000
Additions and improvements at multipurpose facilities.....	454,222	622,000	373,000
Investigations for future facilities.....	1,138,940	1,035,000	1,000,000
Power supply and use:			
Browns Ferry nuclear plant units 1 to 3.....	77,687,779	36,965,000	58,850,000
Cumberland steamplant units 1 and 2.....	40,559,596	71,758,000	23,786,000
Paradise steamplant unit 3.....	25,549,538	27,832,000	21,920,000
Bull Run steamplant unit 1.....	3,765,291	1,062,000	
Widows Creek steamplant unit 8.....	364,049		
Nickajack hydro units 1 to 4.....	7,937,468	3,823,000	7,000
Modernization of Wilson hydro units 1 to 8.....	1,273,450	1,335,000	
Additional capacity for 1974.....		91,000	60,160,000
Transmission system facilities.....	64,625,283	62,269,000	66,400,000
Coal land and rights.....	1,155	62,000	
Additions and improvements at power facilities.....	1,029,288	7,844,000	9,519,000
Investigations for future power facilities.....	33,019	89,000	95,000
Fertilizer and munitions development.....	8,174,357	4,628,000	2,650,000
Land Between the Lakes.....	9,809,082	8,738,000	5,090,000
General service activities.....	2,718,035	2,181,794	2,450,000
Total, capital outlay obligations.....	275,947,944	253,070,794	272,564,000
<b>OPERATING OBLIGATIONS</b>			
Water resources development:			
Navigation operations.....	\$2,575,240	\$2,641,000	\$2,758,000
Flood control operations.....	2,421,202	2,556,000	2,673,000
Regional water quality management.....	879,404	1,213,000	1,300,000
Fish and wildlife development.....	237,816	280,000	300,000
Multipurpose reservoir operations not allocated.....	458,832	356,000	320,000
Surveys and general studies.....	567,441	600,000	554,000
General resources development.....	4,236,795	5,350,000	5,771,000
Power supply and use.....	244,972,238	255,675,000	267,303,000
Fertilizer and munitions development.....	26,060,451	28,619,000	29,664,000
Land Between the Lakes.....	744,610	950,000	1,175,000
General service activities.....	4,630,728	4,553,000	3,897,000
Change in selected resources.....	16,853,519	5,613,000	18,846,000
Total operating obligations.....	304,638,276	308,406,000	334,561,000
Total obligations.....	580,586,220	561,476,794	607,125,000
Payments to the Treasury.....	62,126,684	61,865,450	62,020,000
Total obligations and payments.....	642,712,904	623,342,244	669,145,000
Financed from:			
Power proceeds and borrowings.....	-543,624,075	-536,264,000	-589,986,000
Nonpower proceeds.....	-29,038,523	-27,293,450	-25,658,000
Appropriation balances.....	-6,350,306	1,215,206	-3,251,000
New obligational authority (appropriations).....	63,700,000	61,000,000	50,250,000

*Summary of 1969 budget financed from appropriations (obligations basis)*

Begin construction of Oliver Springs project, including flood control works, Oliver Springs, Tenn.....		\$500,000
Begin design of Upper French Broad multipurpose water control system, western North Carolina.....		250,000
Continue construction of Bear Creek multipurpose water control system, northwest Alabama and northeast Mississippi.....		3,200,000
Continue construction of Tellico Dam and Reservoir near Lenoir City, Tenn.....		7,907,000
Continue construction of Tims Ford Dam and Reservoir near Winchester, Tenn.....		7,892,000
Continue rehabilitation of chemical facilities at Muscle Shoals, Ala. ....		2,650,000
Continue development of Land Between the Lakes, western Kentucky and Tennessee.....		5,090,000
Continue additions and improvements to navigation, flood control, and multipurpose facilities:		
Navigation facilities.....	\$22,000	
Flood control facilities.....	55,000	
Completion of Nickajack Dam and Reservoir....	438,000	
Multipurpose facilities.....	373,000	
Investigations for future facilities.....	1,000,000	
		1,888,000
Begin construction of medical annex, Muscle Shoals, Ala.....		100,000
General facilities (office, transportation, and other general-use facilities) .....		2,350,000
Program expenses:		
Water resources development.....	\$7,585,000	
General resources development.....	5,174,000	
Fertilizer and munitions development.....	7,320,000	
Land Between the Lakes.....	1,175,000	
General service activities.....	420,000	
		21,674,000
Total budget financed from appropriations.....		53,501,000

SUMMARY OF BUDGET FINANCED FROM APPROPRIATIONS (FOR FISCAL YEARS ENDING  
JUNE 30, 1967, 1968, and 1969)

OBLIGATION BASIS

	1967 actual	1968 estimate	1969 estimate
<b>CAPITAL OUTLAY</b>			
Water resources development:			
Navigation facilities.....	\$835,710	\$60,000	\$22,000
Flood control facilities:			
Oliver Springs.....			500,000
Other.....	1,647,128	322,000	55,000
Multipurpose facilities:			
Upper French Broad multipurpose water control system.....			250,000
Bear Creek multipurpose water control system.....	1,009,807	2,545,000	3,200,000
Nickajack Dam and Reservoir.....	11,709,730	5,502,000	438,000
Tellico Dam and Reservoir.....	4,093,068	5,787,000	7,907,000
Tims Ford Dam and Reservoir.....	11,531,949	8,520,000	7,892,000
Additions and improvements at multipurpose facilities.....	454,222	622,000	373,000
Investigations for future facilities.....	1,138,940	1,035,000	1,000,000
Total, water resources development.....	32,420,554	24,393,000	21,637,000
Fertilizer and munitions development: Chemical facilities.....	7,016,628	4,268,000	2,650,000
Land Between the Lakes: Land Between the Lakes acquisition and development.....	9,809,082	8,738,000	5,090,000
General service activities: General facilities.....	2,850,813	2,181,794	2,450,000
Total, capital outlay.....	52,097,077	39,580,794	31,827,000
<b>EXPENSES</b>			
Water resources development:			
Navigation operations.....	853,898	872,000	900,000
Flood control operations.....	632,978	710,000	725,000
Regional water quality management.....	879,404	1,213,000	1,300,000
Fish and wildlife development.....	237,816	280,000	300,000
Multipurpose reservoir operations.....	3,509,566	3,615,000	3,806,000
Surveys and general studies.....	567,441	600,000	554,000
Total, water resources development.....	6,681,103	7,290,000	7,585,000
General resources development:			
Agricultural projects.....	1,640,680	1,750,000	1,800,000
Forestry projects.....	1,022,451	1,100,000	1,100,000
Minerals projects.....	139,459	175,000	200,000
Recreation projects.....	1 (402,000)	475,000	600,000
Environmental quality projects.....	130,815	250,000	315,000
Development of tributary areas.....	886,636	887,000	992,000
Multipurpose reservoir operations.....	49,108	51,000	57,000
Regional development planning.....	1 (72,000)	86,000	110,000
Total, general resources development.....	3,869,149	4,774,000	5,174,000
Fertilizer and munitions development.....	6,377,513	6,815,000	7,320,000
Land Between the Lakes: Land Between the Lakes operations.....	744,610	950,000	1,175,000
General service activities:			
Topographic mapping.....	263,755	300,000	350,000
Other expenses.....	52,275	75,000	70,000
Total, general service activities.....	316,030	375,000	420,000
Total, expenses.....	17,988,405	20,204,000	21,674,000
<b>INVENTORIES AND PROPERTY TRANSFERS</b>			
General service activities:			
General inventories.....	97,602		
Property transfers.....	-132,778		
Total, inventories and property transfers.....	-35,176		
Total, budget financed from appropriations.....	70,050,306	59,784,794	53,501,000
<b>FINANCING</b>			
Appropriations.....	63,700,000	61,000,000	50,250,000
Balance brought forward.....	8,386,100	2,035,794	3,251,000
Balance carried forward.....	-2,035,794	-3,251,000	
Total financing.....	70,050,306	59,784,794	53,501,000

<sup>1</sup>Nonadd.

TVA maintains and operates chemical laboratories and experimental production facilities at Muscle Shoals, Alabama, as a national research and development center for new and improved fertilizers and for munitions. The principal peacetime objectives of the fertilizer development and use program are:

1. To develop new and improved chemical fertilizers and processes for their manufacture in order to lower their costs to the farmer and to increase their effectiveness.
2. To test and demonstrate the value and best methods of fertilizer use.

These two objectives pertain to the Nation at large and are reached through the cooperative efforts of TVA, other Federal agencies, state land-grant colleges, the fertilizer industry, and farmers. Within the Tennessee Valley a third objective, agricultural development, is sought with the aid of TVA fertilizer materials, and is discussed on page 115 and following.

TVA's success in developing and introducing high nutrient content fertilizers and improved processes for their manufacture, along with the effect of its educational programs, has had a broad impact upon the Nation's fertilizer industry, the farmer, and the economy. In the face of rapidly rising costs of other farm inputs, the cost of plant nutrients actually has declined—a significant development that can be ascribed largely to TVA's fertilizer program. (See chart on the following page.)

The TVA chemical research and production facilities are important to national defense. In both World War II and the Korean War, TVA conducted research and supplied munitions materials at the request of defense agencies. TVA aided the Department of the Army in developing and constructing a plant at Muscle Shoals, Alabama, for production of an intermediate material used in manufacture of nerve gas. TVA operated this plant for the Army and now maintains it in a standby status. The TVA chemical research and production facilities are immediately available for national defense. During fiscal years 1968 and 1969, a considerable part of TVA's phosphorus production will be delivered to the Department of Defense. In addition, substantial amounts of nitric acid will be supplied to defense agencies.

#### CHEMICAL FACILITIES

Total chemical facilities:

1967 actual.....	\$8,174,357
1968 estimate.....	4,628,000
1969 estimate.....	2,650,000

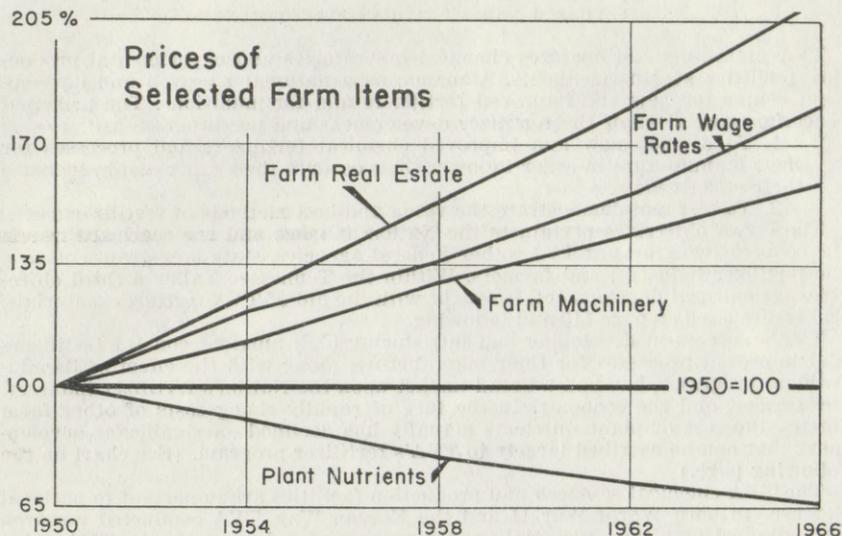
The 1969 estimate for chemical facilities is \$2,650,000. This estimate covers additions, replacements, and improvements to the chemical and agronomic laboratories and experimental production plant.

During the 1960's, emphasis is being placed on modernization of the basic chemical production facilities. It is hoped that this work can be completed by 1975. The objectives of the modernization program are fivefold: (1) to achieve operating costs savings, (2) to reduce the possibility of air or water pollution, (3) to ensure plant dependability for continuous operation, (4) to create a safer, more attractive work environment, and (5) to provide for demonstration-scale production of new products developed in TVA laboratories and pilot plants.

The effects of the modernization program are apparent with each rehabilitation or replacement project. Cumulative cost savings through fiscal year 1968 from improvements made since 1964 are estimated at \$799,000. Further savings of \$788,000 in 1969 will be realized from projects now under way. A significant reduction in potential sources of pollution has been accomplished. At the end of fiscal year 1967, losses of dust and fumes to the atmosphere—exclusive of phosphorus pentoxide—had been reduced by 57 percent under the losses at the end of 1962. The loss of phosphorus pentoxide was reduced by 52 percent between 1965 and 1967. The discharge of nutrients in the liquid wastes was decreased by 86 percent for the period 1962-1967. The 1969 estimate for plant modernization contains \$341,000 for projects that will reduce remaining pollution problems.

#### *Rehabilitation of Switchhouse, (\$1,000,000)*

All the electric energy used by the National Fertilizer Development Center at Muscle Shoals, Alabama, is delivered to a switchhouse that was built in 1918. Most of the equipment controlling 60 circuits serving the entire center is the



original and is now obsolete. Spare parts can no longer be obtained for this out-of-date equipment. When breakdowns occur, repairs must be made with parts fabricated in TVA shops. While this switchhouse was aging, the loads upon it were increasing until they have far outgrown safe operation. Deterioration and increased stresses have so increased that circuit breakers sometimes explode, causing outages of that and adjacent circuits. These explosions are hazardous to operating personnel and could result in other failures that would interrupt all operating and research activities for a long period of time.

It is necessary to rehabilitate this facility completely to ensure uninterrupted electrical service to the research and development center and to guarantee its continual operation as a vital national defense installation. The principal circuit breakers and transformers in the A.C. system and the motor generators in the D.C. system will be replaced. Extensive modification of the cable work within the switchhouse will be done. The switchgear room will be pressurized and ventilated. The rehabilitation, estimated to cost \$2,700,000, was begun in 1968 and will be completed in 1970.

#### *Other Chemical Facilities (\$1,575,000)*

*Improvements to Liquid Fertilizer Facilities, \$125,000.*—TVA has pioneered in the development and introduction of liquid and suspension fertilizers. The production facilities have been pieced together on a temporary basis. Program requirements for these new products exceed the dependable output of the present facilities. Improvements initiated during fiscal year 1967 will be completed during 1969 to increase the hourly production and shipping rate, to replace temporary equipment, and to improve operating procedures. These improvements are expected to result in savings of \$23,000 a year.

#### *Minor Improvements in and Additions to Production Facilities, \$780,000.*—

Minor improvements and additions are routinely necessary in a plant as complex as is TVA's. Some are made to improve operating efficiency, others to reduce pollution, and some for the purpose of reducing maintenance costs. They are made when plant operating studies show them to be necessary or desirable.

