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93-46 OIL SHALE, MINING AND ENERGY DOCUMENTS

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HEARINGS

BEFORE THE

SUBCOMMITTEE ON MINES AND MINING

OF THE

COMMITTEE ON

INTERIOR AND INSULAR AFFAIRS

HOUSE OF REPRESENTATIVES

NINETY-THIRD CONGRESS

SECOND SESSION

ON

H.R. 12014 and Related Bills

TO AMEND THE MINERAL LANDS LEASING ACT TO PROVIDE
FOR A MORE EFFICIENT AND EQUITABLE METHOD FOR THE
EXPLORATION FOR AND DEVELOPMENT OF OIL SHALE RE-
SOURCES ON FEDERAL LANDS, AND FOR OTHER PURPOSES

HEARINGS HELD IN WASHINGTON, D.C.,
MARCH 14, MAY 23, AND AUGUST 8, 1974

Serial No. 93-46

Printed for the use of the
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OIL SHALE, MINING AND ENERGY

THURSDAY, MARCH 14, 1974

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON MINES AND MINING OF
THE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS,
Washington, D.C.

The subcommittee met, pursuant to notice, at 10 a.m., in room 1324, Longworth House Office Building, Hon. Patsy T. Mink (chairman of the subcommittee) presiding.

Present: Representatives Mink, Udall, Vigorito, Seiberling, Jones, Skubitz, Camp, Martin, and Cronin.

Also present: Tom Dunmire, Tom Laughlin, Charles Leppert, and Norman Williams.

Mrs. MINK. The Subcommittee on Mines and Mining is now in order.

Today, we are opening hearings on three bills, H.R. 12014, H.R. 12170, and H.R. 12588, that deal with the development of oil shale sources on the Federal lands and the establishment of a public corporation for such development.

In the absence of objection, a copy of H.R. 12014 and the report of the Department of the Interior will be placed in the record at this point.

[The bill and report are as follows:]

(1)

93^D CONGRESS
1ST SESSION

H. R. 12014

IN THE HOUSE OF REPRESENTATIVES

DECEMBER 18, 1973

Mrs. MINK (for herself, Mr. BINGHAM, Mr. WILLIAM D. FORD, Mr. KASTENMEIER, Mr. MEEDS, Mr. RONCALIO of Wyoming, and Mr. SEIBERLING) introduced the following bill; which was referred to the Committee on Interior and Insular Affairs

A BILL

To amend the Mineral Lands Leasing Act to provide for a more efficient and equitable method for the exploration for and development of oil shale resources on Federal lands, and for other purposes.

1 *Be it enacted by the Senate and House of Representa-*
2 *tives of the United States of America in Congress assembled,*

3 That section 21 of the Act commonly known as the Mineral
4 Lands Leasing Act (30 U.S.C. 241), relating to the leas-
5 ing of Federal land for the development of oil shale, is
6 repealed.

7 SEC. 2. The purpose of this Act is to establish a public
8 corporation to explore and develop all oil shale energy re-

1 sources on Federal lands, to assure that the Nation's energy
2 requirements are met without degradation to the environ-
3 ment, and to assume responsibility for ameliorating the ad-
4 verse economic and social effects of oil shale development.

5 DEFINITIONS

6 SEC. 3. For purposes of this Act—

7 (a) The term "Corporation" means the Oil Shales
8 Mining and Energy Corporation established by section 4 of
9 this Act.

10 (b) The term "Board" means the Board of Directors of
11 the Corporation established in section 4 of this Act.

12 (c) The term "Federal land" means all federally
13 owned lands and any land in which the United States has
14 reserved mineral interests relating to oil shale except lands—

15 (1) held in trust for Indians, or

16 (2) owned by Indians with Federal restrictions on
17 the title, or

18 (3) within national parks, forests, monuments,
19 seashore, and wildlife and wilderness areas.

20 (d) The term "oil shale" means any argillaceous, car-
21 bonate, or siliceous sedimentary rock which, through de-
22 structive distillation, will yield synthetic petroleum or shale
23 oil, and other minerals, and which contains—

24 (1) organic matter which was derived chiefly
25 from aquatic organisms or waxy spores or pollen grains,

1 which is only slightly soluble in ordinary petroleum
2 solvents; and

3 (2) inorganic matter which may contain other
4 minerals.

5 ESTABLISHMENT OF THE CORPORATION

6 SEC. 4. (a) In order to provide for the exploration and
7 development in the public interest of oil shale resources on
8 Federal land, there is hereby created a body corporate by
9 the name of the "Oil Shale Mining and Energy Corporation"
10 which shall establish and administer on Federal land a na-
11 tional program of oil shale exploration and development.

12 (b) The Corporation shall have a Board of Directors,
13 which shall consist of three members appointed by the
14 President, by and with the advice and consent of the Senate.
15 In appointing the members of the Board, the President shall
16 designate the Chairman. Not more than two members of the
17 Board shall be appointed from the same political party.

18 (c) The members of the Board first appointed shall
19 be deemed the incorporators, and the incorporation shall be
20 held to have been effected from the date of the first meeting
21 of the Board.

22 (d) Members of the Board shall be appointed for terms
23 of seven years, except that the terms of office of the members
24 of the Board first taking office after the date of enactment,
25 shall expire as designated by the President at the time of

1 nomination, one at the end of the fifth year, one at the end
2 of the sixth year, and one at the end of the seventh year
3 after such date. A successor to a member of the Board shall
4 be appointed in the same manner as the original member
5 and shall have a term of office expiring seven years from the
6 date of expiration of the term for which his predecessor was
7 appointed.

8 (e) Any member appointed to fill a vacancy in the
9 Board occurring prior to the expiration of the term for which
10 his predecessor was appointed shall be appointed for the re-
11 mainder of such term. Vacancies in the Board, so long as
12 there are two members in office, shall not impair the powers
13 of such Board to execute its functions, and two of the mem-
14 bers in office shall constitute a quorum for the transaction of
15 the business of such Board.

16 (f) Each of the members of the Board shall be a citizen
17 of the United States. His compensation shall be paid at the
18 rate provided for level III of the Executive Schedule (5
19 U.S.C. 5315). Each member of the Board shall be employed
20 on a full-time basis and in addition to his salary shall be
21 reimbursed by the Corporation for actual expenses (includ-
22 ing traveling and subsistence expenses) incurred by him in
23 the performance of the duties vested in the Board by this
24 Act. No member of the Board shall, during his continuance
25 in office, be engaged in any other business.

1 (g) No director shall have a financial interest in any
2 corporation engaged in the business of distributing and sell-
3 ing oil or gas to the public nor in any corporation engaged
4 in the business of oil and gas exploration, development, trans-
5 portation or use, nor shall any director have any interest in
6 any business which may be affected by the activities of the
7 Corporation.

8 (h) The Board shall direct the exercise of all the powers
9 of the Corporation.

10 (i) Each member of the Board, before entering upon
11 the duties of his office, shall subscribe to an oath (or affirma-
12 tion) to support the Constitution of the United States and
13 to faithfully and impartially perform the duties imposed upon
14 him by this Act.

15 (j) Any member of the Board may be removed from
16 office for cause at any time by joint resolution of the Senate
17 and the House of Representatives. No member of the Board
18 shall within one year after leaving office receive compen-
19 sation directly or indirectly from any private source for
20 activities directly related to the Corporation and further
21 to assure the equity of this restriction and to assure the in-
22 dependence of the Board, the departing member's compen-
23 sation shall be continued for one year at the same level as
24 existed at the end of his term.

25 (k) Any member of the Board who is found by the

1 President of the United States to be in violation of any
2 provision of this Act shall be removed from office by the
3 President of the United States.

4 OFFICERS AND EMPLOYEES OF CORPORATION

5 SEC. 5. (a) The Board may, without regard to the
6 provisions of title 5, United States Code, governing appoint-
7 ments in the competitive service, appoint such managers,
8 assistant managers, officers, employees, attorneys, and agents
9 as are necessary for the transaction of its business, fix their
10 compensation (without regard to the provisions of chapter
11 51 and subchapter III of chapter 53 of title 5, United States
12 Code, relating to classification and general schedule pay
13 rates), define their duties, and require bonds of such of
14 them as the Board may designate. Any appointee of the
15 Board may be removed in the discretion of the Board. No
16 officer or employee of the Corporation may receive a salary
17 in excess of that received by the members of the Board.

18 (b) (1) For purposes of the Act of March 3, 1931
19 (Davis-Bacon Act; 40 U.S.C. 276a), each contract to
20 which the Corporation is a party shall be considered a con-
21 tract to which the United States is a party. The Board shall
22 not enter into any such contract without first obtaining
23 assurance that required labor standards will be maintained
24 on the construction work. Health and safety standards

1 promulgated by the Secretary of Labor pursuant to section
2 107 of the Contract Work Hours and Safety Standards Act
3 (40 U.S.C. 333) shall be applicable to all construction work
4 performed under such contracts.

5 (2) If work, which if let by contract would be subject
6 to paragraph (1) of this subsection, is done directly by
7 the Corporation, the prevailing rate of wages shall be
8 paid in the same manner as though such work had been
9 let by contract. In the determination of such prevailing rate
10 or rates, due regard shall be given to those rates which have
11 been secured through collective agreement by representatives
12 of employees and employers.