During 1969 these minor additions will include completion of some nitric acid storage facilities, a system for removing fumes from two phosphorus furnaces, and minor improvements to furnace charge preparation equipment. Experience has shown the need for a better nitric phosphate slurry feed system and for a hoist system in the granular combination fertilizer plant.

*Plant Replacements, \$300,000.*—The 1969 estimate is for necessary replacements within the TVA chemical plant which cannot be identified and scheduled very far in advance of the need. In a plant the size, complexity, and age of the TVA chemical plant, many occasions arise in which facilities must be replaced immediately to

continue operations or to protect employee health and safety. The emergency replacements cannot be anticipated as individual items for inclusion in the budget estimates for a particular fiscal year.

*General Equipment and Design Studies, \$370,000.*—This category of chemical plant additions includes uninstalled equipment and work tools, principally replacements and spares which are continuing requirements, miscellaneous chemical research laboratory equipment, and the rehabilitation of property transferred to TVA at no cost from other Federal agencies as surplus to their needs. Also included in this budget category are preliminary design studies for future chemical facilities. Examples are: (1) furnace charge proportioning and blending facilities, and (2) rehabilitation of in-plant electrical distribution facilities.

SCHEDULE B-3.—FERTILIZER AND MUNITIONS DEVELOPMENT (FOR FISCAL YEARS ENDING JUNE 30, 1967, 1968, AND 1969)

	1967 actual	1968 estimate	1969 estimate
<b>Income:</b>			
Farmer payments for test demonstration fertilizer.....	\$431,871	\$400,000	\$404,000
Industry payments for fertilizer materials.....	15,596,475	18,017,000	19,234,000
Sales of byproducts and intermediates and recovery of other expense.....	3,666,189	3,301,000	2,828,000
Other income.....	6,204	4,000	3,000
<b>Total, income.....</b>	<b>19,700,739</b>	<b>21,722,000</b>	<b>22,469,000</b>
<b>Expenses:</b>			
<b>Research and development:</b>			
Basic chemical and agronomic research.....	1,487,001	1,565,000	1,640,000
Fertilizer processes research and development.....	2,391,235	2,535,000	2,635,000
<b>Total, research and development.....</b>	<b>3,878,236</b>	<b>4,100,000</b>	<b>4,275,000</b>
Sulfur recovery research.....		150,000	200,000
<b>Fertilizer introduction:</b>			
Appropriations.....	2,174,668	2,200,000	2,450,000
Nonpower proceeds.....	16,028,346	18,417,000	19,638,000
<b>Total, fertilizer introduction.....</b>	<b>18,203,014</b>	<b>20,617,000</b>	<b>22,088,000</b>
<b>Developmental production:</b>			
Production expenses and finished inventory changes.....	20,591,061	22,713,000	23,378,000
Less products used in demonstration activities.....	17,451,639	19,887,000	21,252,000
<b>Total, developmental production: Nonpower proceeds.....</b>	<b>3,139,422</b>	<b>2,826,000</b>	<b>2,126,000</b>
<b>Fertilizer marketing research:</b>			
Appropriations.....	63,140	75,000	75,000
Nonpower proceeds.....	5,944		
<b>Total, fertilizer marketing research.....</b>	<b>69,084</b>	<b>75,000</b>	<b>75,000</b>
<b>Distribution of administrative and general expenses (schedule B-4):</b>			
Appropriations.....	261,469	290,000	320,000
Nonpower proceeds.....	509,226	561,000	580,000
<b>Total, administrative and general expenses.....</b>	<b>770,695</b>	<b>851,000</b>	<b>900,000</b>
<b>Total expenses before depreciation:</b>			
Financed from appropriations.....	6,377,513	6,815,000	7,320,000
Financed from nonpower proceeds.....	19,682,938	21,804,000	22,344,000
<b>Total.....</b>	<b>26,060,451</b>	<b>28,619,000</b>	<b>29,664,000</b>
Depreciation.....	2,667,728	1,905,000	2,005,000
<b>Total, expenses.....</b>	<b>28,728,179</b>	<b>30,524,000</b>	<b>31,669,000</b>
<b>Net expense of fertilizer and munitions development.....</b>	<b>9,027,440</b>	<b>8,802,000</b>	<b>9,200,000</b>

FERTILIZER RESEARCH AND DEVELOPMENT

	1967 actual	1968 estimate	1969 estimate
Basic chemical and agronomic research.....	\$1,487,001	\$1,565,000	\$1,640,000
Fertilizer processes research and development.....	2,391,235	2,535,000	2,635,000
<b>Total, research and development.....</b>	<b>3,878,236</b>	<b>4,100,000</b>	<b>4,275,000</b>

TVA's research on new and improved fertilizer products and processes and on the most effective ways of using them requires the close cooperation of chemists, agronomists, and chemical engineers. This carefully coordinated research effort is aimed at answering questions concerning the nature of phosphorus and nitrogen compounds, behavior of chemical fertilizers in the soil and in growing plants, characteristics of good fertilizers, chemical reactions involved in making fertilizer compounds, engineering technology of fertilizer manufacture, and agronomic evaluation of new fertilizers. The combination of scientific talents and facilities necessary to this complete research effort is uniquely available at TVA's National Fertilizer Development Center at Muscle Shoals, Alabama.

TVA research results are made public through articles in professional and trade journals, participation in technical meetings, published reports, correspondence, formal demonstrations, technical training sessions, and discussions with the many industry representatives who visit the laboratories and chemical facilities at Muscle Shoals. Private firms may use TVA patented manufacturing processes and items of equipment under royalty-free, nonexclusive licenses—a procedure that promotes wide, competitive use. Through June 30, 1967, TVA had granted 489 licenses to 287 firms for use in 441 plants in 39 states. As it adopts TVA developments, the fertilizer industry performs an important part in conveying to agriculture the benefits of technological advances.

TVA fertilizer research and development contributes significantly to the solution of food problems of developing nations. Under programs of the appropriate agencies, TVA technical developments are made available for use in developing countries; their scientific and technical personnel make study and training visits to the National Fertilizer Development Center. TVA personnel are loaned to AID and to international agencies to assist the emerging nations to identify and solve problems of fertilizer production and use.

TVA works largely in the fields of nitrogen and phosphorus and their compounds. Nitrogen and phosphorus are primary plant nutrients. They also are basic materials for the production of munitions, and the research staff and facilities are available for aiding national defense as needed.

#### *Basic Chemical and Agronomic Research (\$1,640,000)*

*Basic Chemical Research.*—The objective of basic chemical research is to obtain new chemical knowledge on fertilizers and their manufacture and to gain an understanding of fertilizer-soil-plant relationships.

Within the foreseeable future abundant electricity at very low cost is expected to be available from large nuclear power plants. This will make major changes in the economics of many fertilizer processes. For example, a sufficient decrease in the cost of electricity would make electric-furnace phosphoric acid fully competitive with wet-process acid. To prepare for maximum utilization of the advantages of very low-cost electricity, TVA chemists will explore the *utilization of electric power in the production of fertilizer materials*. Basic studies will be made of the chemistry underlying changes that might be made in present processes by different applications of electric power. Illustrations are the fixation of nitrogen and reduction of phosphate rock at higher temperature or by electrolysis. Potential new developments now considered impracticable because of their energy requirements will also be studied; for example, the production of compounds of phosphorus and nitrogen and the regeneration of nitric acid from calcium nitrate by electrolysis or thermal decomposition.

Intensive work will be done also on *compounds of phosphorus with nitrogen or ammonia and other elements*. Compounds even higher in plant nutrient content than the polyphosphates can be prepared with elemental phosphorus as a starting material. Although some such compounds may be relatively poor fertilizer materials themselves, they can be transported economically and then converted readily to effective fertilizer materials in uncomplicated equipment.

*Polyphosphate fertilizers*, one of the major recent TVA contributions to fertilizer technology, will continue as an area of investigation, as this broad field promises to yield considerably more highly valuable information. A useful property of the polyphosphates is their capacity to sequester and thus to hold in solution essential micronutrients and impurities such as sludge-forming agents in wet-process phosphoric acid.

Ammonium polyphosphates now being manufactured by ammoniation of superphosphoric acids (76 to 83 percent  $P_2O_5$ ) under pressure are mixtures of several condensed phosphate species. The most desirable species for fertilizer use, how-

ever, is pyrophosphate. Laboratory studies have shown that ammonium polyphosphates that are largely pyrophosphate can be prepared by ammoniation of the superphosphoric acids at atmospheric pressure through control of the amount of water, the acidity, and the temperature in the system. Study of the atmospheric pressure ammoniation process will be continued to determine the most efficient method of preparation of ammonium pyrophosphates.

*Basic Agronomic Research.*—Basic agronomic research is a necessary step in the development and use of new and improved fertilizers. It has these objectives:

1. To obtain information on needs for new types of fertilizer and their desired characteristics.
2. To evaluate new fertilizer materials as to their availability to crops, reaction to soils, and uses for which best adapted.
3. To study the most efficient ways to use fertilizer.
4. To study basic soil-plant-fertilizer relationships.
5. To investigate special plant nutrition problems.

The research is national in scope and is conducted either at the National Fertilizer Development Center or under cooperative arrangements at the agricultural experiment stations of selected land-grant colleges. The selection of projects and cooperating institutions depends on:

1. TVA program needs with respect to fertilizer development.
2. Research facilities and staff competence of colleges.
3. General need for information to improve fertilizer use.

During 1969 continued emphasis will be placed on studies of the *behavior of soil and fertilizer nitrogen* with the objective of improving its utilization by crop plants. Generally about half of applied nitrogen is used by crops. The rest is leached from the soil, is lost to the atmosphere, or perhaps is converted to unavailable forms in the soil. Studies of this problem of plant nutrient utilization will involve the use of  $N^{15}$ , an isotopic form of nitrogen which can be measured in its movement from soil to plant.

The reactions of anhydrous ammonia and sulfur in soils will be studied, as will substances and conditions that inhibit the oxidation of ammonium salts to nitrites and finally to nitrates. Studies of *mineral nutrition of rice* will continue during the year. Rice is an important cereal component of the world food supply and is produced in export quantity in this country.

There is an increasing need for *micronutrients and secondary nutrients* in the economic production of crops and for more information on the ways to apply them to growing plants. Very little scientific information exists in this whole area. Laboratory, greenhouse, and field studies will be directed toward determining the factors controlling the concentration and distribution of nutrients in the soil solution, determining the toxic levels in soils, and developing techniques for evaluating micronutrients.

One of the problems of the application of phosphate to certain soils is that it may induce a zinc deficiency. Considerable progress is being made with regard to zinc. Work will continue on the polyphosphates as carriers of micronutrients.

A study of the *basic nutritional requirements of forest trees* will continue. Very little is known about the effects of fertilizers on forest tree production. Since wood products support one of the Nation's principal industries, the value of experimental work dealing with tree response to soil fertility and management is clearly indicated. This research is being conducted on TVA phosphate lands in Florida where deep sandy soils are ideal for long-term nutrition studies of forest trees.

#### FERTILIZER PROCESSES RESEARCH AND DEVELOPMENT (\$2,635,000)

The objectives of fertilizer process research and development are—

1. To develop new and improved chemical fertilizers and processes for their manufacture.
2. To encourage their adoption by industry so that the cost of fertilizers to the farmer can be held down at the same time that effectiveness is improved.
3. To produce sufficient quantities of new fertilizers for greenhouse and field tests.

Development of better ways to use *nitric acid in treatment of phosphate rock* has taken on new importance because of the short supply of sulfur for making sulfuric acid. The long-term trend is to higher cost of sulfur as reserves become

depleted. This is a public problem of major importance, and TVA is taking the lead in developing processes that use less sulfur. Ways of *recycling nitric acid* used in treating phosphate rock also will be investigated. This would allow production of fertilizer high in phosphate without the accompanying production of a large amount of nitrate fertilizer.

Production of *elemental phosphorus by the electric-furnace method* is receiving increasing attention as an alternative route to phosphate fertilizer production. The rising cost of sulfur and prospects for lower cost electric power in the future through nuclear energy brighten the outlook for the electric furnace. Shipment of elemental phosphorus offers good prospects for savings in transport of fertilizer intermediates. Studies will be made of improvements in present electric-furnace equipment.

Development of a direct process for production of *ammonium polyphosphate* from merchant-grade wet-process phosphoric acid instead of superphosphoric acid will be continued. This development would eliminate the cost of concentrating the acid and would yield a product less expensive to ship and store than merchant-grade acid.

*Polyphosphate technology* continues to be of major importance as a new field of fertilizer development. Alternative processes for *combining urea and ammonium polyphosphate* to produce very high analysis fertilizers with unique beneficial properties will be studied and the most promising will be developed on pilot-plant scale.

*Suspension fertilizers* are showing increasing promise as TVA 12-40-0 is tested more widely over the country. Studies of these materials will be given increased emphasis, as suspensions appear particularly appropriate for the farming technology of the future.

A novel *combination of urea, nitric acid, and phosphate rock* will be tested. Simple mixing of these components gives a solid product that seems to have acceptable physical and agronomic properties. Because of its simplicity, such a method might be advantageous in developing countries.

Coating of granular fertilizers, such as urea, with sulfur will be studied on pilot-plant scale to improve moisture-resistant coatings as means of *controlling the rate of release of plant nutrients* into the soil.

Pending the outcome of research work on fertilizers made by reaction of ammonia, elemental phosphorus, and other elements, pilot-plant studies may be undertaken to develop a *process for production of 16-80-0* and other similar high-analysis materials. These materials are extremely rich in phosphorus.

Current annual consumption of *wet-process phosphoric acid* in the United States for fertilizers is about 2,600,000 tons of  $P_2O_5$ . A present problem restricting the use of this acid in improved fertilizers is the impurities it contains. The development of economic means for purifying wet-process acid will be sought.

Studies of *fertilizer granulation processes* that do not require a drying step will be pressed and pilot-plant work will be undertaken when appropriate. The lower investment and lower operating costs of such processes are attractive features.

Increased emphasis will be given to the problem of *waste disposal and control* in fertilizer processing. Although many of the past and current research projects have had a bearing on this problem, several projects have been set up as an integrated effort toward better methods of waste control.

#### LAND BETWEEN THE LAKES

Capital outlay	\$5,000,000
Operating expenses	1,175,000

#### *Purpose and Scope*

Land Between the Lakes is an area being developed by TVA as a demonstration in outdoor public recreation and conservation education. The area has limited timber, agricultural, and industrial resources and its development will demonstrate how multiple use of an area for outdoor recreation, forests, and wildlife can offer outdoor classroom opportunities for conservation education. Stimulation of the economic growth of the surrounding region is an additional objective. The demonstration will also help establish and define guidelines for the acquisition, development, and operation of other areas where conservation education opportunities can be integrated with outdoor recreation and related resources.

### Setting

The area is a peninsula, roughly 40 miles long and 6 to 8 miles wide bounded on one side by TVA's Kentucky reservoir and on the other side by the Corps of Engineers' Barkley reservoir, a total area of some 170,000 acres. It lies in western Kentucky and Tennessee, within approximately a day's drive for a third of the Nation's population. It is thinly settled, predominantly wooded, and effectively isolated by the Kentucky and Barkley reservoirs which frame it. Its recreation potential lies principally in its 300 miles of shoreline on the two reservoirs and its proximity to large population centers. Despite the isolation created by the reservoirs, highway access to the area is good from all sides.

### Development Plan

TVA plans by 1971 to complete the first stage of development in Land Between the Lakes. In the first stage TVA will:

1. Bring the entire 170,000-acre area into public ownership and assist those living in the area in relocating elsewhere.
2. Begin upgrading basic physical resources as needed to support planned programs in outdoor recreation and conservation education and to improve aesthetic values.
3. Develop a basic interior road system and establish controlled access points to the area.
4. Initiate a wide range of programs for education of young people and adults in resource development and conservation; for outdoor recreation experiences by individuals and by family groups, whether on an extended vacation, enjoying a weekend away from the daily routine, or seeking an afternoon's relaxation; for outdoor living as members of organized groups of adults and youths, whatever their economic circumstances, and whatever their previous contact with the out-of-doors.
5. Initiate cooperative programs with vicinity towns and counties and with the states of Kentucky and Tennessee for optimizing development opportunities afforded by Land Between the Lakes.

The initial development will be substantially less than that of which the area is capable or than required to meet public needs already evidenced. It will, however, be a widely diversified development—a platform upon which TVA can test public needs and test and demonstrate innovative ways of satisfying them. From these tests and demonstrations—some are already under way—will emerge guidance for the shape and sequence of the much greater development of which LBL is capable, and for development of outdoor recreation and conservation programs elsewhere.

### CAPITAL OUTLAY

	Actual to June 30, 1967	Obligations (in thousands)			Total
		1968	1969	Estimate Ensuing years	
Acquisition of land .....	\$18,952	\$5,896	\$3,750	-----	\$28,598
Development of project facilities.....	7,553	2,279	790	\$11,409	22,031
Planning and administration.....	955	295	259	259	1,768
Surveys and mapping.....	1,362	118	116	207	1,803
Distribution of administrative and general expenses.....	379	150	175	96	800
<b>Total.....</b>	<b>29,201</b>	<b>8,738</b>	<b>5,090</b>	<b>11,971</b>	<b>55,000</b>

Note: This table shows the actual and estimated capital outlay through fiscal year 1971.

Estimates of cost through 1971 have increased from \$51.5 million to \$55 million. The change results from an increase of \$4.6 million in the land acquisition estimate. A portion of the higher cost has been offset by adjustments elsewhere in the total cost estimate for this period. A review of land acquisition cost experience to date and of lands which remain to be purchased shows the increase to be necessary. Land prices in the general vicinity have been rising at an extremely rapid rate, about 25 percent in the last year (instances of rises of 300 percent within a year have been noted). This is far in excess of the 8 percent average annual rate of rise assumed in TVA's earlier estimate of land costs.

Following is a statistical summary of land acquisition work.

	Land acquisition statistics			Total
	Actual to June 30, 1967	Estimate		
		1968	1969	
Purchases:				
Tracts.....	1,694	600	206	2,500
Acres.....	51,402	26,000	20,196	97,598
In Federal ownership at start of project: Acres.....	74,902			74,902
Total:				
Acres (cumulative).....	126,304	152,304	172,500	172,500
Percent.....	73	88	100	10

During fiscal year 1968 land acquisition continues to be of primary importance and includes the purchase of 600 tracts totaling 26,000 acres.

Major construction activities scheduled include:

1. Further improvement and development of roads.
2. Construction of the first stage of the Fort Henry family camping area with capacity for approximately 400 people, located in the southwest part of the project.
3. Construction of a year-round camp for organized groups who will use their own tents, trailers, and other equipment for outdoor living. This facility will have capacity for 1,000 to 1,200 people.
4. Construction of an educational farm for demonstration purposes in the Conservation Education Center area.

Other construction items include continued work on informal-use areas; informational and directional signs; completion of work on the Hillman Ferry and Rushing Creek camps; an overlook; an arts and crafts building serving the conservation education program; development of land for wildlife purposes; and on trails and footbridges. Work has begun on cleanup of abandoned structures along major roads and drives and for certain utility adjustments. Temporary reception centers will be provided at the northern and southern entrances.

Land acquisition is scheduled to be completed in fiscal year 1969. Purchases for the year will involve 206 tracts, including 20,196 acres, to bring the purchase program total to 2,500 tracts encompassing some 97,600 acres. The remainder of the project's 172,500 acres was in public ownership at the beginning of the program.

No major construction items are included in the estimates for 1969. Work will continue on informal use areas to help distribute the increasing visitor load, and on removal of abandoned buildings, foundations, wells, cisterns, and fences. The first stage of the Fort Henry camping area will be completed and work will continue on utility adjustments. Emphasis will be given to improvement of the area's natural resources and to ways of making these more available for public enjoyment including lake access, trails, points of historic or natural interest, and exposure to wildlife habitat areas.

#### Operations

Land Between the Lakes is emerging as a new opportunity in outdoor recreation and conservation education at a time when demands for outdoor recreation are rising sharply. Campgrounds are already experiencing capacity crowds. Visitors to the area have come from 50 states and 19 foreign countries. It is estimated that a total of 800,000 visits were made to the area in 1967. Statistics for registered visitors follow.

Calendar year	Registered visitors		
	Canner nights	Day use (persons)	Conservation Education Center (persons)
1964.....	12,000	(1)	(1)
1965.....	27,444	17,487	7,312
1966.....	74,997	18,297	21,571
1967.....	150,090	13,296	36,484

<sup>1</sup> No facilities available.

It is estimated that more than one million visits will be made to the area in calendar year 1969. To relieve pressure on the capacities of existing facilities increasing use will be made of areas with only limited facilities and additional areas of this kind will be developed. Pending a catchup in facilities to be constructed, interim measures will be undertaken to promote greater use of the natural undeveloped areas. More effort in terms of reception and other services to guide and accommodate the visitors will be necessary. Planning efforts will continue to focus on a viable program that will attract, accommodate, and hold visitors in large numbers—three to five million during the next five to eight years.

The completion of land acquisition in fiscal year 1969 will extend management responsibilities and operational activities to the entire area of 170,000 acres for the first time. New lands available by acquisition will be evaluated and classified as to their best use in the unified program; for example, facilities development, recreation, forestry, wildlife, conservation demonstration, aesthetic variety, or left in their natural state. All lands serve a useful purpose and are fitted into the total operating plans for the area as appropriate to their suitability and program relationship. About 20 percent of the land area will be kept open for aesthetic values, wildlife and recreation activities; the remainder will be maintained largely in forest cover.

During fiscal year 1969 the following major facilities will be in operation.

1. Rushing Creek family camp—212 campsites, completed in fiscal year 1966.
2. Hillman Ferry family camp—310 campsites, completed in fiscal year 1967.
3. Fort Henry family camp—100 campsites (first stage), to be completed in fiscal year 1969.
4. Jones Creek day-use area—500 persons on site capacity, completed in fiscal year 1966.
5. Conservation Education Center:
  - a. Youth activities station—72 persons resident capacity, opened in fiscal year 1966.
  - b. Center station (visitor center)—100 persons on-site capacity, transferred to TVA custody in fiscal year 1965.
  - c. Educational farm—150 persons on-site capacity, open in early fiscal year 1969.
6. Camporee area:
  - a. Camp Energy group camp—400 persons on-site capacity, open in late fiscal year 1968.
  - b. Bivouac group camp area—700 persons on-site capacity, open in late fiscal year 1968.

*Outdoor recreation and conservation education activities* consume the major portion of the operating effort. Information and interpretative programs direct visitors to these opportunities and provide information about them. Associated services include registration of guests, collection of user fees, provision of various services, preparation of informational materials to guide and protect visitors, etc. *Recreation developments* include the family camping areas with overnight capacity for 2,500 people; organized group camping areas for a maximum of 1,100 overnight campers; 32 lake access, picnic and scenic overlook areas with related roads, sanitary facilities, water supply, playgrounds, and maintenance services assuring clean, safe, and attractive conditions.

The Conservation Education Center operations include—

1. *Center station*.—A reception point to receive and acquaint visitors with the conservation education program through the use of informational leaflets, resource exhibits, graphic displays, and other visual aids. A series of hiking trails and several points of natural and historical interest are nearby. Over 36,000 people registered at this station in calendar year 1967.
2. *Youth activities* station which provides resource education and training opportunities for classroom groups, grades 4 through 9, where 60 youths and their teachers or counselors can spend a day, a week, or more seeing, studying, and learning in an environment where land, water, forest, wildlife etc., can be collated with text. Until completion of the planned adult activities station this facility is also being used by adult groups, teacher-training workshops, and by college and university classes.

3. *Educational farm* consists of approximately 150 acres equipped to provide children and other visitors opportunities to observe farm animals; to learn about growing crops and conservation practices on the land; to understand the relationships between products of the land and tools and equipment used before 1925 in the home and on the farm to grow, process, and transport these products.

Other operational activities include:

*Wildlife management activities* involve (1) the improvement of habitat and food supply in quality and quantity for both upland game and migratory species; and (2) wildlife population work involving such measures as propagating, stocking, conserving, banding and tagging, harvesting, disease investigation, and control measures. Wildlife food crop planting covering approximately 5,200 acres will include about 3,000 acres by contract with local farmers under crop-sharing arrangements. These activities support managed hunting on more than 100 days in each calendar year. Hunts are scheduled for deer, wild turkey, geese, ducks, upland birds, and small game. A total of 6,094 hunter days were recorded in fiscal year 1967.

*Forest management operations* are designed to develop the forest (approximately 145,000 acres) to provide an improved wildlife habitat, to perpetuate an attractive setting for outdoor recreation and conservation education, and to improve timber quality and growth through various management methods and techniques including: reforestation, erosion control, timber stand improvement, commercial timber harvest, and forest fire protection. Through fiscal 1968, 1,641,000 seedlings will have been planted on 1,720 acres. About 500,000 pine seedlings on 620 acres and 50,000 hardwood seedlings on 300 acres will be planted in fiscal year 1969; the long-range program calls for planting 4.1 million more in years ahead. Timber stand improvement work has been done on 1,213 acres and in fiscal year 1969 an additional 625 acres will be covered. Stand improvement is critically needed on 20,000 acres and should be accomplished over the next 10 years.

*Upkeep of roads and trails.*—Over 400 miles of roads and trails comprise the circulation pattern of Land Between the Lakes for use of visitors and for administration and access purposes. A major portion of the road system is gravel surface which requires periodic blading with motor graders, addition of surface aggregate, and maintenance of drainage structures. Approximately one-fourth of the road system is hard surfaced which requires patching, a cyclic program of resurfacing, and maintenance of drainage structures. On many of the roads special treatment is being given to the cut slopes and fills by seeding and special plantings to control erosion and for aesthetic purposes. To provide an acceptable standard of appearance and to maintain vegetative cover, it is necessary to do periodic mowing, liming, fertilizing, spot sodding, and reseeding. All roads which serve visitor use require adequate signing for directional and informational purposes.

Other general maintenance activities include (1) operation and maintenance for four subimpoundments totaling approximately 1,000 acres devoted to fish and wildlife, conservation and recreation purposes; (2) elimination of hazards, such as open wells and cisterns, for protection of persons and wildlife in the area; (3) cleanup of drift and flottage at heavy-use points along the 300 miles of shoreline, (4) application of insect control measures, and (5) provision of shops, warehousing, and subbases facilities project-wide.

#### PAYMENTS TO THE TREASURY

Payments to the Treasury for fiscal year 1969 are estimated at \$62,020,000. This will bring total cumulative payments from TVA to the Treasury to \$786,199,150, of which \$744,646,570 is from power proceeds and \$41,552,580 from nonpower proceeds. Of the payments from power proceeds, \$65,072,500 represents retirement of bonds issued prior to 1942, \$295,059,019 represents reduction of the appropriation investment in power facilities, and \$384,515,051 represents a return on that investment in the nature of dividends.

#### *Payments from Power Proceeds*

Prior to August 6, 1959, payments to the Treasury from power proceeds were made pursuant to Section 26 of the TVA Act and Title II of the Government Corporations Appropriation Act, 1948. Under this legislation, payments totaling \$250,131,519 were made toward reduction of the Treasury's investment in TVA

power facilities. Of these payments, \$185,059,019 represented reduction of the appropriation investment in power facilities and \$65,072,500 represented retirement of bonds sold by TVA to the Treasury prior to 1942 under Sections 15, 15a, and 15c of the TVA Act.

As amended on August 6, 1959, the Tennessee Valley Authority Act provides for payments, beginning in fiscal year 1961, of stipulated minimum annual amounts as reductions of the appropriation investment in TVA power facilities until a total of \$1,000,000,000, in addition to previous payments, shall have been repaid. The amended act also provides for payments to the Treasury of a return on the appropriation investment in the power program. The total to be paid annually is determined by applying to the unrepaid appropriation investment the computed average interest rate payable by the Treasury upon its total marketable public obligations as of the beginning of each fiscal year. Actual and estimated payments to be made under the provisions of the amended TVA Act are presented in the following table:

Fiscal year	Computed average interest rate	Return on appropriation investment	Repayment of appropriation investment	Repayable appropriation investment as of June 30
1950				\$1,000,000,000
1961	3.449	\$41,432,398	\$10,000,000	990,000,000
1962	3.063	36,541,640	10,000,000	980,000,000
1963	3.285	38,874,543	10,000,000	970,000,000
1964	3.425	40,206,432	10,000,000	960,000,000
1965	3.659	42,599,979	10,000,000	950,000,000
1966	3.800	43,873,085	15,000,000	935,000,000
1967	4.134	47,124,974	15,000,000	920,000,000
1968	4.165	46,862,000	15,000,000	905,000,000
1969 <sup>1</sup>	4.234	47,000,000	15,000,000	890,000,000
Total		384,515,051	110,000,000	

<sup>1</sup> Estimate.

#### *Payments from nonpower proceeds*

The balance of nonpower proceeds at the end of each fiscal year not required for the purposes enumerated in Section 26 of the TVA Act is paid into the Treasury prior to the end of the following calendar year. The total of such payments through June 30, 1969, is estimated at \$41,552,580. A payment of \$20,000 is estimated for 1969, representing income received by TVA from the Beech River Watershed Development Authority toward liquidation of that agency's obligations incurred in cooperative development of a multipurpose water control system.