13 (c) Insofar as applicable, the benefits of chapter 81
14 of title 5, United States Code, shall extend to persons given
15 employment under the provisions of this Act.

16 (d) In the appointment of officials and the selection
17 of employees for the Corporation, and in the promotion of
18 any such employees or officials, no political test or qualifica-
19 tion shall be permitted or given consideration, but all such
20 appointments and promotions shall be given and made on
21 the basis of merit and efficiency without regard to race or
22 sex. Any appointee of the Board who is found by the Board
23 to be guilty of a violation of this subsection may be removed
24 from office by such Board.

1 CORPORATE POWERS GENERALLY

2 SEC. 6. (a) Except as otherwise specifically provided
3 in this Act, the Corporation—

4 (1) shall have succession in its corporate name;

5 (2) may sue and be sued in its corporate name;

6 (3) may adopt and use a corporate seal, which
7 shall be judicially noticed;

8 (4) may make contracts to carry out its functions
9 under this Act;

10 (5) may adopt, amend, and repeal bylaws;

11 (6) may purchase, or lease and hold such personal
12 property as it deems necessary or convenient in the
13 transaction of its business, and may dispose of any such
14 personal property held by it;

15 (7) shall have the power in the name of the United
16 States of America to exercise the right of eminent do-
17 main, in accordance with section 13;

18 (8) shall have such power as may be necessary
19 or appropriate for the exercise of the powers specifically
20 conferred in this Act upon such Corporation;

21 (9) shall have the power to acquire or dispose of
22 real property to carry out its functions under this Act,
23 except that no real property may be acquired or leased
24 for any oil or gas exploration and development (exclud-
25 ing transmission) ;

1 (10) shall have the power to explore for oil shale on
2 Federal lands, to develop and sell oil and gas and other
3 oil shale products produced on Federal lands, and to build
4 and operate all those facilities necessary for the develop-
5 ment or sales of such resources, as herein authorized;

6 (11) shall have the power to explore, develop, ac-
7 quire or sell oil and gas and other oil shale products alone
8 or on a joint or cooperative basis with any private or
9 other public entity, except no joint or cooperative basis is
10 authorized if there is any likelihood that exploration, de-
11 velopment, acquisition, or sale jointly or cooperatively
12 with any other entity may adversely affect competition,
13 restrain trade, further monopolization, or violate the spirit
14 or content of any Federal statute respecting trade or com-
15 merce;

16 (12) shall have the power to engage in research di-
17 rected toward the development and utilization of oil shale
18 deposits on Federal lands, and may build, own, and op-
19 erate research testing, or demonstration facilities, alone or
20 on a joint or cooperative basis with any private or other
21 public entity;

22 (13) shall have the power to build, lease, purchase
23 or otherwise obtain and operate facilities necessary for
24 the production, sale, transportation, or delivery of oil,
25 gas, or other shale products, except no facility may be

1 constructed or operated unless such facility meets and
2 complies with all of the requirements of any Federal
3 statute relating to environmental quality, or any regu-
4 lation issued under such statute, including those aspects
5 of life and objectives which are delineated in section
6 101 (b) of the National Environmental Policy Act of
7 1969 (42 U.S.C. 4331 (b)) and which it is the pur-
8 pose of such Act to protect; and

9 (14) shall have the power to sell commercially
10 valuable minerals which may be mined or extracted or
11 discarded incidental to the production of oil, gas, or
12 other oil shale products on Federal lands.

13 (b) In order to enable the Corporation to exercise the
14 powers and duties vested in it by this Act:

15 (1) The exclusive use, possession, and control of all
16 property to be acquired by such Corporation in its own name
17 or in the name of the United States of America are en-
18 trusted to such Corporation for the purposes of this Act.

19 (2) The President of the United States may provide
20 for the transfer to such Corporation of the use, possession,
21 and control of such other Federal land or personal property
22 of the United States as he may from time to time deem nec-
23 essary and proper for the purposes of such Corporation.

24 (c) The Corporation shall maintain its principal office
25 at a place determined by it.

1 (d) Section 101 of the Government Corporation Control
2 Act is amended by inserting "Oil Shale Energy and Mining
3 Corporation;" after "Tennessee Valley Authority;"

4 (e) The Corporation may contract with any person
5 or public agency which it deems qualified, to design, prepare
6 specifications and bidding documents, recommend the award
7 of contracts, or supervise the construction and installation of
8 equipment and facilities of any required type anywhere in
9 the United States.

10 ACCOUNTS AND CONTRACTS; ANNUAL FINANCIAL STATE-
11 MENTS AND REPORTS; AUDIT BY COMPTROLLER GENERAL

12 SEC. 7. (a) The Corporation shall at all times maintain
13 complete and accurate books of accounts. The Corporation
14 shall determine its own system of administrative accounts
15 and the form and contents of its contracts and other business
16 documents except as otherwise provided by law.

17 (b) Subject to the other provisions of this Act, the
18 Corporation may make such expenditures and enter into
19 such contracts, agreements, and arrangements, upon such
20 terms and conditions and in such manner as it may deem
21 necessary, including the final settlement of all claims and
22 litigation by or against the Corporation; and notwithstanding
23 the provisions of any other law governing the expenditure
24 of public funds, the General Accounting Office, in the settle-
25 ment of the accounts of the accountable officer or employee of

1 the Corporation, shall not disallow credit for, nor withhold
2 funds because of, any expenditure which the Board shall
3 determine to have been necessary to carry out the provisions
4 of this Act.

5 (c) All purchases and contracts for supplies or serv-
6 ices, except for personal service, made by the Corporation,
7 shall be made after advertising, in such manner and at
8 such times sufficiently in advance of opening bids, as the
9 Board shall determine to be adequate to insure notice and
10 opportunity for competition; except that advertisement
11 shall not be required when (1) an emergency requires
12 immediate delivery of the supplies or performance of the
13 services; or (2) repair parts, accessories, supplemental
14 equipment, or services are required for supplies or services
15 previously furnished or contracted for; or (3) the aggre-
16 gate amount involved in any purchase of supplies or pro-
17 curement of services does not exceed \$500; in which cases
18 such purchases of supplied or procurement of services may
19 be made in the open market in the manner common among
20 businessmen. In comparing bids and in making awards,
21 the Board may consider such factors as relative quality
22 and adaptability of supplies and services, the bidder's
23 financial responsibility, skill, experience, record of integ-
24 rity in dealing, ability to furnish repairs and maintenance

1 services, the time of delivery or performance offered, and
2 whether the bidder has complied with the specifications.

3 (d) The Board shall file with the President and with
4 the Congress, in December of each year, a financial state-
5 ment and a complete report as to the business of the Cor-
6 poration covering the preceding governmental fiscal year.
7 This report shall include an itemized statement of all oil,
8 gas, and other oil shale products sold under this Act, the
9 total number of employees, and the names, salaries, and
10 duties of those receiving compensation at the rate of more
11 than \$1,500 a year.

12 (e) (1) The Comptroller General of the United States
13 shall audit the transactions of the Corporation at such times
14 as he shall determine, but not less frequently than once each
15 governmental fiscal year, with personnel of his selection. In
16 such connection he and his representatives shall have free
17 and open access to all papers, books, records, files, accounts,
18 plants, warehouses, offices, and all other things, property,
19 and places belonging to or under the control of or used or
20 employed by the Corporation, and shall be afforded full
21 facilities for counting all cash and verifying transactions with
22 and balances in depositories. He shall make report of each
23 such audit in quadruplicate, one copy for the President of
24 the United States, one for the Chairman of the Board, one

1 for public inspection at the principal office of the Corpora-
2 tion and the other to be retained by him for the use of the
3 Congress.

4 (2) Such report shall not be made until the Corpora-
5 tion shall have had reasonable opportunity to examine the
6 exceptions and criticisms of the Comptroller General or the
7 General Accounting Office, to point out errors therein, ex-
8 plain or answer such errors, and to file a statement which
9 shall be submitted by the Comptroller General with his re-
10 port. The expenses for each such audit shall be paid from any
11 appropriation for the General Accounting Office, and such
12 part of such expenses as may be allocated to the cost of pro-
13 ducing, marketing, and distributing oil, gas, and other oil
14 shale products shall be reimbursed promptly by the Corpora-
15 tion as billed by the Comptroller General. Nothing in this
16 Act shall relieve the Treasurer or other accountable officers
17 or employees of the Corporation from compliance with the
18 provisions of existing law requiring the rendition of accounts
19 for adjustment and settlement pursuant to section 236 of the
20 Revised Statutes (31 U.S.C. 71) and accounts of all re-
21 ceipts and disbursements by or for the Corporation shall be
22 rendered accordingly.

23 TRANSMISSION PIPELINES

24 SEC. 8. (a) In order to place the Corporation upon a
25 proper basis for the sale of oil and gas products from oil shale

1 on Federal lands, it may, either with funds appropriated by
 2 Congress or from funds secured from the sale of such oil and
 3 gas, or from funds secured by the sale of bonds construct,
 4 lease, purchase, or authorize the construction of transmission
 5 pipelines within transmission distance from the place where
 6 such oil and gas are produced and to interconnect with other
 7 systems. The board may lease to any person the use of any
 8 transmission pipeline owned and operated by the Corpora-
 9 tion, but no such lease shall be made that in any way inter-
 10 feres with the use of such transmission pipeline by the Board.