NONDEPARTMENTAL WITNESSES

STATEMENT OF CHARLES C. HOBBS, PRESIDENT, AND GENERAL ORGANIZER OF THE INTERNATIONAL ASSOCIATION OF BRIDGE, STRUCTURAL AND ORNAMENTAL IRON WORKERS, AFL-CIO ACCOMPANIED BY:

M. C. HARGETT, VICE PRESIDENT OF THE TENNESSEE VALLEY TRADES AND LABOR COUNCIL AND INTERNATIONAL REPRESENTATIVE OF THE INTERNATIONAL UNION OF OPERATING ENGINEERS, AFL-CIO

A. R. CARSON, BUSINESS MANAGER OF THE TVA COUNCIL OF OFFICE AND PROFESSIONAL EMPLOYEES, AFL-CIO

Senator HILL. We will now proceed by hearing public witnesses on the Tennessee Valley Authority. Our first witness is Mr. C. C. Hobbs, president of the Tennessee Valley Trades and Labor Council, he is accompanied by Mr. M. C. Hargett, vice president, Mr. W. R. Lewis, secretary.

Gentlemen, you may proceed.

Mr. HOBBS. Mr. Chairman, I had no knowledge that the board of directors would be here. It kind of puts us in an awkward position, although I wish to speak about people as well as other things.

I am Charles C. Hobbs, president of the Tennessee Valley Trades and Labor Council, which represents and bargains for some 11,000 trades and labor employees of the Tennessee Valley Authority. The council is an organization made up of 16 international AFL-CIO trades and labor unions and 105 affiliated local unions throughout the Tennessee Valley vicinity.

I have with me Mr. M. C. Hargett, vice president of the council. We are also international representatives of our international unions. Also with me is Mr. A. R. Carson, who is business manager of the TVA Council of Office and Professional Employees, and represents approximately 2,500 white-collar employees of the Tennessee Valley Authority; and Mr. F. H. McGuigan, legislative representative, AFL-CIO.

We are here to lend support to the request of TVA for funds to continue the program established in 1933, but our main concern for the TVA program at this time is the chemical research facilities, the National Fertilizer Development Center, at Muscle Shoals, Ala.

We have submitted several exhibits for your attention. They are:

Exhibit 1.—President Roosevelt's message to the 73d Congress requesting legislation to create the Tennessee Valley Authority.

Exhibit 2.—Remarks of President Kennedy at the celebration of TVA's 30th anniversary on May 18, 1963.

Exhibit 3.—Letter from President Johnson to TVA Chairman, Aubrey Wagner, designating Mr. Wagner to the Council on Cost

Reduction in Government, March 25, 1968.

Exhibit 4.—Article on TVA's training program for chemical plant operations.

Exhibit 5.—Statement of the National AFL-CIO.

(The exhibits were submitted and placed in the subcommittee files.)

Mr. Chairman, I understand that the original letter was directed to you and I request that that be made a part of the testimony.

Senator HILL. Without objection we will place it in the record.

(The letter follows:)

TENNESSEE VALLEY TRADES AND LABOR COUNCIL.

May 3, 1968.

HON. LISTER HILL,  
New Senate Office Building,  
Washington, D.C.

DEAR SENATOR HILL: This is to advise that drastic cuts in the Tennessee Valley Authority budget request by the Bureau of Budget has resulted in curtailment of planned programs affecting the jobs of hundreds of AFL-CIO members, especially at the National Fertilizer Development Center in Alabama and at Columbia, Tennessee.

I understand that your sub-committee on TVA appropriations will hold public hearings on the Tennessee Valley Authority request for appropriations for the next fiscal year.

I respectfully request that I, along with M. C. Hargett, International Representative, Operating Engineers of Russelville, Alabama; W. R. Lewis, International Representative, International Brotherhood of Electrical Workers, of Chattanooga, Tennessee; and A. R. Carson, Business Manager, TVA Council of Office and Professional Employees, Knoxville, Tennessee, be allowed to appear before your committee in support of TVA requests for appropriations, especially in regard to Agriculture Development Center, Muscle Shoals, Alabama.

We are prepared to appear at any time and on any date acceptable to you. Please advise.

Yours very truly,

C. C. HOBBS,

*President, Tennessee Valley Trades and Labor Council.*

#### STATEMENTS FAVORING ADMINISTRATION

Mr. HOBBS. Exhibit 6—Statement of the TVA Council of Office and Professional Employees, AFL-CIO.

We refer to that as the white-collar group, and trade and labor as the blue-collar group.

Let me first quote briefly from what three Presidents of the United States have said about TVA. These statements are found in the exhibits.

PRESIDENT FRANKLIN D. ROOSEVELT

President Franklin D. Roosevelt, in his message to the 73d Congress requesting legislation to create TVA said:

The continued idleness of a great national investment in the Tennessee Valley leads me to ask the Congress for legislation necessary to enlist this project in the service of the people. . . . It is clear that the Muscle Shoals development is but a small part of the potential public usefulness of the entire Tennessee River.

He referred here to the large power dam—Wilson—and the munitions plant built during World War I with its great potential value to American agriculture. He went on to envision the complete harnessing of the Tennessee River, flood control, measures to end soil erosion and bring new vitality to the forests.

## PRESIDENT JOHN F. KENNEDY

President John F. Kennedy, at the celebration of TVA's 30th anniversary, May 18, 1963, said that before TVA:

No other Government agency had ever established its headquarters away from Washington, close to the problems and the people. . . . And no one—no one in Washington and no one in the Tennessee Valley—knew whether this effort could ever overcome the forces of poverty and despair and destruction which had devastated this region for so long. But we have living proof that it has.

He also said:

But all of the essential roles of TVA remain, their importance increasing as the importance of this area's atomic energy, military, and commercial activities increases. . . . In short, the work of TVA will never be over. There will always be new frontiers for it to conquer. For in the minds of men the world over, the initials TVA stand for progress.

## PRESIDENT LYNDON B. JOHNSON

President Lyndon B. Johnson in a letter of March 25, 1968, to TVA Chairman Aubrey Wagner, designating Mr. Wagner to the Council on Cost Reduction in Government, urged Mr. Wagner to bring to the Council the benefits from "the long tradition of the TVA for diligently and imaginatively seeking out new and more efficient ways to accomplish its task, and also from the labor-management relationships that have borne fruit in wholehearted support of cost reduction by TVA employee organizations."

## NATIONAL FERTILIZER DEVELOPMENT CENTER, MUSCLE SHOALS, ALA.

We are really proud of that because we represent those organizations.

(Exhibit referred to is in committee files.)

Senator HILL. You are the dean?

Mr. HOBBS. Yes, sir. It is in the interest of the continued success of this organization, the TVA, that we are here today. Our special interest today is one phase of the TVA activity, both because of the valuable and successful work done there, and of which this activity is a part. I am speaking of TVA's National Fertilizer Development Center at Muscle Shoals, Ala. This center is both a national and international institution for the improvement of chemical fertilizers. From the laboratories and pilots plants operated by TVA have come the most significant new fertilizers made in the United States today using TVA developed and patented processes and equipment.

As of March 30, 1968, some 1,500 people were employed at this center. We represent slightly less than 1,000 of them. As of June 1, 364 of these employees had been terminated, and it will be necessary to terminate more in the fall. This means about half of the employees we represent at this plant have lost their jobs with TVA. Here is a large body of trained men—a human resource if you will—not only ready and willing to work but prepared to push forward with work that needs to be done, in the national and local interest as well as in their own interest.

Most of the employees acquired their skills under the joint TVA-Council training program within TVA's own plants. This training

program is described in exhibit 4. Over the years, about two-thirds of the employees at the plant attained their skills by on-the-job training. This training—and remember, this is in Alabama—was given to whites, Negroes, males, and females, without discrimination, and this was long before the Civil Rights Act was passed.

Many of these employees, highly trained in their particular work at the plant, are well along in years, and beyond the age when they can return to common labor work even if it were available; even beyond the time when they can be retrained in another skill.

All of the women craftsmen and technicians at the plant have been terminated. Of about 229 Negroes in the work force we represent, 75 have been terminated. Most of these Negroes are operators, apprentices, and others whose training and employment have definitely contributed to the utilization and upgrading of Negro manpower in the South. I might add, too, that we have trained many other Negroes who, on the basis of this training, have secured good jobs with other employers in the chemical industry.

We are all aware of the importance in our society of integrating our working community, of merging the skills of Negroes with those of our white population and upgrading the opportunities of Negro citizens. This is what we have been doing at Muscle Shoals. Thus, it seems to be clearly out of keeping with our national policy to curtail the center's operations. It is difficult for our people to reconcile this with President Johnson's proposal for billions of dollars for aid to the poor of all kinds, including \$2 billion for on-the-job and classroom training to increase the employability of people lacking work.

We see people who are already trained being deprived of employment in the occupation of their training. We see new burdens placed on the welfare programs of the locality and the country. We see Negroes who are moving forward in their earning abilities suddenly set back. We see a community officially designated as part of the depressed Appalachian area suddenly deprived of almost one-fourth of an \$11 million annual payroll.

But the greatest tragedy of all is that this occurs at a time when TVA should be expanding its fertilizer research and development work in the interest of the entire Nation. I am not an expert in the fertilizer field. Frankly, my main interest is in the loss of skilled workers. But I do know that fertilizer is one of the principal tools of progressive, effective farming today. It is one of the chief instruments for conserving soils as the food demands of the Nation, and the world increase.

The sciences related to improving chemical fertilizers must remain in a dynamic state, constantly pressing the new frontiers of which President Kennedy spoke. And one of the primary purposes of TVA, as stated in sections 1 and 5 of the TVA Act, is agricultural development.

The United States and the rest of the world are facing the ever-mounting pressures of an expanding population—which means increasing demand for food and fibers—against limited farmland potential and declining agricultural employment. This means that somehow every acre of land now producing crops must produce even more in the future. Vast expansion of fertilizer use and new and im-

proved fertilizers are absolutely indispensable in efforts to solve the world food program.

In 1967, President Johnson had this to say in his state of the Union message:

Next to the pursuit of peace, the really greatest challenge to the human family is the race between food supply and population increase. The race is being lost. The time for rhetoric has clearly passed. The time for concerted action is here and we must get on with the job.

This means only one thing to organized labor. It is imperative that the U.S. Government strengthen, rather than weaken, every program that is working effectively to assure an abundant future supply of food for this Nation, and assist other nations in their grim battle against famine. Enormously increased use of fertilizers is indispensable to winning this life or death contest.

The underdeveloped nations of the world are facing increased difficulties in feeding their people because of the "population explosion." Neither people as individuals, nor the countries that govern them and speak for them, can remain quiescent in this face of the destructive famines they face in only a few years. Our Nation possesses, in the National Fertilizer Development Center, a tool which can be used very effectively in these circumstances to widen the area of international friendship with the United States and ward off starvation. The extent to which it has been employed to date, while significant, is but a beginning in what will be necessary abroad and advantageous at home.

It is therefore inconceivable that the Bureau of the Budget would regard the enormously valuable, effective and efficient fertilizer development program of TVA and the experienced people who man it as a target for retrenchment at this time. This program has not only been a major factor in transforming the farm economy of our own United States over the past three decades, but it badly needs the tools now to expand pioneering work in developing new, better and lower cost fertilizer for our Nation and the underfed peoples of the world.

In recent years, TVA, working with the Agency for International Development has sent 25 fertilizer teams to 13 developing countries, helped to draw up better fertilizer policies and programs for these nations, and provided training at the National Fertilizer Center for foreign technicians. One of the expressions of appreciation is a plaque hanging in the Center, which says:

This plaque is gratefully presented to the Chemical Engineering Division of the Tennessee Valley Authority in appreciation for the training furnished to the technical staff of the first synthetic fertilizer plant in the Republic of Indonesia by Pupuk Sriwidjaja, owner, Talembang, Sumatra, Indonesia, and Morrison-Knudsen of Asia, Incorporated, contractor, 17 August 1962.

This is only one of several expressions of appreciation which the Center has received.

The money invested by the United States in the Center and its world renowned specialists and operating people constitute a valuable resource without equal in this field. To allow it to deteriorate and waste away because of shortsighted and fallacious notions of economy when the need for food in the world is increasing with every passing hour would be a disaster which this committee and the Congress should not allow to happen.

Facts and figures speak for themselves. The TVA accomplishments in the field of fertilizer development and demonstration constitute a record which justifies the wisdom of Congress in placing this responsibility with TVA 35 years ago. A brief look at the record tells why.

TVA has been a primary contributor to building and national demand for fertilizer which quadrupled between 1933 and 1966, with TVA technology used in the processing of about 75 percent of 1966 tonnage, nearly all of which was accounted for by 276 companies in 426 plants throughout the United States, most of which use TVA patents and technical information available to all without cost.

While there are no figures on how many dollars of private plant investment and how many new jobs created were directly attributed to TVA, there is a clear relationship.

Another result can be shown when statistics between 1950 and 1966 on prices of farm items, show land costs up more than 100 percent, farm machinery up more than 60 percent, farm wage rates up nearly 80 percent, but cost per unit of plant food one-third less.

What is needed now is action by this committee and the Congress, to give TVA the money to do its important job. Recent Federal appropriations have not allowed for the modernization of old facilities, some of which date back to World War I, or the addition of facilities for production of new fertilizer materials. TVA should start now to modernize its old ammonia facilities and to develop a major new fertilizer of great importance to our own and the world's agricultural economies—granular urea ammonium phosphate—and produce it in quantities available for test use by farmers and demonstration for private industry large-scale use.

More than 4 years ago TVA had carried the development of the process to the point that building a demonstration-scale production unit was the next logical step, but financing for the facility has not been forthcoming.

The plant food content of urea ammonium phosphate has up to 60 percent plant food content as compared with the 37 percent average in U.S. fertilizers, which in turn means less freight, labor, and handling costs, and higher potential use. The production cost is 10 percent under those of comparable fertilizers. It can be used in a variety of crop and soil conditions, and is outstanding for rice production which is of great importance to hundreds of millions of people who depend on that cereal as a staple diet.

If the fertilizer sent to developing countries in fiscal year 1967 had been urea-ammonium phosphate instead of conventional materials, the cost to the United States would have been \$120 million instead of \$150 million, a savings of 20 percent, or a saving in that 1 year of more than twice the cost of the TVA plant.

The present rationale by the Bureau of the Budget in applying the ax to TVA's fertilizer and chemical operation flies in the face of the need for further pioneering in the development of new and better and cheaper fertilizers to help our own and the world's food supply. It ignores national defense needs. It casts aside the long record of TVA in sparking a domestic fertilizer industry which has so benefited from processes originated by the Center that it is technologically ahead of other countries, with a minimum of imports and a strong competitive

position in the world market. It refuses to recognize how little this program costs the American taxpayer, particularly as measured against its results.

These are the compelling facts, Mr. Chairman, which prompt us, on behalf of the people we represent, to recommend to you and urge you to take a long look at the appropriations for TVA's National Fertilizer Development Center. To the best of my knowledge this Center is the only institution of its kind in the world.

We believe that the Center should be expanded rather than curtailed because it serves needs that are vital to the region and the Nation—even to the world. We already have in the area of the Center the people who have the skills and possess the incentive to accomplish important results, which the Congress has the power to provide for in this appropriations measure.

We foresee that unless this is done, the chemical plant program may cease operations in a few years, the fertilizer program will lose its value and effectiveness, and the skilled employees that have made the National Fertilizer Center an unparalleled success will disband. This is not economy, it is destructive shortsightedness. The loss will be felt by every farmer, every fertilizer manufacturer and every hungry family in the world. We urge that you do not allow this to happen.

In May we were privileged to appear before the House Public Works Subcommittee on Appropriations. The full House Appropriations Committee, in forwarding the bill to the House, expressed its concern that lack of funds has delayed modernization of the old facilities at the Center, resulting in a reduction in the force of experienced personnel and curtailment of the program for new and improved fertilizers.

The committee urged that adequate funds be budgeted for new facilities as soon as the fiscal situation permits and asked TVA to continue to make every effort to find other employment for the affected employees.

I can assure you that we are working closely with TVA, using all resources at our command, to find suitable employment for these former employees, and where necessary, retraining them in other skills. We are having some success in this respect.

We appreciate the House committee's concern over the loss of jobs and the curtailment of the TVA program. I hope our plea to you has made you aware of the need for providing sufficient funds to restore this plant to its full capacity and future potential.

Thank you.

Senator HILL. You have brought us an excellent statement, a challenging statement. It is very interesting to me, Senator Ellender. Just this week, sitting as the chairman of the subcommittee that handles the appropriation for Health, we heard some very distinguished biologists, doctors, and scientists. They were urging family planning on the basis that we were not going to be able to supply the food that the people would need. That they had to have in the next 50 or 60 years. So your statement is very timely and ties in well with the plea they were making.

Mr. HOBBS. It certainly is bread and butter to our people, Senator. We hate to see these people moved out, plus the great value that we feel this plant is to the Nation.

Senator ELLENDER. I notice here that the amount for fertilizer has been increased instead of decreased. Where does that cut come? Is it a cutback or is it a lack of interest by the Government to expand or renew the plant?

Mr. HOBBS. Our people feel that it is the desire probably brought about by the economy that we read so much about in the paper, and I am certainly a novice at this, that they are holding back and allowing this old plant as stated, portions of it, and as you stated, Mr. Chairman, that were built in 1916 and which is falling apart. They are using it to the best of their ability, but they advise us that they cannot continue to operate under the old antiquated methods that they have to use in this antiquated equipment.

Senator ELLENDER. They are asking for the same amount of money as they asked for last year, or a little more. I am wondering if it is intended to decrease the employment.

Mr. HOBBS. There will be another layoff in the fall, they advise us, of our people in October. If they cannot modernize the plant, it might result in the closing down, and we fear if it does close down it will take an atomic bomb almost to open it again.

Senator ELLENDER. Of course, all of the appropriations are being reduced. I happen to serve on seven of 11 subcommittees of the Appropriations Committee, and I handle all of the appropriations for public works, rivers and harbors and flood control. The House cut us back 17 percent. That is the most important work that we can do for our country. I will try my best to have some of that restored, but the House seems to be adamant in not appropriating a dime over what the budget request figures are.

The Senate put in money to find jobs for people, and also for various other projects, and just because the Budget Bureau did not accede to the wishes, it was all stricken out. That is what we are faced with here. It is not that we don't believe in what you are saying, but it is just that you present a bill that is in excess of what the Budget Bureau says should be spent, and the House will not accept it.

Mr. HOBBS. I would like to call your attention, being a labor representative, and of course the Tennessee Valley Trades and Labor Council has no dues structure. We are paid by our international unions. We have no salaries or anything from this. We would like to see Tim Ford, Tellico, Bear Creek and all go at full force. But we feel, rightly or wrongly, that we can, when the times are ripe, go back and pick up here. But we are very fearful that if the chemical plant should have to close its operations, that here we have the rest of these people, these 1,500 people, we would have a little less than 1,000 of them that would be thrown out on the streets and we just do not know what we could do with them there in that area.

Senator Hill is very familiar with the Shoals area.

Senator HILL. And the Budget Bureau this year cut the TVA appropriation some 18 percent below the present year.

Senator ELLENDER. Just about what they did to Public Works.

Mr. HOBBS. We feel we could survive, if we could get some relief for the chemical plant to take care of these people.

Senator ELLENDER. I understand the Bureau of the Budget allowed \$2,650,000 out of a \$13 million request.

Senator HILL. That is quite a cut.

Mr. HOBBS. It cuts our throats.

Senator ELLENDER. If we could get rid of that war in Southeast Asia I guess we could return to normal.

Mr. HOBBS. I have two sons in Laos involved in that and I was involved in the last one.

Senator HILL. I was involved in the war to end all wars, but we did not do the job.

Senator ELLENDER. So was I.

Senator HILL. Is there anything you gentlemen would like to add? I want to congratulate you, sir, on your statement. I thought you brought us an excellent statement. As I said, your testimony is confirmed by the subcommittee over which I presided earlier in the week. They had many scientists, doctors, agronomists urging family planning, because we were not going to have enough food to feed the people.

Mr. HOBBS. In discussing it with some of the people down at the plant, they claim that if it is soluble they can make this liquid fertilizer, urea-ammonia. I believe they used the word that it would quadruple the rice crop in Indonesia. That would really be a good deal if it could be worked out.

Senator HILL. They are having quite a problem with starvation over there, with hunger.

Mr. HOBBS. Yes, sir.

(Discussion off the record.)

#### TRAINING OF PERSONNEL OF DEVELOPING NATIONS

Mr. CARSON. Mr. Chairman, I would like to offer one thought. It is not contained in my statement, which is an exhibit. I am A. R. Carson representing the Office of Professional Employees of TVA. We are engaged in a worldwide struggle with the Soviets and others for the hearts and minds of developing nations and so forth, and I think that we are losing on this phase of it. Whereas we send direct aid, we send them wheat and surplus foods and so forth, and we just give this to them for free, the Soviets are sending technicians to assist them to help themselves. Now this offers a dynamic program by which we can go in and help to train their people in agriculture, the production of fertilizer and so forth, and I believe it would be appreciated.

Senator HILL. You are right, sir.

Mr. HOBBS. May I, on behalf of all of us 11,000 employees down there, state that we certainly appreciate being allowed to appear before you, and if you can find some way to help us, to quote Andy Griffith, it certainly would be appreciated.

Senator HILL. You can tell them you brought us a strong and mighty fine statement.

Mr. HOBBS. Thank you, sir.

Senator HILL. We certainly appreciate your testimony.

Mr. HOBBS. Thank you, sir.

#### STATEMENT OF CORRINE R. WHITEHEAD

##### LAND BETWEEN THE LAKES

Senator HILL. Now, Mr. Thompson and Miss Whitehead will be our next witnesses.

Miss WHITEHEAD. Thank you, sir.

Mr. Chairman, Senator Ellender, I hope some time I can come up before this committee, the situation in our area in regard to TVA is such that I can ask for their appropriation instead of appearing in the capacity that I do today. But as matters now stand it is certainly impossible. I am Corrine R. Whitehead. I represent other landowners there as executive secretary of the Kentucky State chapter of the American Landowners Association. We also have people in our area who are in Tennessee who are members of our group.

I respectfully request that you:

(1) Assure that no more funds from TVA's appropriations be used to acquire land from unwilling sellers in the Land Between the Lakes.

(2) That you use your good offices to turn the LBL recreation area project over to some other agency for completion of development of the already acquired land; preferably the Bureau of Outdoor Recreation under the Department of Interior.

(3) That steps be taken to provide restitution and remedial action for those individuals who have filed affidavits showing gross mistreatment and injustices at the hands of TVA.

Our people in the Land Between the Lakes have endured Federal acquisition of their homes two, three, four, five times since the 1930's. No concern for the wishes or recommendations of our Senators and Congressmen has been headed by the TVA. In a letter signed by all three TVA board members plus a letter from Secretary Udall submitted to the White House early in the LBL stage, a recommendation for the acquisition of 140,000 acres was made. I am sure Senator Cooper will verify the fact that he, as well as we, were stunned when TVA announced after they received the first appropriation that they would acquire all private lands or 170,000 acres.

The total unreasonableness of TVA in the decision to acquire every home, every church, every place of business, and even the underlying fee title to our cemeteries is alarming. Ours is an old community which is really more like a big family. The LBL recreation areas is said to be a demonstration. Historically the biggest problem faced by the Department of Interior agencies is the management of National parks, recreation areas, and refuges where there are private inholdings. A constructive part of the TVA-LBL demonstration should have been for TVA to demonstrate how to get along with inholdings. Namely, us.

Personal affidavits and statements have been filed against TVA by residents and former landowners. The complaints include charges of harassment, discourtesy, actual criminal acts, that TVA agents are rude and abusive when landowners refuse to cooperate, that TVA has brought vandalism and looting to the area, that TVA has discouraged vital services to holdout landowners. There are charges that TVA has trespassed upon private lands and cemeteries.

One man said that his lands were used by soldiers on war maneuvers in guerrilla warfare practices at the behest of TVA and against his specific approval. He did not at any time complain to the boys who laid in the ditches back of his house and did battle over his holdings. He was aware of the statements by TVA personnel that "if it took the U.S. Army" we would be put out of our homes.

We are reliably informed that those of us who have appeared here before congressional committees and who have asked to be left

in peace and not acquired have been placed on a hostile list by TVA and the list made available to the TVA police who are, of course, in charge of the area now, and officials. Those who have sold and moved tell of indebtedness, homesickness, and bitterness. Family physicians lay the early death of many residents at the door of TVA. I can assure you that when a man from Between the Rivers tells you, as they have me, that he has not slept for nights because of worry, and he breaks down and weeps; you had better believe it is bad.

The following comments are on individual situations as documented in this report that people have filed, individual complaints, on TVA's land-buying practices in the LBL.

Forest and Pearl Murdock bought a TVA commercial site at auction. It consists of 68 acres plus another 17½-acre tract. TVA required them to develop the resort within 5 years. The Murdocks have spent 18 years working hard and developing the business for their retirement. He built 2½ miles of road over very rough terrain into the resort. Mr. and Mrs. Murdock have canceled checks and records which show a cash outlay of \$83,315. That amount is not nearly all of the total investment.

They have been there 18 years, and they did not dream they would be asked to give it up, so they actually have not kept an accurate account. TVA's offer to the Murdocks was just about enough to cover the cost of building the road and the cottages with nothing as payment for the land, he has said. The Murdocks have tried unsuccessfully to secure land from TVA across Kentucky Lake in exchange. This has been unsuccessful. TVA has now condemned the resort using their immediate possession powers, which is the same as the U.S. Defense Department.

While the Murdocks were trying to no avail to get property from TVA upon which to relocate, an advertisement in the local press listed a TVA auction on June 13, 1968, of a residential lot on Kentucky Lake, across the lake. The minimum acceptable bid listed by TVA was \$8,500 for the lake view, not lakefront lot containing 1.31 acres.

Much of this land has been bought for \$12 an acre. Of course land is enhanced in value but this is typical.

My neighbor, Mrs. Retha Smith, is a widow who works as a practical nurse. She has not sold to TVA. She has been through the whole acquisition agony twice before. In 1940 TVA took their farm, a new house and all outbuildings for a total of \$3,000. That farm today stands unused and grown up in bushes. This is in the Land Between the Lakes. She says "We know many such places in the LBL. Wouldn't they be good for camping instead of taking people's homes?" she asks.

W. H. Travis, magistrate of our district, states:

This agency (TVA) has trespassed and damaged our property. They have bulldozed roads and trees and have stopped the natural flow of water in two places on our land. All done by TVA with no apology.

He adds:

So much land has been permanently removed from the county tax rolls by TVA that, as it stands, its financial condition is seriously and permanently impaired.

In some instances individuals have been separated from their possessions by TVA without being compensated at all. Mr. and Mrs. George Wilson operated Sugar Bay resort on Kentucky Lake under a lease with the Department of the Interior. Over many years they in-

vested a substantial amount of money in the resort and facilities. They paid between \$3,600 and \$3,700 to have an electric line run into the property. They invested in a water system and chlorinator, five fishing camps, and added rooms onto the house. Late in 1967 TVA ordered them to be out by January 1, 1968. Mr. Wilson had suffered a stroke at age 59. It was a terrible hardship but they sold most of their furniture and belongings and got out. They were not compensated 1 penny by TVA. Mr. and Mrs. Wilson told me about their unhappy bitter experience with TVA on May 29 of this year. He was very obviously worried about their future where they had relocated. Business had been terrible. He died within a few hours after I left.

Earl and Sue Molloy owned a 0.58 acre on which they built a concrete block store building. The property was condemned by TVA as a part of his mother's property.

The price was what she had refused 2 years ago and prior to the construction of the store. TVA told his elderly mother they would come and bulldoze her house down and bury it if she did not prevail upon the son to sign the sales contract. She became so overwrought and upset; he signed. The property had been legally transferred and the deed is valid. TVA did not compensate Molloy charging him with bad faith. He was ordered to close the business by May 31, 1968. The TVA police came with Mr. Milliken of TVA to close the store on that date.

Mr. and Mrs. Alex Crutcher of Stewart County, Tenn., are convinced that TVA attempted to take their property at a ridiculously low figure because he was a TVA employee. He is not imagining that the figure is ridiculous low, because the man has gone out and has hired a nationally known appraisal organization from completely out of the Tennessee Valley, and they have come in and they have appraised the property, and it is two or three times what the offer was. He said:

People from other states who owned land here were always paid much higher prices. Usually 50-60 per cent more than natives who have lived here always.

As background for that, this area had people who are owners, who were owners from 35 States. They came in. It was subdivided. The subdivisions were laid out by TVA, in many instances, in some instances private individuals.

Mrs. Mary Davis in an affidavit regarding a historic little church founded many years ago by relatives of the Zacary Taylor family stated:

Suddenly TVA took over. Now our parents' graves, along with the building and site are strewn with beer cans, whiskey bottles, trash, lunch papers, et cetera. It is even used as an outdoor toilet. Fishermen park cars, trailers and boats on the church grounds as well as on the graves. This ground is very sacred to us. But what can we do?