11 FINANCIAL ASSISTANCE TO STATES AND LOCAL GOV-
 12 ERNMENTS IN LIEU OF TAXATION; APPORTION-
 13 MENT: REPORT TO CONGRESS

14 SEC. 9. (a) In order to render financial assistance to
 15 those States and local governments within whose jurisdic-
 16 tion the operations of the Corporation are carried on and in
 17 which the Corporation has acquired properties previously
 18 subject to State and local taxation, the Board is authorized
 19 and directed to pay to such States, and the counties therein,
 20 for each fiscal year, beginning with the first fiscal year after
 21 the date of enactment of this Act in which there are gross
 22 proceeds as defined by subsection (b) of this section, the
 23 following percentages of the gross proceeds derived from
 24 the sale of oil or gas or other oil shale products by the Cor-
 25 poration for the preceding fiscal year as hereinafter pro-

1 vided, together with such additional amounts as may be
2 payable pursuant to the provisions hereinafter set forth, such
3 payments to constitute a charge against the operations of
4 the Corporation: For the first fiscal year beginning after
5 the date of enactment of this Act in which there are gross
6 proceeds as defined by subsection (b) of this section, 10
7 per centum; for the first, second, third, fourth, fifth, sixth,
8 and seventh succeeding fiscal years, 9 per centum, 8 per
9 centum, $7\frac{1}{2}$ per centum, 7 per centum, $6\frac{1}{2}$ per centum, 6 per
10 centum, $5\frac{1}{2}$ per centum, respectively; and for each fiscal
11 year thereafter, 5 per centum.

12 (b) The term "gross proceeds", as used in this section
13 means the total gross proceeds derived by the Corporation
14 from the sale of oil and gas or other oil shale products or
15 other minerals for the preceding fiscal year, excluding oil
16 and gas used by the Corporation or sold or delivered to any
17 other department or agency of the Government of the United
18 States for any purpose other than the resale thereof.

19 (c) The payments herein authorized are in lieu of taxa-
20 tion, and the Corporation, its property, franchises, and in-
21 come, are expressly exempted from taxation in any manner
22 or form by any State, county, municipality, or any sub-
23 division or district thereof.

24 (d) The payment for each fiscal year shall be appor-
25 tioned among such States in the following manner: One-half

1 of said payment shall be apportioned by paying to each
2 State the percentage thereof which the gross proceeds of
3 the sales by the Corporation within such State during the
4 preceding fiscal year bears to the total gross proceeds from
5 all sales by the Corporation during the preceding fiscal year;
6 the remaining one-half of such payment shall be apportioned
7 by paying to each State the percentage thereof which the
8 book value of the property held by the Corporation within
9 such State at the end of the preceding fiscal year bears to
10 the total book value of all such property held by the
11 Corporation on the same date. The book value of property
12 shall include that portion of the investment allocated or
13 estimated to be allocable to production of oil and gas and
14 other oil shale products.

15 (e) The minimum annual payment to each State (in-
16 cluding payments to counties therein) shall not be less than
17 an amount equal to the two-year average of the State and
18 local ad valorem property taxes levied against property
19 purchased and operated by the Corporation in such State.
20 Such two-year average shall be calculated for the last two
21 tax years during which such property was privately owned
22 and operated or such land was privately owned.

23 (f) The minimum annual payment to each State in
24 which the Corporation owns and operates property (includ-

1 ing payments to counties therein) shall not be less than
2 \$10,000 in any case.

3 (g) The Corporation shall pay directly to the respective
4 counties the two-year average of county ad valorem property
5 taxes (including taxes levied by taxing districts within the
6 respective counties) upon property determined as above
7 provided, and all payments to any such county within a
8 State shall be deducted from the payment otherwise due to
9 such State under the provisions of this section. The determi-
10 nation of the Board of the amounts due hereunder to the
11 respective States and counties shall be final.

12 (h) The payments above provided shall in each case
13 be made to the State or county in equal monthly installments.

14 (i) The Corporation shall, not later than the first
15 January 1 which occurs more than five years after the date
16 of enactment of this Act, submit to the Congress a report
17 on the operation of the provisions of this section, including
18 a statement of the distribution to the various States and
19 counties hereunder; the effect of the operation of the provi-
20 sions of this section on State and local finances; an appraisal
21 of the benefits of the program of the Corporation to the
22 States and counties receiving payments hereunder, and the
23 effect of such benefits in increasing taxable values within
24 such States and counties; and such other data, information,
25 and recommendations as may be pertinent to future legis-
26 lation.

1 COST ACCOUNTING, REPORTS OF COSTS OF OPERATIONS;

2 SALE OF OIL SHALE PRODUCTS AT PROFIT

3 SEC. 10. (a) For the purpose of accumulating data use-
4 ful to the Congress in the formulation of legislative policy
5 in matters relating to the exploration and production of oil
6 and gas and other oil shale products necessary to national
7 defense, and to the Federal Power Commission and other
8 Federal and State agencies, and to the public, the board
9 shall keep complete accounts of its costs of exploring for and
10 producing such oil and gas and other oil shale products and
11 a description of the major components of such costs accord-
12 ing to such uniform system of accounting for public utilities
13 as the Federal Power Commission has, and if it has none,
14 then it is empowered and directed to prescribe such uniform
15 system of accounting, together with records of such other
16 physical data and operating statistics of the Corporation
17 as may be helpful in determining the actual costs and value
18 of services, and the practices, methods, facilities, equipment,
19 appliances, and standards and sizes, types, location, and
20 geographical and economic integration of plants, and systems
21 best suited to promote the public interest, efficiency, and the
22 wider and more efficient use of shale oil and gas and other
23 oil shale products.

24 (b) The data accumulated under subsection (2) shall
25 be reported to the Congress by the Board from time to time,

1 with appropriate analyses and recommendations, and, so far
2 as practicable, shall be made available to the Federal and
3 State agencies which may be concerned with the administra-
4 tion of legislation relating to the exploration and develop-
5 ment of oil and gas resources.

6 (c) It is declared to be the policy of this Act that, as
7 soon as practicable, in order to make oil shale resources ex-
8 ploration and development projects self-supporting and self-
9 liquidating, the oil shale products shall be sold at prices
10 which, in the opinion of the Board, when applied to the
11 normal capacity of the Corporation's production and distribu-
12 tion facilities, will produce gross revenues in excess of the
13 cost of production of such oil and gas and other oil shale
14 products, and priority in such sales shall be given to corpora-
15 tions engaged in the business of distributing and selling oil
16 or oil derivatives or gas to the public which have no facilities
17 for the primary production of oil or gas.

18 (d) In addition to the statement of the cost of produc-
19 tion as required by section 7 (d) of this Act, the Board shall
20 file with each annual report a statement of the total costs of
21 all production and distribution during each year, the average
22 cost per unit of such production and distribution, the prices
23 at which sold, and to whom sold, and copies of all contracts
24 for the sale of oil and gas and other oil shale products and
25 other minerals.

1 BONDS FOR FINANCING OIL SHALE RESOURCES

2 EXPLORATION AND DEVELOPMENT PROGRAM

3 SEC. 11. (a) The Corporation is authorized to issue
4 and sell bonds, notes, and other evidences of indebtedness
5 (hereinafter collectively referred to as "bonds") in an amount
6 not exceeding \$5,000,000,000 outstanding at any one time
7 to assist in financing its oil shale resources exploration and
8 development program and to refund such bonds. The Cor-
9 poration may, in performing functions authorized by this Act,
10 use the proceeds of such bonds for the construction, acquisi-
11 tion, enlargement, improvement, or replacement of any plant
12 or other facility used or to be used for oil shale resources
13 exploration and development, and for other purposes inci-
14 dental thereto.

15 (b) The principal of and interest on the bonds de-
16 scribed in subsection (a) of this section shall be payable
17 solely from the Corporation's net proceeds as hereinafter
18 defined. Net proceeds are defined for purposes of this sec-
19 tion as the remainder of the Corporation's gross revenues
20 after deducting the costs of operating, maintaining, and ad-
21 ministering its properties and payments to States and coun-
22 ties in lieu of taxes but before deducting depreciation ac-
23 cruals or other charges representing the amortization of capi-
24 tal expenditures. Notwithstanding the provisions of section
25 20 of this Act or any other provision of law, the Corporation

1 may pledge and use its net proceeds for payment of the
2 principal of and interest on such bonds, for purchase or re-
3 demption thereof, and for other purposes incidental thereto,
4 including creation of reserve funds and other funds which
5 may be similarly pledged and used, to such extent and in
6 such manner as it may deem necessary or desirable. The
7 Corporation is authorized to enter into binding covenants
8 with the holders of such bonds (and with the trustee, if
9 any) under any indenture, resolution, or other agreement
10 entered into in connection with the issuance thereof (any
11 such agreement being hereinafter referred to as a "bond
12 contract") with respect to the establishment of reserve funds
13 and other funds, application and use of net proceeds, stipu-
14 lations concerning the subsequent issuance of bonds, or the
15 execution of leases or lease-purchase agreements relating
16 to properties, and such other matters, not inconsistent with
17 this chapter, as the Corporation may deem necessary or de-
18 sirable to enhance the marketability of such bonds. The is-
19 suance and sale of bonds by the Corporation and the expendi-
20 ture of bond proceeds for the purposes specified herein, shall
21 not be subject to the requirements or limitations of any other
22 law.