Senator Thruston Morton by letter dated April 30, 1968, gave me the following information obtained from TVA. It is the income from the LBL visitors' fees. The amount of money collected from campers should be an indication of the actual number of users of the LBL. The figures are for the calendar year.

	1965	1966	1967
Camping.....	\$6,884	\$17,448	\$39,185
Noncamping.....	2,023	1,992	1,830
Youth station camping.....		5,442	11,889

It is my understanding that this is for launching of boats. In many instances people pay to go down to these camping areas and if they have relatives camping there they pay.

These figures raise several questions aside from the number of users.

In a sworn deposition by TVA officials, they have stated to us that the meals that are furnished at this youth station camping center are paid for by the individuals and they are at cost.

Let me emphasize this. This money is paid into the land and water conservation fund. TVA provides meals at cost at the youth station camp. Police protection is provided by TVA, collectors of the camping fees, cleanup crews, plus men at the information stations.

TVA did pay into the Lyon County school system and the county treasury over \$40,000 in lieu of taxes this year. This was on land removed from the tax rolls by TVA. I have no idea what was paid in lieu of taxes in Trigg and Stewart Counties. I hasten to add that I certainly am not critical that the payment to the county was too large. The county would cease to exist if TVA ever failed to meet this in lieu of tax payment. Had the land remained in private ownership at the present 100 assessment rate which prevails in Kentucky the county would be self-sustaining.

These things which make the Land Between the Lakes individual and beloved to us may be of no actual value, yet they are priceless. The spiritual affinity of a people to their land, their homes and churches of many generations is very real. We ask only that the golden rule apply here.

In conclusion our request is that you:

- (1) Assure that no more funds from TVA's appropriations be used to acquire land from unwilling sellers in the Land Between the Lakes. Those who want to sell, more power to them.
- (2) that the project be transferred to another agency and
- (3) that the injustices to landowners be remedied.

I have been up here many times and I appreciate your kindness and your courtesy in letting me appear and stating our side of the situation. I would like to place in the record, if I may, the letter substantiating the figures on the income.

Senator HILL. Without objection that will be placed in the record at this point.

(The letter follows:)

TENNESSEE VALLEY AUTHORITY,  
Knoxville, Tenn., April 24, 1968.

HON. THRUSTON B. MORTON,  
U.S. Senate,  
Washington, D.C.

DEAR SENATOR MORTON: We are glad to provide the following information in response to your letter of April 16.

	1965	1966	1967
1a. Income from visitor fees (calendar year):			
Camping fees.....	\$6,884	\$17,448	\$39,185
Noncamping fees.....	2,023	1,992	1,830
1b. Income from groups using youth station (calendar year).....		5,442	11,889
2. Sale of timber (fiscal year).....	127	4,007	18,714

The income shown in item 1a consists of user fees collected subject to the Land and Water Conservation Fund Act of 1965.

Sincerely yours,

AUBREY J. WAGNER, *Chairman.*

MISS WHITEHEAD. Mr. Chairman, these are statements signed, some are sworn affidavits of people who live in the Land Between the Lakes. Some of them are still there. Some of them have moved out. May I read from one, please?

Senator HILL. Yes.

MISS WHITEHEAD [reading]:

I worked with TVA during the construction of Ky. Dam. My foreman who worked for TVA 28 years told me that Land Between the Lakes project was being planned even then. He has told me that TVA will move the people out if it takes the Army to get them out. He also has told me that TVA plans to take all of the land all of the way to Smith land or the mouth of the Cumberland River. If the people are too determined to stay he says TVA will turn the area over to the Army for maneuvers to get rid of them.

TVA rushed my mother-in-law's death. My wife took her own life December 11, 1967. She had never been satisfied with our leaving the home area Between the Lakes, and she had been so worried at the treatment of her sister and her mother by TVA in their dealings with them on the Land Between the Lakes project.

This is only a portion of a statement from Mr. Jim Lane. There are several in here where people have taken their lives because of the sorrow and pressures that have been put on them.

Thank you so much for your patience. We certainly appreciate it.

Senator ELLENDER. Miss Whitehead, you know I have been in your corner on this.

MISS WHITEHEAD. You are an angel. So far as I am concerned you are an angel.

Senator ELLENDER. I have tried to do all I could. As you heard awhile ago, I am insisting that this land be turned over to the Interior or some other agency than TVA at an early date. I do not know how I will succeed in doing this, but personally I do not see why any Federal money should be spent experimenting on how to use a park. I feel very deeply about your situation, as I have stated before.

MISS WHITEHEAD. Thank you.

Senator ELLENDER. It is bad for the Government to go in there with all the land it has around there and remove a lot of good people from that area. The testimony by Mr. Wagner suggested awhile ago that the amount being asked now will complete the purchase of all the Land Between the Lakes.

MISS WHITEHEAD. Yes.

Senator ELLENDER. Do you know of any in which the people were not willing to sell? How about your land?

MISS WHITEHEAD. They have not been on my land. I have told them to stay off. And I am not alone.

Senator ELLENDER. As I remember it, you have your land on the river?

MISS WHITEHEAD. Yes.

Senator ELLENDER. The east end?

MISS WHITEHEAD. The north end. Close to 100 individual property owners have refused to allow them to enter the property unless they get a court order. Now there are many more. Certainly TVA has the figures. The last ones that they gave to our attorney was that there were over 200 property owners who refused, for reasons of price. I have some amazing statements in here by these individuals as to price.

Senator HILL. Mr. Thompson.

We will be pleased to hear from you now, sir.

Mr. THOMPSON. Thank you, Senator.

STATEMENT OF CHARLES P. THOMPSON, EXECUTIVE DIRECTOR,  
AMERICAN LANDOWNERS ASSOCIATION

JURY TRIAL IN TVA CONDEMNATION CASES

Mr. THOMPSON. Thank you very much.

I am Charles Thompson of the American Landowners Association and I appreciate the opportunity to present some facts here that may be relevant. The American Landowners Association in 1967 offered to appear in behalf of its Kentucky membership in support of a bill to permit jury trial in TVA condemnation cases. The appearance of the executive director in support of landowners in the Tennessee Valley led to an increase in membership and a jump in the number of complaints received from that area.

In these complaints a pattern became visible with regard to certain practices used by TVA agents in the acquisition of land. These practices were clearly in defiance of the admonitions of the House and the Senate. In fact, little if anything had been done towards an effort to exercise all possible care to maintain good public relations in the land acquisition program.

Among the indications that something was indeed wrong with the program we mention:

(1) Joint letter of Senators Morton and Cooper of February 21, 1967 (6). In the period since Presidential approval of the transfer to TVA of jurisdiction over this area certain questions have been raised about plans announced by TVA in the designated area. We have viewed these questions with growing concern, with particular regards to the acquisition of private lands and in connection with the achievement of local cooperation sought by TVA. This cooperation would seem to be of specific importance since TVA was assigned this project as a demonstration in resource development under section 22 of the TVA Act.

We mentioned also letters of Senator Thruston B. Morton of August 10, 1965:

As you know, I have been deeply disturbed by the tactics of the Tennessee Valley Authority in developing the recreation area, especially in its acquisition of land, and have tried to induce the agency to be more reasonable with property owners. Unfortunately TVA's reponse has been most discouraging.

We received also complaints from elected officials of Government, complaints of citizens of unquestionable public reputation, citizens complaining who were citizen landowners.

The joint letter mentioned above stated that as laudable as the objectives of the project might be "we cannot agree that they merit the neglect of the rights of a large number of area citizens." It also stated that many of the affected citizens would be moved for the third, fourth, and fifth time due to Federal programs.

The general clamour of area citizens for someone to tell the story of their situation, to bring the situation to the attention of the Congress, piercing through the golden curtain presented by the Authority to the Congress, led the association to send its executive director to the area for an 8-day preliminary investigation. The report of the execu-

tive director, following his return, convinced the board of the association that there was good reason to believe that the Authority was:

- (1) Acting to deny the rights of landowners in the Tennessee River drainage basin and adjoining territory.
- (2) Acting in defiance of the general and specific conditions of the appropriations made by the U.S. Congress.
- (3) Acting to thwart its own declared intentions as stated by the Authority to the Congress and the press.

#### DIFFICULTIES IN CONDUCT OF THE PRELIMINARY INVESTIGATION

Many people interviewed feared reprisals; added pressure, lower appraisal values, fear of orders of immediate possession, loss of the right to their buildings, et cetera. In other cases, families were divided: one partner determined to fight the alleged injustices—the other, worn out with the fighting and the pressures and desiring only to spend the remaining years in submissive peace and place their home on a permanent foundation anywhere outside the impacted area. The question “Will this get me in trouble” was common.

That the authority has acted to deny landowners rights is generally evident from the investigation which I made in the LBL area. The results of this investigation are contained in this preliminary report.

We have further the concurring statement of the Congressmen from the First District of Kentucky, Frank Alberts Stubblefield, who represents many of the abused Americans:

If one or two people complained of mistreatment or unfair assessment of property values, I would think that corroborating evidence ought to be gathered before making an acquisition against TVA generally. If I had received only a few complaints, I would believe that some misdirected purchasing agent had been hired accidentally by TVA and I would expect his superiors to fire him forthwith. However, it is another matter indeed when a mass of evidence from a number of respectable, law-abiding citizens clearly established an ugly pattern of unethical and unjust acts so clearly and so extensively as to make such acts appear to be the unquestionable policy of the agency, TVA. As Congressional representative of these people who have been wronged I intend to do everything in my power to correct this scandalous situation and I believe that every member of Congress, if honestly appraised of the facts, will join me in my efforts.

That the authority has acted in defiance of the general and specific requests of Congress is also evident. With regard to the land acquisition program Senators Cooper and Morton wrote the President in 1964:

Because of this situation, and because of the concern it has aroused, we respectfully request that you ask the TVA to withhold implementation of its land acquisition program until that program has been presented in detail to the Appropriation Committees of both the House of Representatives and the Senate. Since these committees are considering your request for an additional \$6 million this fiscal year to continue an acquisition and construction we would hope that the TVA could detail these plans soon so that it would not be necessary to consider including particular instructions for the use of funds available to the TVA for this purpose.

The Authority, however, remained absolutely silent about its plans, waited to receive its funds, and having by these tactics succeeded in getting LBL funded without detailing any plans to the congressional appropriations committee, proceeded on the day of the funding to begin a land acquisition program without congressional comment. Subsequent attempts to get the Authority to deal justly and reasonably

with landowners have been futile. The Authority remained unapproachable on this matter.

We mentioned Senator Morton's comment in his letter which we mentioned above:

Unfortunately I have tried to induce the Agency to be more reasonable with property owners. Unfortunately the TVA's response has been most discouraging.

Congressman Stubblefield on the same matter:

I would warn this committee specifically against the facade of innocence on the part of TVA officials when confronted with complaints. From correspondence and telephone calls my office has found no willingness to correct or even acknowledge its wrong-doing.

This facade of innocence has not yet been pierced. We ask that you help to break this facade and pierce through to the ugly facts which may be hidden behind it. We ask you to remember that your early admonitions, contained in Senate Report No. 1426, of August 5, 1965, the committee also agrees with the House in expecting the TVA to use all possible care to maintain good public relations in the land acquisition program, these admonitions have gone unheeded, while the abuses continued one upon the other without end. We pray that you will stop funds used for the purpose of condemning lands from unwilling sellers, and bring in the General Accounting Office to conduct an investigation of TVA's land acquisition program. This is a long pattern set when the GAO was called in to investigate the land acquisition practice of the Corps of Engineers at the Chatfield Dam in Colorado. I thank you for your time and I know it is late, so I will quit now.

(The prepared statement follows:)

#### PRELIMINARY REPORT

#### LAND ACQUISITION PRACTICES OF THE TENNESSEE VALLEY AUTHORITY WITH SPECIAL REFERENCE TO THE L. B. L. PROJECT

The American Landowners Association does not in any way claim to be on a par with the Tennessee Valley Authority nor even to be able to comprehend the vastness of some of its programs. We are, however, the owners of a small slice of truth with regard to some landowners who can no longer believe they are living in America. We believe this truth should be the property of all Americans.

CHARLES P. THOMPSON.

"... TVA came to me to buy. I told them I have nothing for them. They told me if I wouldn't take the easy way it would go the hard way. I told them I had gotten nothing easy in life and we'd just go the hard way..."—Landowner Ray

"In the period since Presidential approval of the transfer to TVA of jurisdiction over this area, certain questions have been raised about plans announced by TVA in the designated area. We have viewed these questions with growing concern, with particular regard to the acquisition of private lands and in connection with the achievement of the local cooperation sought by TVA. This cooperation would seem to be of special importance since TVA was assigned this project as a 'demonstration in resource development' under section 22 of the TVA Act."—Senators Morton & Cooper

"What is disturbing about TVA condemnations to practicing attorneys generally is the fact that the TVA, though charged under the Constitution with the responsibility of paying 'just compensation' for the property it condemns, nevertheless in practice conducts its acquisitions through agents who sometimes employ tactics which are at best thoroughgoing exploitation of the superior resources and advantages of the TVA, and at worst constitute entirely improper economic bludgeoning of small landowners."—John T. Henniss, Attorney

"The committee expects the TVA to use all possible care to maintain good public relations in the land acquisition program."—House Report 1497, 11 June

"The committee also agrees with the House in expecting the TVA to use all possible care to maintain good public relations in the land acquisition program."—Senate Report 1326, 5 August 64

"As you know, I have been deeply disturbed by the tactics of the Tennessee Valley Authority in developing the recreation area, especially in its acquisition of land, and have tried to induce the agency to be more reasonable with property owners. Unfortunately, the TVA's response has been most discouraging."—Letter of Senator Morton

We protest because Congress has not been given the truth about what TVA is trying to do to us."—Landowners H. J. & Nadine Smith

"No one can believe the absolute hell we lived through until we could stand it no longer. Those who have moved are so uprooted they are dying and many are young who have passed away. My heart will always be between the Rivers."—Landowners Rex & Ruby Peal

"Specifically it is charged that TVA acquires land under eminent domain, at a low price, and later disposes of it at a high price. . . . I call this material to the attention of the Senate, in view of the generally expressed dissatisfaction with early acquisitions of land for the recreation project."—Congressional Record

#### INTRODUCTION

When the Tennessee Valley Authority was created, its purpose was to aid and encourage development, proper use, and conservation of the resources of the Tennessee River Drainage Basin and adjoining territory.

On June 27, 1961 the Authority submitted to the White House *A Proposal for a National Recreation Area Between the Lakes formed by Kentucky and Barkely Dams* (#1). Close in concept to an earlier feasibility study conducted by Interior, it was, however, larger in scope and more disruptive of existing land use patterns.

On July 5, 1961 the White House referred the proposal to Interior for review (#2). Interior recommended that the plans be carried by the Authority to make the area known as *Between the Lakes a National Recreation area* (#3). Accordingly the White House announced June 14, 1963 that the Authority would develop the area as a "demonstration in resource development" under section 22 of the TVA Act. (#4) While the Authority's proposal to the White House proposed 140,000 acres for inclusion in the area (#1), the White House Press Release used the figure 170,000 acres. (#4)

With the President's announcement, the Authority's budget request for fiscal 1964 was amended to include \$4 million for commencement of the project. (#5) The project was underway.

#### BACKGROUND OF THE AREA

More than 150 years ago the area known as the Land Between the Lakes was settled by the same solid Anglo-Saxon Stock which settled so much of Appalachia. Paralleling the situation common to so much of Appalachia, these people knew and either suffered or enjoyed as the case may be, those environment restrictions imposed upon them by mountains, lack of public roads or railways and the fact that their 200,000 acres lay between 3 rivers; the Cumberland on the East, the Tennessee on the West and the Ohio on the North.

By nature deeply religious and solidly moral, these people carved out of the wilderness a place for themselves and their offspring. Proud and dignified this folk lived in no expectation that their area would suffer the upheavals which the necessities of the Tennessee Valley would, in the future, dictate.

Reduced to nomadic or refugee status, moved out of their homesteads by the Area Resettlement Administration, the Kentucky Wildlife Refuge, Kentucky Lake and Dam Project, Barkely Lake and Dam Project and now the L.B.L. Project, these people left their homes on stilts so that they might readily be moved or moved to trailers—all so that they might not cut the ties to the area so deeply engraved in their generations.

These people know, perhaps better than any in this country, the social and economic implications which ensue from the large projects of the type and scope undertaken in this area. They also know what it is to deal with several different government agencies in the acquisition of land, each agency with its special rules, conditions and policies.

## LAND BETWEEN THE LAKES NATIONAL RECREATION AREA

The feasibility study which the National Park Service drew up for Between the Lakes Recreation Area had the unusual quality that it was acceptable both to the Landowners on the outer shores whose lands would not be taken and to the landowners of the L.B.L. area who would be materially affected. The original plan would have brought to material reality the same basic concept we see materializing today with far less disruption of established homesteads and communities. The Authority Proposal extended the quantity of land needed with questionable if any extension of the quality of recreational opportunity afforded.

Authorization of the project has been Executive rather than Legislative. The congress has appropriated monies for the development of the 'demonstration'. No express congressional Authorization has ever been given. No definite lines or limitations have been set. The Authority has, in effect, been given a blank check over every aspect of the project except the appropriations, which are controlled by the Congress.

The public relations program insisted upon by the House and Senate has evidently been successful only in the larger towns outside the L.B.L. area—yet these are not the people affected by the land acquisition program where these good relations were to have been practiced.

The House and the Senate admonished the Authority with regards to treatment of the people it dealt with in the acquisition of land. While these people are a minority in the entire Tennessee Valley, no majority of interests can justify the wrongs which this minority has suffered. The vast power of the Authority and the accumulated goodwill from past projects as well as interest in the present undertaking will not yet suffice to deprive this minority of their proper share in the American Dream.

## OF MICE AND MEN

The effects of displacement on White Field Mice was the subject of an investigation by the Authority. The effects of displacement on the people of the area will probably not be studied for some time, if at all.

## CONCLUSIONS

The tale told by this area is a story of shameful treatment of American property owners, destruction of communities and churches, desecration of cemeteries and eradication of American Appalachian Historical Heritage. It is a story fraught with personal tragedy from insanity to suicide. Neither the sound of water rushing over its spillways nor the noise of its huge generating plants will insulate the Authority from the cries of these outraged Americans for justice and their share of the American Dream.

## REASON FOR THE INVESTIGATION BY THE A.L.A.

In 1967 the A.L.A. (then still the Landowners Protective Association) offered to appear in behalf of its Kentucky membership in support of a bill—S. 1637, to permit jury trial in TVA condemnation cases. The appearance of its executive director in support of landowners in the Tennessee Valley, led to an immediate increase in membership and a jump in the number of complaints received from that area. A pattern became visible with regard to certain practices used by TVA agents in the acquisition of land. These practices were clearly in defiance of the admonitions of the House and the Senate. In fact little if anything had been done towards an effort to "exercise all possible care to maintain good public relations in the land acquisition program."

Among the indications that something was, indeed, wrong with the program we mention:

- (1) Joint Letter of Senators Morton and Cooper of 21 Feb 1964 (#6).
- (2) Letter of Senator Thruston B. Morton of 10 August 1965 (#7).
- (3) Remarks of Senator Morton—Congressional Record Appendix 29 Sept 1964 (#22024).
- (4) Complaints of elected officials of government.
- (5) Complaints of citizens of unquestionable public reputation.
- (6) Complaints of citizen landowners.

The joint letter mentioned above stated that as laudable as the objectives of the project might be "we cannot agree that they merit the neglect of the rights

of a large number of area citizens". It also stated that many of the affected citizens would be moved for the third, fourth, and fifth times due to federal programs.

The general clamour of area citizens for someone to tell the story of their situation, to bring the situation to the attention of the Congress, piercing through the golden curtain presented by the Authority to the Congress, led the Association to send its executive director to the area for an 8 day preliminary investigation. The report of the executive director, following his return, convinced the Board of the Association that there was good reason to believe that the Authority was:

- (1) Acting to deny the rights of landowners in the Tennessee River Drainage Basin and adjoining territory.
- (2) Acting in defiance of the general and specific conditions of the appropriations made by the United States Congress.
- (3) Acting to thwart its own declared intentions as stated by the Authority to the Congress and the press.

#### DIFFICULTIES IN CONDUCT OF THE PRELIMINARY INVESTIGATION

Many people interviewed feared reprisals; added pressure, lower appraisal values, fear of orders of immediate possession, loss of the right to their buildings, etc. In other cases, families were divided: one partner determined to fight the alleged injustices—the other, worn out with the fighting and the pressures and desiring only to spend the remaining years in submissive peace and place their home on a permanent foundation anywhere outside the impacted area. The question "will this get me in trouble?" was common.

The ability of the Authority to apply pressures cannot be adequately described to persons not acquainted with the situation on a first hand basis.

Today the area reminds one of an axis occupied Scandinavian country. The pacification methods are in many ways comparable (violence is, of course not practiced. Subtler pressures suffice). These methods deserve to be the subject of a special report. Reference is made here only to the areas where the hard-core resistance still holds out. Here the Authority has practiced general and specific harassment, cases of which are reported in the instant report.

#### CONDUCT OF THE INVESTIGATION

Eight days were spent in the area. Extensive interviewing took place. Documents have been collected since 17 March 1968. No unsubstantiated statements have been accepted or reported and some charges have been found to be without substance. Statements, complaints and affidavits have been collected and are included in the appendix to this report.

#### CONTACTS WITH THE AUTHORITY

The Executive Director wrote to the Authority following his return from the area. In a letter to Chairman Wagner, Mr. Thompson stated that he had been looking into complaints of resident landowners and that he found it hard to believe that certain practices were taking place with the knowledge of the Board. While this letter was answered somewhat late due to Mr. Wagner's absence, Mr. Smith replied. Another letter was sent the Authority asking for information based on certain charges brought to the Association's attention and stating the progress of the investigation would be by discovery, in the hopes that the Authority might act quickly to rectify certain situations of which it might not be aware.

#### SPECIFIC COMPLAINTS

(Number references are to supporting documents or complaints)

That the Authority has ignored restrictions and reversion clauses as well as other rights in the deeds of certain lands acquired and used other practices contrary to legal procedure. (#22008, 22030, 22031, 22032, 22038, 22040, 22041)

That the Authority has misrepresented its case as to the willingness of landowners to convey voluntarily. (#22011, 22057)

That the actions of the Authority have brought vandalism and looting to an area where these were unknown. (#22012, 22036, 22043, 22046)

That the Authority does not apply adequate appraisal standards in many cases. (#22014, 22027, 22037, 22048)

That the conduct of Authority agents is often rude and abusive when all does not go according to their desires. (#22015, 22036, 22040)

That the Authority recognizes and boasts that landowners don't have a chance in court proceedings. (#22015, 22023, 22025, 22053)

That the Authority uses a two-price system which forces many to accept the first offer. (#22015)

That the Authority has used discrimination in its tactics hurrying some off while leaving some languishing. (#22017, 22051)

That the Authority has trespassed upon and desecrated cemeteries. (#22017, 22023, 22033, 22058)

That the agents of the Authority have conveyed to their own use items of personal property belonging to landowners in an entirely illegal and criminal manner. (#22018, 22019)

That the Authority has conducted its field contacts on many occasions in a manner contrary to normal and legal procedure. (#22023)

That the Authority's contention that the present appraisal system allows uniformity is a myth. (#22027, 22047, 22057)

That the Authority's Policing of the area has been inadequate to protect remaining landowners and that the conditions under which these owners are forced to live is part of the harassment program. (#22028, 22036, 22012, 22043, 22048, 22051, 22054)

That the Authority's statement that most people are better off after being moved out is a myth and a hoax. (#22034, 22047, 22050, 22051, 22054, 22055)

That the Authority has acted to cut off vital services to dwellers as part of the harassment program. (#22043, 22043A, 22044, 22046, 22047, 22051)

That the Authority's statement that the first offer represents a liberal amount is a myth. (#22049)

That the Authority has used immediate possession powers for recreation lands (#22060)

That the Authority's tactics have caused a decline in the mental health of the area and a rise in the number of suicides. (#22029, 22057)

#### NO CONTEST—THE TVA APPRAISAL SYSTEM

The peculiar combination of powers given to the Authority as the tools to reach its ends has resulted in a complete lack of equity when the small landowner confronts the superior resources and powers of the Authority. From the beginning to the end of the proceedings by which the landowner is divested of his property, he is faced with an uphill and losing battle—the more he fights the lower the appraised value of his land becomes. The final Coup de Grace is the knowledge that he will never have recourse to his peers. There is nothing that can stop the decline in the value of his property.

Two elements combine to make the situation impossible for the small landowner to put up any kind of a fight for just compensation. One is the value of his property which commences to diminish from his first refusal to accept. The other is the knowledge that without jury trial rights there is little if any chance that the process can go any other way than the way the Authority wants it to go.

These elements have enabled the Authority to post the most favorable V/FC (voluntary to forced conveyance) ratio which can be posted or for that matter even imagined. No other federal agency acquiring land can come near the Authority in the matter of this ratio. The Authority has boasted of this ratio from the time figures were available to establish such a ratio. According to the Authority "As of June 30, 1967, 92.7% of TVA's total acquisitions of land and land rights had been by voluntary conveyance and only 7.2% through the exercise of the right of eminent domain. Less than half of the condemnations resulted from disagreement over price."

Looking at the matter objectively, there are two possible reasons for such a favorable V/FC ratio. One could be that the Authority's estimate to just compensation is so liberal as to cause landowners to accept with joy. The other reason could be, and is in fact the reason for the ratio, that no matter what the offer is, and be it ever so low, they will never get more for their property than the first amount offered and there is every good reason to believe that contesting the offer will get them less in the end. Landowners are well aware of the set of

declining values on their property which are not the result of an objective appraisal which is a function of the absolute value of the property as viewed as part of an area, but is rather a function of the landowners behavior towards the Authority from the time the Authority makes known its desire to acquire the land.

Let us focus for a moment on this system of declining values for the same piece of property.

Value #1: This is the value reached after appraisal and first offered to the landowner. Owners are assured that this is the maximum they will receive for their land.

Value #2: This is the value which the owner is told will be assigned to his property should he misbehave and force the Authority to condemn his land by not accepting the Authority's estimate of "liberal Compensation".

Value #3: This is the amount deposited with the court upon institution of condemnation proceedings and represents a "reasonable amount" which TVA feels the court (its commissioners) will uphold. In practice this amount is usually at least 10% less than Value #1.

It is significant to note that this series of reductions applies not only to the offers made to the owners (first offer and subsequent reevaluations) but also to the officially approved appraisals upon which the offers were based. There are on file in the offices of Witt, Gaither, Abernathy & Wilson of Chattanooga, Tennessee, sworn admissions that two TVA employee-appraisers reduced their first offer appraisals by 50% before the trial, not because they had erred, but rather and solely because the landowner has refused to accept the original offer at the Value #1 price.

Actually the landowner is bludgeoned into acceptance of the first offer and that is why an overwhelming majority do accept. They know that the price will not get any higher and will actually decline after he refuses. Most lawyers advise him not to get a lawyer since there is little if any chance the commissioners will change the price offer in favor of the landowner. Many landowners complain that they can not get a lawyer to take a case before the commissioners.

The landowner is told he will not be permitted retention of his buildings if he does not accept value #1. He may face pressures of orders of immediate possession or be banned to languish in Limbo for an undetermined period of time should he misbehave and refuse the first offer. He is told the Authority will close down essential services, buy up the roads and erect toll gates and he knows from the experiences of other landowners that he will be subject to the complete program of harrassment which awaits all landowners who do not cooperate in keeping up the V/FC ratio.

The Authority has control of its independent appraisers which it pays about \$100.00 for a preliminary appraisal. In this area TVA is the best possible customer for an appraisers services—a customer no appraiser is likely to offend. The Authority is quite clear as to what would constitute an offensive appraisal. All appraisals which do not fit into the preestablished pattern are considered offensive. The appraiser bringing in such an appraisal is quickly paid off and told to take his high price home with him. He will never again be hired by the authority. According to good practice he is barred from testifying for the landowner in this matter and thus his high appraisal is closed from the picture and high appraisers are eliminated from the system. Appraisals which fit into the PU&CA (pattern of uniform and consistent appraisals) are accepted and, of course, they may be changed during the process as dealings with the landowner may require.

The pattern of uniform and consistent appraisals is set up in the following manner. When the area for acquisition is determined a pattern favorable to the authority is set and backed up by sales in the past which tend to support this pattern—sales which do not fit into the pattern are rejected and not used as data. When the pattern is set and justified by a choice selection of pattern sales in the past—the independent appraisers are taken into the field by TVA appraisers. They are shown those parcels which fit into and support the TVA pattern. It can thus be expected that these independent appraisers will turn in an appraisal which fits into the pattern—they usually do. Low-price or pattern appraisers assure themselves of continuing work—high-price or non-pattern appraisers will have to look elsewhere for work. One can only guess what the ratio of pattern to non-pattern appraisers in the valley really is.