23 (c) Bonds issued by the Corporation under this sec-
24 tion shall not be obligations of, nor shall payment of the
25 principal thereof or interest thereon be guaranteed by, the

1 United States. Proceeds realized by the Corporation from
2 issuance of such bonds and from operations and the expendi-
3 ture of such proceeds shall not be subject to apportionment
4 under the provisions of section 3679 of the Revised Statutes
5 (31 U.S.C. 665).

6 (d) Bonds issued by the Corporation under this sec-
7 tion shall be negotiable instruments unless otherwise speci-
8 fied therein, shall be in such forms and denominations, shall
9 be sold at such times and in such amounts, shall mature
10 at such time or times not more than fifty years from their
11 respective dates, shall be sold at such prices, shall bear such
12 rates of interest, may be redeemable before maturity at the
13 option of the Corporation in such manner and at such times
14 and redemption premiums, may be entitled to such relative
15 priorities of claim on the Corporation's net proceeds with
16 respect to principal and interest payments, and shall be
17 subject to such other terms and conditions, as the Corpora-
18 tion may determine.

19 (e) At least fifteen days before selling each issue of
20 bonds hereunder (exclusive of any commitment shorter than
21 one year) the Corporation shall advise the Secretary of the
22 Treasury as to the amount, proposed date of sale, maturi-
23 ties, terms and conditions, and expected rates of interest of
24 the proposed issue in the fullest detail possible and, if the
25 Secretary shall so request, shall consult with him or his

1 designee thereon, but the sale and issuance of such bonds
2 shall not be subject to approval by the Secretary of the
3 Treasury except as to the time of issuance and the maximum
4 rates of interest to be borne by the bonds.

5 (f) If the Secretary of the Treasury does not approve
6 a proposed issue of bonds hereunder within seven working
7 days following the date on which he is advised of the pro-
8 posed sale, the Corporation may issue to the Secretary
9 interim obligations in the amount of the proposed issue,
10 which the Secretary is directed to purchase. In case the
11 Corporation determines that a proposed issue of bonds here-
12 under cannot be sold on reasonable terms, it may issue to
13 the Secretary interim obligations which the Secretary is
14 authorized to purchase.

15 (g) Notwithstanding the foregoing provisions of this
16 section, obligations issued by the Corporation to the Sec-
17 retary shall not exceed \$150,000,000 outstanding at any
18 one time, shall mature on or before one year from date of
19 issue, and shall bear interest equal to the average rate
20 (rounded to the nearest one-eighth of a percent) on out-
21 standing marketable obligations of the United States with
22 maturities from dates of issue of one year or less as of the
23 close of the month preceding the issuance of the obliga-
24 tions of the Corporation. If agreement is not reached within
25 eight months concerning the issuance of any bonds which

1 the Secretary has failed to approve, the Corporation may
2 nevertheless proceed to sell such bonds on any date there-
3 after without approval by the Secretary in amount sufficient
4 to retire the interim obligations issued to the Treasury and
5 such interim obligations shall be retired from the proceeds
6 of such bonds.

7 (h) For the purpose of any purchase of the Corpora-
8 tion's obligations, the Secretary of the Treasury is authorized
9 to use as a public debt transaction the proceeds from the sale
10 of any securities issued under the Second Liberty Bond Act,
11 as amended, and the purposes for which securities may be
12 issued under the Second Liberty Bond Act, as amended, are
13 extended to include any purchases of the Corporation's obli-
14 gations hereunder. The Corporation may sell its bonds by
15 negotiation or on the basis of competitive bids, subject to the
16 right, if reserved, to reject all bids; may designate trustees,
17 registrars, and paying agents in connection with said bonds
18 and the issuance thereof; may arrange for audits of its ac-
19 counts and for reports concerning its financial condition and
20 operations by certified public accounting firms (which audits
21 and reports shall be in addition to those required by sections
22 105 and 106 of the Government Corporation Control Act
23 (31 U.S.C. 850, 851) may, subject to any covenants con-
24 tained in any bond contract, invest the proceeds of any bonds
25 and other funds under its control which derive from or per-

tain to its production program in any securities approved for investment of national bank funds and deposit said proceeds and other funds, subject to withdrawal by check or otherwise, in any Federal Reserve bank or bank having membership in the Federal Reserve System; and may perform such other acts not prohibited by law as it deems necessary or desirable to accomplish the purposes of this section. Bonds issued by the Corporation hereunder shall contain a recital that they are issued pursuant to this section, and said recital shall be conclusive evidence of the regularity of the issuance and sale of such bonds and of their validity. The annual report of the Board filed pursuant to section 6(d) of this Act shall contain a detailed statement of the operation of the provisions of this section during the year.

(i) Bonds issued by the Corporation under this section shall be lawful investments and may be accepted as security for all fiduciary, trust, and public funds, the investment or deposit of which shall be under the authority or control of any officer or agency of the United States. The Secretary of the Treasury or any other officer or agency having authority over or control of any such fiduciary, trust, or public funds, may at any time sell any of the bonds of the Corporation acquired by them under this section. Bonds issued by the Corporation hereunder shall be exempt both as to principal and interest from all taxation now or hereafter imposed by

1 any State or local taxing authority except estate, inheritance,
2 and gift taxes.

3 (j) From net proceeds in excess of those required to
4 meet the Corporation's obligations under the provisions of
5 any bond or bond contract, the Corporation shall, beginning
6 with the eleventh fiscal year which begins after the date
7 of enactment of this Act, make payments into the Treasury
8 as miscellaneous receipts on or before December 31 and June
9 30, of each fiscal year as a return on the appropriation
10 investment in the Corporation's facilities, plus a repayment
11 sum of not less than \$10,000,000 for each of the first five
12 fiscal years, \$15,000,000 for each of the next five fiscal
13 years, and \$20,000,000 for each fiscal year thereafter, which
14 repayment sum shall be applied to reduction of such appro-
15 priation investment until such appropriation investment shall
16 have been repaid. Such appropriation investment shall con-
17 sist, in any fiscal year, of that part of the Corporation's total
18 investment assigned to production as of the beginning of
19 the fiscal year (including both completed plant and con-
20 struction in progress) which has been provided from appro-
21 priations or by transfers of property from other Government
22 agencies without reimbursement by the Corporation. The
23 payment as a return on the appropriation investment in each
24 fiscal year shall be equal to the computed average interest
25 rate payable by the Treasury upon its total marketable public

1 obligations as of the beginning of such fiscal year applied
2 to such appropriation investment. Payments due hereunder
3 may be deferred for not more than two years when, in the
4 judgment of the Board, such payments cannot feasibly be
5 made because of inadequacy of funds occasioned by poor
6 business conditions, emergency replacements, or other factors
7 beyond the control of the Corporation.

8 (k) It is declared to be the intent of this section to aid
9 the Corporation in discharging its responsibility for fulfilling
10 the national energy needs and the environmental, social, and
11 economic advancement of the region in which it conducts its
12 operations by providing it with adequate authority and ad-
13 ministrative flexibility to obtain the necessary funds with
14 which to assure an ample supply of oil and gas and other
15 oil shale products for such purposes by issuance of bonds and
16 as otherwise provided herein, and this section shall be con-
17 strued to effectuate such intent.

18 RATES FOR SALE OF OIL SHALE PRODUCTS; APPLICATION OF

19

NET PROCEEDS

20 SEC. 12. (a) The Corporation shall charge prices for oil
21 shale products which will produce gross revenues sufficient to
22 provide funds for exploration and development of its oil shale
23 resources; payments to States and counties in lieu of taxes;
24 debt service on outstanding bonds, including provision and

1 maintenance of reserve funds and other funds established in
2 connection therewith; payments to the Treasury as a return
3 on the appropriation investment pursuant to subsection (j)
4 of section 11 of this Act; payment to the Treasury of the
5 repayment sums specified in such subsection; and such addi-
6 tional margin as the board may consider desirable for retire-
7 ment of outstanding bonds in advance of maturity, additional
8 reduction of appropriation investment, and other purposes
9 connected with the Corporation's oil shale resource explora-
10 tion and development program, having due regard for the
11 primary objectives of the Act.

12 (b) In order to protect the investment of holders of the
13 Corporation's securities and the appropriation investment as
14 defined in section 11 of this Act, the Corporation, during
15 each successive five-year period beginning with the five-year
16 period which commences on July 1 of the first full fiscal year
17 after the effective date of this section, shall apply net pro-
18 ceeds either in reduction (directly or through payments into
19 reserve or sinking funds) of its capital obligations, including
20 bonds and the appropriation investment, or to reinvestment
21 in production assets, at least to the extent of the combined
22 amount of the aggregate of the depreciation accruals and
23 other charges representing the amortization of capital ex-
24 penditures applicable to its properties.

CONDEMNATION PROCEEDINGS

1
2 SEC. 13. The Corporation may cause proceedings to be
3 instituted for the acquisition by condemnation of any lands,
4 easements, or rights-of-way, or of any transmission capacity
5 which, in the opinion of the Corporation, are necessary to
6 carry out the provisions of this Act pursuant to the provi-
7 sions of section 6 (a) (9) of this Act. The proceedings shall
8 be instituted in the United States district court for the dis-
9 trict in which the land, easement, right-of-way, or other
10 interest, or any part thereof, is located, and such court shall
11 have full jurisdiction to divest the complete title to the
12 property sought to be acquired out of all persons or claim-
13 ants and vest the same in the United States in fee simple,
14 and to enter a decree quieting the title thereto in the United
15 States of America. In any such eminent domain proceeding
16 (including a proceeding in the District of Columbia) a cor-
17 poration may file with the complaint or at any time before
18 judgment a declaration of taking in the manner and with
19 the consequences provided by the first section and sections
20 2 and 4 of the Act entitled "An Act to expedite the con-
21 struction of public buildings and works outside the District
22 of Columbia by enabling possession and title of sites to be
23 taken in advance of final judgment in proceedings for the
24 acquisition thereof under the power of eminent domain",
25 approved February 26, 1931 (46 Stat. 1421).

PATENTS

1
2 SEC. 14. (a) The Corporation, as an instrumentality
3 and agency of the Government of the United States for the
4 purpose of executing its constitutional powers, shall have
5 access to the Patent Office of the United States for the pur-
6 pose of studying, ascertaining, and copying all methods,
7 formulas, and scientific information (not including access to
8 pending applications for patents) necessary to enable the
9 Corporation to use and employ the most efficacious and eco-
10 nomical process for the exploration and development of oil
11 shale resources, and any owner of a patent whose patent
12 rights may have been thus in any way copied, used, in-
13 fringed, or employed by the exercise of this authority by the
14 Corporation shall have as the exclusive remedy a cause of
15 action against the Corporation to be instituted and prosecuted
16 in the appropriate district court of the United States, for the
17 recovery of reasonable compensation for such infringement.
18 The Commissioner of Patents shall furnish to the Corpora-
19 tion, at its request and without payment of fees, copies of
20 documents on file in his office.

21 (b) The benefits of subsection (a) of this section shall
22 not apply to any art, machine, method of manufacture, or
23 composition of matter, discovered or invented by such em-
24 ployee during the time of his employment or service with

1 the Corporation or with the Government of the United
2 States.

3 (c) The Corporation shall make available, by license
4 or otherwise, on a nonexclusive basis, upon payment of a
5 reasonable royalty, and without the territorial limitation,
6 the use of any patent, trade secret, and copyrighted or other
7 information developed by the Corporation in the perform-
8 ance of any of its activities under this Act. In appropriate
9 cases where the purposes of this Act would be served, the
10 Board may waive the payment of royalties.

11 OFFENSES; FINES AND PUNISHMENT

12 SEC. 15. (a) All general penal statutes relating to the
13 larceny, embezzlement, conversion, or to the improper
14 handling, retention, use, or disposal of public moneys or
15 property of the United States, shall apply to the moneys
16 and property of the Corporation and to moneys and prop-
17 erties of the United States entrusted to the Corporation.

18 (b) Any person who, with intent to defraud the Cor-
19 poration, or to deceive any director, officer, or employee
20 of the Corporation or any officer or employee of the United
21 States (1) makes any false entry in any book of the Cor-
22 poration, or (2) makes any false report or statement for
23 the Corporation, shall upon conviction thereof, be fined
24 not more than \$10,000 or imprisoned not more than five
25 years, or both.

1 (c) Any person who shall receive any compensation,
2 rebate, or reward, or shall enter into any conspiracy, collu-
3 sion, or agreement, express or implied with intent to defraud
4 the Corporation or wrongfully and unlawfully to defeat its
5 purposes, shall, on conviction thereof, be fined not more than
6 \$5,000 or imprisoned not more than five years, or both.

7 NET PROCEEDS OVER EXPENSE PAYABLE INTO TREASURY;

8 AMERICAN INDIAN FUND

9 SEC. 16. (a) Commencing in the first fiscal year begin-
10 ning after three years from the date of enactment of this Act,
11 the net proceeds for each fiscal year derived by the Board
12 from the sale of any oil shale products or minerals produced
13 by the Corporation, and from any other activities of the
14 Corporation including the disposition of any real or personal
15 property, shall be paid into the Treasury of the United States
16 at the end of each calendar year, save and except such part
17 of such net proceeds as in the opinion of the Board shall be
18 necessary for the Corporation in the operation of its oil shale
19 resources exploration and development program, for conduct-
20 ing its business in producing, transmitting, and distributing
21 oil shale products, and for compensation for terminated leases
22 under section 19. In addition a continuing fund of \$5,000,-
23 000 is excepted from the requirements of this section and
24 may be withheld by the board to defray emergency expenses
25 and to insure continuous operation.

1 (b) There is hereby created in the Treasury of the
2 United States a fund to be known as the American Indian
3 Fund (hereinafter referred to as the "fund"). All money
4 paid into the Treasury of the United States under subsection
5 (a) of this section shall be deposited in the fund. If at the
6 end of any fiscal year, the amount accumulated in the fund
7 exceeds \$2,000,000, the Secretary of the Interior shall al-
8 locate to each eligible Indian tribe from the fund an amount
9 which bears the same ratio to the total accumulated amount
10 as the total enrolled membership of such tribe bears to the
11 total enrolled membership of all eligible Indian tribes.

12 (c) The Secretary shall disburse the amount allocated to
13 the eligible Indian tribes pursuant to subsection (b) to such
14 Indian tribe and such amount shall be subject to the appro-
15 priation by the tribal governing body of such Indian tribe
16 for any purpose which promotes the economic, social, and
17 cultural benefit of the tribe and its members: *Provided,*
18 That such funds shall not be available for a general per capita
19 distribution to the tribe's members nor shall any of such
20 funds inure to the private benefit or gain of any person ex-
21 cept as a part of a general program for the tribal member-
22 ship.

23 (d) For the purposes of this section, "eligible Indian
24 tribe" shall mean those entities found eligible to receive as-
25 sistance pursuant to section 108(b) (4) of the State and

1 Local Fiscal Assistance Act of October 20, 1972, (86 Stat.
2 920; 31 U.S.C. 1227).

3 ENVIRONMENTAL PROTECTION; ENVIRONMENTAL ADVISORY
4 COMMITTEE; PUBLIC HEARING; IMPACT STATEMENTS

5 SEC. 17. (a) In exploring and developing oil shale re-
6 sources and in the construction and operation of any produc-
7 tion or transmission facility, the Corporation shall administer
8 such programs so as to promote the conservation of lands and
9 other natural resources, to preserve and enhance the en-
10 vironment, to maintain ecological balances, to protect the
11 public health, safety, and welfare, and to restore and rehabili-
12 tate, as far as practicable, any lands from which oil shale
13 resources have been taken and which will no longer be
14 needed by the Corporation for such use.

15 (b) The Corporation shall treat all decisions regarding
16 the siting and design of any facility which may be constructed
17 under this Act as a significant aspect of land use planning in
18 which all environmental, social, economic, and technical
19 issues with respect to such facility should be resolved in an
20 integrated fashion. In the resolution of these possible compet-
21 ing demands, the Corporation shall give all possible weight to
22 the protection of the environment and full compliance with
23 all applicable Federal laws and regulations.

24 (c) To guide the Corporation in its consideration of the
25 factors listed in subsections (a) and (b) of this section, the

1 President shall appoint an environmental advisory committee
2 (hereafter referred to as the "committee") consisting of
3 twenty members who may each serve for a period of no more
4 than five years on a staggered basis and having equal repre-
5 sentation from:

6 (1) the oil and gas industry;

7 (2) State and local planning and governmental
8 agencies;

9 (3) public interest and environmental groups hav-
10 ing a regional or national scope;

11 (4) Federal agencies, including the Environmental
12 Protection Agency and the Energy Research and
13 Development Administration; and

14 (5) American Indian tribal councils.

15 (d) A majority of the committee shall be residents of
16 the States in which oil shale exploration and development
17 of the Corporation is contemplated or is in process. Members
18 of the advisory committee who are not State or Federal
19 employees shall receive adequate per diem compensation for
20 days spent in actual performance of duties for the committee,
21 not to exceed \$100 per day, and shall be reimbursed by the
22 Corporation for actual expenses in the performance of such
23 duties, including costs of travel for necessary inspection
24 of sites. In addition, the Corporation shall provide the com-
25 mittee with an adequate staff.

1 (e) Prior to the initiation of any program of explora-
2 tion or the construction of any major facility under this Act,
3 the Corporation shall prepare with the approval of the
4 committee an environmental impact statement pursuant to
5 section 102 of the National Environmental Policy Act of
6 1969. After adequate public notice, the Corporation shall
7 make the impact statement available to all interested agencies
8 and to the general public and shall hold such public hearings
9 in places convenient to the area affected and shall allow in-
10 terested persons to submit comments on the statement.