Those who wonder at such goings-on are reminded that this is allowed to happen for the very same reason that the Authority insists upon special acquisition pow-

ers: That very large amounts of land in the Valley and adjoining territory come under the jurisdiction of the Authority. Where the Authority has such an overwhelming effect on a given land area, it can be expected that its power could reach into many areas thought to be immune to the power structure of the Authority. There are few such areas which enjoy such immunity.

Beset by a pattern appraisal system which many lawyers are loath to attempt to fight, a declining set of values attached to their property, and the thought of no recourse to their peers—the Landowners in the Tennessee Valley and Adjoining Territories have been bludgeoned into helping the Authority post a V/FC ratio which is truly amazing! Small wonder that they cry “No contest.”

#### SUGGESTIONS FOR CORRECTION AND PREVENTION

(1) That Jury Trial rights be extended to TVA condemnation cases on petition of either party.

(2) That the Authority be subject to scrutiny of the General Accounting Office.

(3) That the landowner be given a reasonable allowance for his own appraisal and attorney.

(4) That the Authority be enjoined from depositing with the court inadequate amounts of compensation, lower than the offer price or lower than a reasonable appraisal value.

The first suggestion is most important. The ratio of voluntary to forced conveyance in TVA area is amazing. This fact has been stated by the Authority and borne out by our investigation. This is not, however, due to the generosity of landowners or the liberal compensation paid by the Authority—It is due only to the fact that the landowners know they do not have a chance in court. No other single factor causes this extremely favorable ratio—a ratio which is higher than for any other Federal Agency and is topped only by the ratio posted in totalitarian countries, where all conveyances are voluntary.

The Multi-budget system of the Authority is confusing to many but necessary because of the different types of funds used on Authority projects. None the less there is a good amount of feeling that the Congress is not getting the whole story on many items which could be cleared up with the help of the GAO.

The idea of an allowance for landowners to get their own appraisal and attorney is not at all new, at least 14 jurisdictions have this provision in the State Law. This provision would give the landowner a better footing when he confronts the superior resources of the Authority.

Typical of the economic bludgeoning of landowners is the two price system. The first price offered by the Authority is termed by them as a “liberal amount”, the amount deposited in court as part of the condemnation proceedings is always lower and represents, to use the Authority’s own words—“a reasonable amount.” This two-price system has also contributed to the favorable voluntary to forced conveyance ratio.

#### CONCLUSION OF HEARING

Senator HILL. We thank both of you very much.

Mr. GUARD. My name is Bailey Guard, a member of the staff of the Public Works Committee and I simply wish to express Senator Cooper’s regrets that he could not be here today to introduce Miss Whitehead as he had done before. I know that you were aware of his concern for some time over the land acquisition practices of the TVA in this area.

Senator HILL. He has expressed his concern to us many times. Thank you very much.

This concludes the hearing. The subcommittee will recess subject to the call of the chair.

(Whereupon, at 4:15 p.m. Friday, June 28, the hearing was concluded and the subcommittee recessed, to reconvene at the call of the Chair.)



## ADDITIONAL MATERIAL FOR THE RECORD

Clerk's statement: Pursuant to directions received from the chairman of the subcommittee, the following material will be printed in the record:

### TVA CHEMICAL AND AGRICULTURAL DEVELOPMENT PROGRAM

SHEFFIELD, ALA., June 4, 1986.

HON. CARL HAYDEN,  
U.S. Senate,  
Washington, D.C.

DEAR SENATOR HAYDEN: A matter of grave national concern has arisen in regards to the Tennessee Valley Authority's chemical and agricultural development program.

Since you are not from this area, you may not be familiar with TVA's program for developing and demonstrating new and improved fertilizers.

For the past 30 years, the Nitrogen Fertilizer Development Center at Muscle Shoals, Alabama, has been the major producer of new fertilizer technology in the United States, and is currently the only major center in the world for fertilizer research and development.

This not only benefits our own country, but is helping solve the food problems of the world. Last year 374 technical visitors from 50 countries and 1,268 technical visitors from this country visited the plants at Muscle Shoals.

The center here is in jeopardy through failure to provide funds brought on in part by the Vietnam conflict. Unless appropriations can be secured for modernization of the plants, it will be closed down. Already 394 employees have been terminated. Most of the plant's facilities were constructed during World Wars I and II.

Congress in the past 30 years has never appropriated as much as a dollar toward the operation and maintenance of the TVA chemical plants. They have operated upon what they get from the sale of products. But they do have to depend upon Congress to appropriate money to build and replace plant facilities.

The amount TVA is asking for is so small compared to what it means to our nation, as well as the hungry nations of the world.

This is not just a regional problem but one that concerns all our statesmen. Please use your influence to help preserve this valuable program.

Very truly yours,

WILLIAM T. MARKS,  
*Dixie Mayonnaise Co.*

---

[From the Sun-Democrat, Paducah, Ky., May 12, 1968]

### TVA'S LAND POLICIES

Several residents of the Land Between the Lakes region testified in Washington last week before a congressional committee. They were opposing, as they have in each of several past years, the appropriation of new money to enable the Tennessee Valley Authority to continue purchasing land in the area for the development of a wilderness-type park.

All but about 160 of the 950 families that lived in the old "between-the-rivers" region have moved out of the park zone, which eventually is to embrace 170,000 acres. Many, possibly the great majority, of those who have sold out and departed did so willingly or even gladly. But it is certain that of those remaining, some simply want to live out their lives on the old home place. Everyone can sympathize with that. Others are determined to hold on because they believe they can make their property turn a nice profit if developed commercially within a vast public recreation area. Most of us can understand that, too; it isn't as high-minded a motive as simple love of home, but it is human.

But the chief witnesses against the TVA appropriation made some new charges and repeated old ones, which so far as we know are not borne out by the facts; and if they aren't true, the allegations are unfair to TVA and its personnel. TVA is charged with using threats and intimidation to persuade unwilling owners to sell out. It was charged with heartlessness, a lack of feeling for those displaced, the offering of prices that are so low as to be unfair, and "police state" methods.

These and similar charges have been made in previous years, in opposition to the Land Between the Lakes plan. The Sun-Democrat has investigated many of them. While we have met and talked with a number of individuals who have refused to sell their property there to TVA, and to others who have done so despite the fact they did not want to move out, we have a never seen real proof that the Authority and its representatives have done anything cold, heartless or unfair in the land-buying procedure. On the contrary, TVA seems to have leaned over backward to be fair.

# INDEX

## U.S. ATOMIC ENERGY COMMISSION

	Page
AEC programs:	
Biology and medicine program.....	13
Community program.....	15
Isotopes development program.....	14
Radioisotope powered engine for heart pump.....	40
Pacemaker.....	41
Physical research program.....	12
200 Bev accelerator.....	17
Budget request and House action.....	34
Correspondence from the following:	
Senator Dirksen.....	17
Clarence Mitchell, Director, Washington Bureau, National Association for the Advancement of Colored People.....	34
Representative Price.....	27
Norman Ramsey, President, Universities Research Association, Inc.....	33
Others.....	50
JCAE staff analysis of effect of House action.....	28
Plowshare program.....	14
Program direction and administration.....	15
Raw materials program.....	9
Reactor development program.....	11
Large heat source generator.....	18
Space propulsion systems (Rover).....	16, 21, 23, 39
Construction.....	25
NERVA.....	22
Appropriation Committee report.....	38
House action.....	37
Impact of reduction.....	23, 39
NASA authorization.....	21
Restoration request.....	38
Statement of Senator Cannon.....	25
Phoebus 2A.....	22
Special nuclear materials program.....	10
Training, education and information program.....	13
Weapons program.....	10
Tests at Nevada Test Site.....	19
Appeals.....	2, 38, 42
Amendments proposed.....	2
Letter from Chairman.....	2
Budget justifications.....	43
Budget reductions and requested restorations.....	15
Chairman: Opening statement of.....	9
National Accelerator Laboratory, principal staff members.....	31
Proposed language changes.....	47



## LIST OF WITNESSES

---

	Page
Abbadessa, John P.....	18, 21, 24
Carson, A. R.....	89
Ericson, E. F.....	53
Hargett, M. C.....	89
Hobbs, Charles G.....	89
Klein, Milton.....	24
Marquis, Robert.....	53
Nelson, Lewis B.....	53
Ramey, James T.....	1
Seaborg, Hon. Glenn T.....	1
Smith, Frank E.....	53
Tape, Gerald F.....	1
Thompson, Charles P.....	103
Van Mol, L. J.....	53
Vreeland, Jacob D.....	53
Wagner, Aubrey.....	53
Wessenauer, G. O.....	53
Whitehead, Mrs. Corrine R.....	97

LIST OF WITNESSES

No.	Name	Residence
1	John A. Smith	123 Main St., New York
2	James B. Jones	456 Broadway, New York
3	Robert C. Brown	789 Park Ave., New York
4	William D. White	1010 Fifth Ave., New York
5	Charles E. Black	1212 Madison Ave., New York
6	Thomas F. Green	1414 E. 86th St., New York
7	Richard G. Hall	1616 Lexington Ave., New York
8	Henry H. King	1818 York Ave., New York
9	George I. Lee	2020 5th Ave., New York
10	Edward J. Miller	2222 3rd Ave., New York
11	Frank K. Nelson	2424 1st Ave., New York
12	Albert L. Phillips	2626 1st Ave., New York
13	Joseph M. Roberts	2828 1st Ave., New York
14	Samuel N. Taylor	3030 1st Ave., New York
15	Benjamin O. Walker	3232 1st Ave., New York
16	John P. Young	3434 1st Ave., New York
17	William Q. Adams	3636 1st Ave., New York
18	Charles R. Baker	3838 1st Ave., New York
19	Thomas S. Carter	4040 1st Ave., New York
20	Richard T. Evans	4242 1st Ave., New York
21	Henry U. Fisher	4444 1st Ave., New York
22	George V. Grant	4646 1st Ave., New York
23	Edward W. Harris	4848 1st Ave., New York
24	Frank X. Ingram	5050 1st Ave., New York
25	Albert Y. Jackson	5252 1st Ave., New York
26	Joseph Z. Kelly	5454 1st Ave., New York
27	Samuel A. Lamb	5656 1st Ave., New York
28	Benjamin B. Martin	5858 1st Ave., New York
29	John C. Nash	6060 1st Ave., New York
30	William D. Owen	6262 1st Ave., New York
31	Charles E. Parker	6464 1st Ave., New York
32	Thomas F. Quinn	6666 1st Ave., New York
33	Richard G. Reed	6868 1st Ave., New York
34	Henry H. Stone	7070 1st Ave., New York
35	George I. Thomas	7272 1st Ave., New York
36	Edward J. Turner	7474 1st Ave., New York
37	Frank K. Vance	7676 1st Ave., New York
38	Albert L. Ward	7878 1st Ave., New York
39	Joseph M. Wright	8080 1st Ave., New York
40	Samuel N. Young	8282 1st Ave., New York
41	Benjamin O. Zane	8484 1st Ave., New York
42	John P. Allen	8686 1st Ave., New York
43	William Q. Baker	8888 1st Ave., New York
44	Charles R. Carter	9090 1st Ave., New York
45	Thomas S. Evans	9292 1st Ave., New York
46	Richard T. Fisher	9494 1st Ave., New York
47	Henry U. Grant	9696 1st Ave., New York
48	George V. Harris	9898 1st Ave., New York
49	Edward W. Ingram	10101 1st Ave., New York
50	Frank X. Jackson	10303 1st Ave., New York

## TENNESSEE VALLEY AUTHORITY

	Page
Tennessee Valley Authority.....	53
Budget request.....	55
Chemical facilities, original request for.....	58
Budget reduction, effect of.....	58
Ammonia plant modernization.....	58
Funding for 1969, minimum.....	59
National defense, program for.....	60
Area production for fertilizer.....	59, 60
Electric power, sales of.....	64
Steam and hydroelectric generation.....	64
Estimate, 1967, and appropriation, 1968.....	69
Fertilizer revenues.....	63
Hill, Hon. Lister, encomiums for.....	72
House allowance.....	60
Area planning and demonstration programs.....	62
Conservation education and participation.....	62
Funding, source of.....	63
Justification.....	73-87
Chemical facilities.....	77
Capital outlay.....	83
Fertilizer and munitions development.....	77
Fertilizer processes, research and development.....	81
Land Between the Lakes.....	82
Treasury, payments to.....	65, 86
Nonpower proceeds.....	87
Land Between the Lakes project.....	72
Material for record, additional.....	113
Marks, William T., letter on chemical and agricultural program.....	113
TVA Land Policies, Paducah "Sun-Democrat" editorial.....	113
Munitions material for Government, cost of.....	71
Muscle Shoals, Ala., fertilizer facilities modernization.....	56
Purpose of facilities.....	57
Navigation and flood control programs.....	69
Oliver Springs cooperative development.....	69
Benefits derived.....	70
Non-Federal payments.....	71
Outside witnesses.....	97
American Landowners Association, The, statement (See Thompson, Charles P., etc.).....	103
Hobbs, Charles C., statement of.....	89
Fertilizer development center, Muscle Shoals, Ala.....	91
Expansion of center, need for.....	95
Hobbs, Charles C., letter from.....	90
Johnson, President Lyndon B., reference to letter.....	91
Kennedy, President John F., speech, 30th anniversary of TVA.....	91
Personnel of developing nations, training of.....	97
Roosevelt, President Franklin D., message to 73d Congress.....	90
Tennessee Valley Trades and Labor Council.....	89
Thompson, Charles P., statement of.....	103
Condemnation cases, jury trial for.....	103
Preliminary investigation, difficulties of.....	104
Abuses, alleged.....	104
Prepared statement.....	105

## Tennessee Valley Authority—Continued

## Outside witnesses—Continued

	Page
Whitehead, Miss Corrine R., statement of.....	97
Statements and affidavits available.....	102
Wagner, Aubrey J., letter to Senator Thruston Morton.....	101
Power bonds, sales of.....	65
Power construction program.....	65
Rates, increase in wholesale powers.....	68
Steamplant constructions.....	72
Treasury, payments to.....	65, 86
Appropriation investment, repayment of.....	65, 66, 67
Statutory requirement.....	67
Dividend payment increase, 1969.....	66, 67
Wagner, Aubrey J., statement of.....	53
Accomplishments of TVA.....	53
Cooperative planning.....	54
Electric power operation and pollution.....	54
Water and related land.....	54
Regional development programs, coordination of.....	55
Oliver Springs development.....	55
Resource management problems.....	54