11 ENVIRONMENTAL SAFEGUARDS; STIPULATIONS ON TECH-
12 NOLOGY; LIMITATIONS ON ACREAGE DURING PRELIM-
13 INARY PHASE

14 SEC. 18. (a) It shall be the objective of the Corporation
15 to prevent all adverse environmental impacts associated with
16 the activities of the Corporation which will likely impose
17 an unacceptable cumulative burden of pollution or degrada-
18 tion upon the natural resources of the vicinity and the region.
19 Because stabilization of surface mining spoil in arid and semi-
20 arid regions poses extraordinary technical problems, the
21 Corporation shall not use surface mining techniques for the
22 exploration or development of oil shale resources.

23 (b) In addition, due to the high priority which must
24 be given to protection of surface and ground water supplies
25 in the arid and semiarid regions wherein the Federal oil shale

1 lands are located, and due to the erodibility of the natural
2 topography and the need to minimize surface disturbance,
3 and due to the difficulty of establishing a permanent, diverse,
4 self-regenerating and effective vegetative cover on the spent
5 shale dumps wherever retorting is carried out above ground,
6 nonnuclear in situ or underground retorting shall be the pre-
7 ferred technology to be utilized by the Corporation. However,
8 if in a given situation, in situ operations may prove to be
9 technologically impractical or environmentally more damag-
10 ing than room-and-pillar mining coupled with aboveground
11 retorting, and if prior approval in writing has been obtained
12 from a majority of the committee following full considera-
13 tion and public review of the environmental impact statement,
14 the Corporation may utilize room-and-pillar mining tech-
15 nology in conjunction with aboveground retorting of the oil
16 shale, except within the limits of practicality, all spent shale
17 shall be returned to the underground mine voids and shall be
18 protected from leaching so as to prevent contamination of
19 ground or surface waters.

20 (c) During the preliminary research and development
21 phase, the Corporation shall undertake to develop one or
22 more prototype plants or facilities on a commercial scale
23 with a daily production of at least fifty thousand barrels of
24 shale oil per day, utilizing the most efficacious technology
25 available. For the purpose of exploration, simulation, ex-

1 perimentation, design, construction, development, and opera-
2 tion of all such plants or facilities, no more than twenty
3 thousand acres of federally owned oil shale lands may be
4 used by the Corporation, until such time as the prototype
5 plant or plants are proven to be viable with regard to the
6 feasibility of the technology employed, the income generated
7 by sale of oil shale products or subsidiary minerals, and the
8 protection of the environment.

9 TERMINATION OF EXISTING OIL SHALE INTERESTS;

10 ACQUISITION OF DEVELOPMENT RIGHTS

11 SEC. 19. (a) No license, lease, patent, or any other in-
12 terest in oil shale deposits on Federal land may be granted
13 under any other Federal law to any person as of the date of
14 enactment of this Act and all existing interests in such de-
15 posits granted under any other Federal law shall terminate
16 as of such date. Any person whose interest has been termi-
17 nated by this section shall receive compensation for such in-
18 terests from the Corporation in the aggregate amount of the
19 actual costs to such person with respect to the exploration and
20 development of such interests. Any person whose interests
21 are so terminated shall have as the exclusive remedy a cause
22 of action against the Corporation in the appropriate district
23 court of the United States, for the recovery of such compen-
24 sation.

25 (b) The Corporation may request the right to develop

1 oil shale resources which are or may be located on any Fed-
2 eral lands, including offshore rights, to the extent necessary
3 to carry out its authorized activities.

4 (c) Except as provided in paragraph (d) of this sec-
5 tion, any Federal agency or department having authority
6 to lease, sell, or otherwise dispose of Federal lands or rights
7 to oil shale resources which are or may be located on Fed-
8 eral lands, including offshore rights, shall, upon the receipt
9 of a request of the Corporation under paragraph (b) of this
10 section, grant the Corporation such right to develop without
11 payment within ninety days after the receipt of such request.
12 Rights to develop under this paragraph shall not be subject
13 to any other Federal statute or regulation governing the
14 lease, sale, or other disposition of any such lands or rights
15 by any Federal agency or department.

16 (d) Notwithstanding the provisions of section 641 of
17 title 10, United States Code, the Secretary of Defense, act-
18 ing for the Secretary of the Navy, shall transfer possession
19 of certain properties inside the naval petroleum and oil
20 shale reserves, which are subject to such Secretary's juris-
21 diction and control, to the Corporation in accordance with
22 this section. Within one year after the date of incorporation
23 of the Corporation, the Secretary of Defense shall prepare
24 and submit to the President a report which specifies the oil
25 shale reserves which he finds are necessary for retention to

1 accomplish the purposes of such section 641. Within six
2 months after receiving such report, the President shall des-
3 ignate those oil shale reserves which are necessary for reten-
4 tion under such section. Such properties may not be trans-
5 ferred to the Corporation, except on such terms and condi-
6 tions as may be set by the President.

7 (e) All rights granted and properties transferred to the
8 Corporation shall be explored, developed, and produced in
9 the most rapid manner practicable without excessive risk
10 of losses in recovery in accordance with the purposes of this
11 title and subject to the authorized powers and limitations
12 of the Corporation under section (6) of this Act.

13 AUTHORIZATION OF APPROPRIATION

14 SEC. 20. All appropriations necessary to the Corporation
15 for each fiscal year to carry out the provisions of this Act
16 are hereby authorized.

17 SEVERABILITY

18 SEC. 21. If any provision of this Act or the applicability
19 thereof to any person or circumstance is held invalid, the
20 remainder of this Act and the application of such provision
21 to other persons or circumstances shall not be affected
22 thereby.

23 SHORT TITLE

24 SEC. 22. This Act may be cited as the "Oil Shale Mining
25 and Energy Corporation Act of 1974".

U.S. DEPARTMENT OF THE INTERIOR,
OFFICE OF THE SECRETARY,
Washington, D.C., February 25, 1974.

HON. JAMES A. HALEY,
Chairman, Committee on Interior and Insular Affairs,
House of Representatives,
Washington, D.C.

DEAR MR. CHAIRMAN: This responds to your request for the views of this Department on H.R. 12014, a bill "To amend the Mineral Lands Leasing Act to provide for a more efficient and equitable method for the exploration for and development of oil shale resources on Federal lands, and for other purposes."

We oppose enactment of this bill.

H.R. 12014 would establish a Federally organized Oil Shale Mining and Energy Corporation with an exclusive right to carry out an oil shale exploration and development program on Federal land. In addition to customary Federal corporate provisions and powers, the bill would authorize the corporation to undertake direct exploration for oil shale and development of oil and gas and other oil shale products on Federal lands and to utilize joint or co-operative arrangements with public or private entities unless such an arrangement would have anticompetitive effects. In addition, the corporation would be authorized to engage in oil shale research, to provide facilities for production, sale, transportation and delivery of oil, gas or other shale products (subject to environmental safeguards) including transmission pipelines, and to issue bonds or other evidences of indebtedness (up to \$5 billion) to assist in financing the program. The corporation would be required to pay over specified portions of the gross proceeds from sales of oil, gas or other oil shale products in lieu of taxes and to pay net proceeds of sales (as determined under section 16) to a fund established in the Treasury for American Indians. The corporation would be prohibited from surface mining oil shale and the use of other technology. The bill prohibits further grants of licenses, patents or other interests on Federal lands and terminates interests, with provision being made for compensation.

Subject to adequate Federal control to protect environmental and other Federal interests, the primary responsibility for oil shale development should rest with the private sector. This is more efficient and a sounder use of scarce national financial resources.

To develop oil shale on Federal lands, we have recently undertaken a prototype oil shale leasing program of six tracts in Colorado, Utah and Wyoming. After thorough study which included the development of strict environmental safeguards and a comprehensive set of leasing regulations, the first lease was offered for competitive bidding in early January and a \$210 million bonus bid was accepted. Bids have also been received for the second tract. Based on these leases, indications of private interest, and the industry's demonstrated ability to undertake large scale and sophisticated operations, there is no reason to doubt that private industry can bear its traditional responsibility for developing this resource in an efficient manner. It is worth emphasizing however, that we intend to pursue vigorously the Federal responsibility for guidance and oversight as oil shale is developed.

Furthermore, it should be noted that (a) a case has not been made that such a corporation is needed; (b) such a corporation would enlarge the bureaucracy of the Federal government; and (c) enactment of the bill would most likely place a financial burden on taxpayers that should be assumed by the private sector.

In addition to our general objection to enactment of H.R. 12014, there are numerous specific objections to its provisions. For example, there is no justification for assigning net oil shale revenues to Indian tribes, nor is there any basis for the extravagant financing provisions of the bill. The corporation's powers appear to authorize its intrusion into other aspects of the petroleum industry in an unwarranted manner. Other provisions are equally objectionable and would themselves justify opposition to enactment of this legislation. In contrast, we now are carrying out a carefully planned program to develop vital oil shale resources, which we believe will best serve the public interest.

The Office of Management and Budget has advised that there is no objection to the presentation of this report from the standpoint of the Administration's program.

Sincerely yours,

JOHN H. KYL,
Assistant Secretary of the Interior.

Mrs. MINK. We are pleased to welcome as our first witness Gerald Dinneen, Director of the Laramie Energy Research Center.

I have a bibliography resume of Dr. Dineen which I ask unanimous consent be inserted into the record at this point.

[The document referred to follows:]

BIOGRAPHICAL DATA FOR GERALD U. DINNEEN

Mr. Dinneen is Research Director of the Laramie Energy Research Center of the United States Bureau of Mines where he has worked for the last 28 years. He has been the author or co-author of some 35 articles dealing with the recovery and utilization of shale oil. In 1968 he received the Department of the Interior Distinguished Service Award for his contributions to shale-oil technology.

Dinneen is a native of Denver, Colorado, and received a chemical engineering degree from the University of Denver in 1934. Before coming to Laramie Center, he had about 10 years' experience in various industrial and government laboratories in New Mexico and California. He is active in a number of professional societies such as the American Chemical Society, the American Institute of Chemical Engineers, the Geochemical Society, and the American Association for the Advancement of Science. He has had numerous assignments concerned with supplemental sources of energy. For example, he has participated in a conference sponsored by the United Nations in the Estonian S.S.R., been on loan to AID for an assignment in Jordan, presented an invited lecture at a symposium sponsored by the Brazilian Academy of Science, and been chairman of symposia for various scientific organizations, such as the American Chemical Society, the Geochemical Society, and the World Petroleum Congress.

Mrs. MINK. We welcome you to the hearing this morning. You may proceed in any way you wish. We have your prepared statement. You may proceed.

STATEMENT OF GERALD U. DINNEEN, RESEARCH DIRECTOR, LARAMIE ENERGY RESEARCH CENTER, BUREAU OF MINES, DEPARTMENT OF THE INTERIOR

Mr. DINNEEN. Madam Chairwoman and members of the committee, the retorting required to convert the solid organic matter in oil shale to oil may be accomplished either in aboveground equipment after mining the shale or underground using naturally occurring or artificially created permeability for passage of gases and liquids. In situ retorting has been receiving increased attention in recent years because it may have a number of advantages: It may be more economical than mining and aboveground retorting; it may be applicable to deposits of various thicknesses, grades, and amounts of overburden that are not readily amenable to mining; and it eliminates the necessity of disposing of large quantities of spent shale.

However, it may introduce other environmental problems such as the possibility that ground water may leach out soluble retorting products left underground. In spite of potential advantages in this approach and recent interest in it, only a relatively small amount of research has been done on in situ processing so technology is generally in the early stages of development.

In situ retorting may be accomplished by passing gases and liquids either horizontally or vertically through fractured shale. The horizontal approach is the one we at the Laramie Center are investigating in the laboratory and at a field site near Rock Springs, Wyo.

The concept we are developing consists of drilling a pattern of wells into the oil-shale formation, creating permeability among the wells if naturally occurring permeability is low, igniting the shale in one or more of the wells, pumping compressed air down the ignition well to support combustion of some part of the oil shale, forcing the hot combustion gases through the oil shale to convert the solid organic matter in it to oil, and recovering the gases and oil generated from other wells in the pattern.

Applications of this general concept have been attempted at various times during the last 20 years by a number of companies, including Sinclair Oil & Gas Co., Equity Oil Co., and Shell Oil Co. However, so far as we know our Rock Springs experiment is the only presently active field project.

At the Rock Springs site, an oil-shale interval that is 20 to 40 feet thick and yields 20 to 25 gallons of oil per ton is relatively shallow—50 to 400 feet deep. In the last several years we have conducted a series of 10 experiments at this site primarily to investigate various fracturing techniques, but in two cases we also attempted retorting.

In the more successful of these retorting experiments we used hydraulic fracturing followed by detonation of liquid nitroglycerin in the fracture system to achieve permeability in the oil shale. The shale in the central well of a small pattern was then ignited and combustion continued for about 6 weeks until the reaction zone exceeded the planned size. During this experiment, about 190 barrels of shale oil were recovered.

The 11th experiment in the series at Rock Springs is presently in progress. In addition to fracturing and retorting research, this experiment will endeavor to evaluate effects on ground water at the site.

The Laramie Center is also conducting research to develop the vertical retorting system using pilot-scale aboveground vessels to simulate some of the conditions that may be encountered underground. For the simulation studies, two vessels, one with a capacity of 10 tons and the other with a capacity of 150 tons, are used to evaluate the effects of such variables as the rate of combustion front travel, gasflows through broken shale, grade of shale, particle size distribution, and composition of retorting gases.

Charges to these retorts have usually ranged in size from sand-like particles to pieces weighing a ton or so, but in some experiments a piece weighing up to five tons has been included in the charge.

For an experiment, the retort is filled and retorting is started by igniting the shale at the top with a natural gas burner. After the burner is turned off, combustion is maintained by injecting air and recycle gas, if used, into the top of the retort. The combustion zone travels down through the bed, retorting the oil shale ahead of it.

A tank mounted on load cells is used to collect the liquid products so that a continuous record of retort output can be maintained. Gaseous products from the retort, which contain some oil and water, are passed through packed towers to remove most of the entrained materials.

After passing through a blower, some of the gas stream may be recycled back into the retort while the remainder vents through a stack equipped with a natural gas burner to oxidize combustible components. In a number of experiments run in this manner to study retorting gas velocities and composition, yields up to 65 percent of Fischer assay have been obtained which is thought to be promising considering the wide range in size of material being retorted and heat losses inherent in the equipment used.

Application of the vertical retorting system in the field requires a method for obtaining a cavity filled with broken shale. Two methods are considered most promising: (1) Mine sufficient shale from the lower part of a room to provide the desired porosity when the shale above the mined portion is fractured by explosives and collapsed into it and (2) use a nuclear explosive to create an underground cavity into which the roof collapses.

Garrett Research & Development Co. is conducting a pilot-scale test of a patented version of the partial mining method on the southwestern edge of the Piceance Creek Basin where 25-gallon-per-ton shale is probably about 75 feet thick. They have driven an adit from the outcrop and are preparing a number of test rooms from it to investigate various retorting variables.

Each of the rooms will presumably contain several thousand tons of broken shale. The first test room was retorting during the summer of 1973 with apparently very satisfactory results. Commercial scale application of this technique will require rooms several times the size of the present test rooms and will present some problems not yet encountered.

The partial mining approach will have some environmental effects similar to those of mining and aboveground retorting. If the development work is done in barren or very lean shale, it will be discarded as mined. If the development is an average grade shale, it will probably be retorted aboveground before disposal. In either case the quantity requiring disposal will be less than for a corresponding development entirely aboveground. However, it will still be large for an industry producing significant quantities of shale oil.

The use of nuclear explosive to prepare oil shale for retorting has been discussed since the late 1950's. In two instances, projects Bronco and Utah, detailed plans for a field test of the concept were developed. However, neither of these projects was implemented. Last year an updated proposal was issued by Lawrence Livermore Laboratory, but at present no field test is scheduled. Although the retorting aspects of the partial mining and nuclear fracturing techniques are similar, the nuclear approach does not involve the disposal of solid material aboveground.

In summary, pilot-scale development of in situ retorting is presently being conducted mainly by the Bureau of Mines and Garrett Research & Development Co. The Garrett work is on a larger scale than the Bureau's and should be directly expandable to a commercial-scale demonstration. Although detailed plans for a nuclear fracturing experiment in oil shale have been developed, no field experiment is presently scheduled.

It is a pleasure to discuss the in situ approach for recovering oil for oil shale. I think you have probably heard more about the aboveground processing approach to the problem. However, in situ does offer some potential advantages.

It might be more economical. It might be applicable to veins of the deposit which would not be readily minable, and it does avoid—and this has often been stressed—the disposal of the large amounts of spent shale that would be involved in the surface processing.

However, it may introduce some environmental problems of its own because you do have the spent shale underground and it may be something that is leachable by ground water. There may be some subsidence problems.

At the moment, we don't have enough background on the technique, since it is still new, to be able to predict these things accurately. We think after additional research has been done, we will be able to predict them.

In attempting to apply the in situ technique, you could do it in two ways. You can either pass the retorting gases vertically through the oil shale formation or horizontally.

The vertical approach normally takes a rather thick interval of oil shale. Hence, if you have only thin intervals, the horizontal sweep would be preferable. This is somewhat comparable to a petroleum fire-flooding technique.

The horizontal approach is the one that we at the Laramie Center are studying in a field project near Rock Springs, Wyo. In this case, you drill a pattern of wells into the formation. If there is enough permeability to allow gases and liquids to pass through the formation from the wells where you are introducing the gases to the ones where you want to get the oil out, then you can proceed immediately. If there is not—and generally there is not enough permeability—you have to create it somehow.

This is one of the subjects to which we have been devoting a considerable amount of research. After permeability is established, you ignite the shale at one or more of the wells in the pattern, insert air in these wells to support the combustion, force the combustion zone to pass horizontally through the shale—heating it to convert it—and then bring the gases and oils out of the production wells.

This procedure has been studied off and on for some 20-odd years. In the early years, work was done by Sinclair Oil & Gas Co.—this was in 1953. Subsequently, Equity, Shell, and others did work. We have now been at it for about 10 years.

Specifically at Rock Springs, we have worked with an interval of shale that is about 20 feet thick and anywhere from 50 to 400 feet deep. One of the reasons for working at this location is that the shale is rather thin and easy to get to.

It is cheap to work on. It isn't too deep. To date, we have conducted some 10 experiments there, trying various methods of fracturing and finding various ways of getting the underground situation to be what you want it to so that you can recover something rather readily from it.

Presently, we are working on the 11th experiment. In this one we are about 175 feet deep, and we are going to use hydraulic pressure for the first fracturing step. This will be followed by explosives in the fractures to break the shale up further to provide the surface area required to support combustion at the rate necessary to convert the organic matter to oil, and then to recover it.

At the Center, we are also working on the vertical retorting system. We have done quite a lot of laboratory work in this regard and applied the results to what we call a simulated underground situation. For the simulation work, we have two aboveground vessels, one of which holds 10 tons and one that holds 150 tons of broken shale.

They are, for want of a better word, called "retorts." They aren't really. A retort from an engineer's point of view is an engineered system for recovery of a product, shale oil. The TOSCO retort is an example. These are engineered retorting systems for recovering oil aboveground.

In contrast, our retorts simulate the situation you might find underground where you are going to have a vertical sweep. You fill the retort with broken shale, and light it on top. After the combustion zone reaches the proper temperature, you add air and force the combustion zone down through the pile of broken shale.

The hot gas goes ahead of the combustion zone and produces the oil from the solid organic matter. The gases and liquids are taken out of the bottom.

We have been studying such things as how fast you should furnish the gas to the retort, what its oxygen content should be, what particle size is best, the effect of the grade of shales, and other factors that you would encounter underground.

If you were to apply this technique underground, you would need some way to prepare the pile of shale. We take mined shale and put it in an aboveground vessel and say "this simulates the underground situation."

To get the same effect underground, you do in some way have to create the broken shale. One way is that you can mine out a part of the shale—20 percent, say—out of the bottom of the shale interval that you want to retort, then blast the remaining shale down into that void space to fill the entire shale interval with the broken rock.

Garrett Research and Development Co. has been conducting a field test using a patented technique for accomplishing this. The test has been reported as quite successful with yields of up to 70 percent, which, under the circumstances, seems very good.

The other approach would be to use a nuclear device to create the nuclear cavity and allow the rock above the cavity to fall into it, thus providing a roomful of broken rock which would be retorted in the same way as in our simulated situation, or as Garrett did in their mine situation. That is the "nuclear" approach then would involve the broken shale on top, passing the combustion vertically down through it, and recovering the products from the bottom.

The Garrett approach, since it involves mining and collapse of the material above, requires getting rid of the quantity of shale that is mined in order to prepare the rooms.

This is some quantity—20 or more percent—mined in preparing the adits and drifts that have to be put into the mountain in addition to the actual amount taken from the bottom of the room.

The nuclear approach, of course, would not require disposal of any rock aboveground. There are other questions such as the radiation that might result, but there is no need for disposal of any waste rock aboveground.

We are also starting to study the possible effects of any one of these approaches on underground water at our Rock Springs field site by getting background data on the ground water. We will attempt then to determine the effect of four pilot-scale work on the waters.

In summary, I would say that we at the Laramie Center have been working in the situ retorting area rather intensively now for about 10 years, investigating both the horizontal and vertical sweep approaches to in situ recovery of oil shale.

There have been others working on in situ processing off and on over the years, the major industrial effort at the moment being the Garrett Research and Development Co. work in Western Colorado. The use of a nuclear explosive to create permeability has been proposed for some 15 years, but no experiment has actually been attempted. I think none is presently scheduled, although a test is still being proposed.

Thank you for this opportunity to give this resume.

Mrs. MINK. Thank you, very much.

Mr. Camp, do you have any questions?

Mr. CAMP. Dr. Dinneen, we appreciate very much your giving us your time and your expertise and knowledge in this matter. Do you have anything along the lines of how long it might be before it would be possible to develop oil shale for the use of the general public, with the knowledge you have from the Bureau of Mines and also with the knowledge you have from private enterprise?

Mr. DINNEEN. I think we need to distinguish between in situ processing and the mining and surface processing approach. I think you have probably had a lot of testimony about the latter. This morning, I am really talking essentially about the in situ work.

As far as the in situ work is concerned, the vertical-sweep approach used by Garrett Research has been applied in one room. I believe they are in the process of applying it in a second one.

If the second test proves as successful as the first one, they presumably would be ready to start a commercial scale demonstration this summer or fall.

Normally, this type of field demonstration, takes something like a year to a year and a half or 2 years to prepare the retort, to operate it, to analyze the results.

It would seem that this particular process could be ready for commercialization in something like 3 years. After that, of course, you must actually accomplish the commercial application.

If you are aiming at 100,000 barrels a day, then it is necessary to prepare the appropriate amount of shale each day for retorting. This amount of shale is roughly half again the number of barrels—something like 150,000 tons, if you hope to get 100,000 barrels.

Mr. CAMP. We had quite a lot of testimony regarding the different processes. Do you think the in situ method is feasible?

Mr. DINNEEN. It would certainly appear from our work, including that done with our simulated retorts, and from Garrett's work that the vertical sweep is definitely not only possible, but is so near to being proven that surely it will work.

The process for economic application, requires quite a thick shale interval. I am not sure how thick it has to be, but it would appear that several hundred feet would be necessary so that you could afford the amount of mining that is needed and the cost of preparing the room.

The Garrett project being done now in the southwestern part of the Piceance Creek Basin, is in an area where the shale is about 72 to 100 feet thick. If you go to leaner shale, you can probably find 200 to 250 feet thicknesses in that general area.

A commercial scale application would require at least that thick and probably thicker, shale.

Mr. CAMP. Do you see any danger with the process of in situ of fire as the shale is forced from the top into the bottom of the room?

Mr. DINNEEN. There should be none. In order for this process to work, the room has to be reasonably competent. You must be able to get the gases you put in the top out of the bottom. If they are just disappearing into the formation, then the process won't work. You have to be able to get out what you put in. If the room is competent, then the chance that the combustion zone or the fire could get away from you seems very, very remote indeed.

Mr. CAMP. Thank you, very much.

Thank you, madam chairwoman.

Mrs. MINK. Mr. Jones, do you have any questions?

Mr. JONES. Not at this time.

Mrs. MINK. Mr. Skubitz?

Mr. SKUBITZ. Not at this time.

Mrs. MINK. Mr. Seiberling?

Mr. SEIBERLING. I have a few questions. First of all, have you studied the in situ operations that are being done under the auspices of Occidental Petroleum?

Mr. DINNEEN. I have used the word Garrett instead of Occidental.

Mr. SEIBERLING. That is the Occidental application?

Mr. DINNEEN. Yes.

Mr. SEIBERLING. Do you have any indication as to which of the processes for in situ retorting seems to be the most promising?

Mr. DINNEEN. As I indicated, I think the vertical approach is definitely progressing, but it must be used in a thick oil shale interval. We in the Bureau would like to be able to develop a sweep for the horizontal.

This would be particularly applicable in Wyoming and Utah rather than Colorado. Colorado has thick seams of shale and there the vertical configuration should be possible.

The horizontal approach is not far along. We cannot say at this point that it is as well developed as the vertical sweep that Occidental is testing in the field.

Mr. SEIBERLING. Is this where you drill wells?

Mr. DINNEEN. The horizontal approach is where you drill wells. This system is desirable for thin seams, and there are a lot of these. There is no necessity, as is also true with the nuclear process, for disposing of rock aboveground.

Mr. SEIBERLING. You mentioned the problem of ground water possibly leaching out the ground rock after the retorting. I suppose there are areas out there where the ground water is so small in volume that this would not make any difference; is that correct?

Mr. DINNEEN. There are areas of this sort. There also are areas where the ground water apparently is already sufficiently saline so that additional things added by leaching would probably not be too significant.

However, we don't really know that yet. The amount of hydrologic work that has been done out there does not yet allow us to make these kinds of statements positive.

Mr. SEIBERLING. I suppose you have to study the character of the substrata to find out to what extent the water is likely to percolate to the surface, or are we talking about the problem of underground sources of water in the area?

Mr. DINNEEN. You have to study both problems and also to determine what chance water has of getting into the area where you are working. For example, as I mentioned, if you don't have sufficient control in any in situ process to know what you are putting down and what you are getting back—if material is disappearing—then the process probably won't work anyway. Moreover, this same situation would, or at least might, cause specific problems with water coming into the processing zone. If things can get out, then things can get in.

Mr. SEIBERLING. How would you compare the problem of leaching and the contamination of the surface water as between the in situ process and the aboveground retorting where you leave all of the spent shale above the surface and merely try to revegetate?

Mr. DINNEEN. The advantage that the surface approach has is that you can compact the spent shale so that passage of water is very much discouraged.

In the in situ approach, because you must create permeability to allow you to get gases down, for the retorting to take place, and to get liquids out, you inevitably leave a quite permeable situation underground. That is, if ground water can enter the retorted zone, it can disperse through it rather readily.

Aboveground piling of spent shale can be done in such a way that the surface water does not readily permeate through the pile.

Mr. SEIBERLING. Doesn't the question of the degree of compaction you can obtain depend partly on the type of shale that you are retorting?

Mr. DINNEEN. It surely does.

Mr. SEIBERLING. Wouldn't you have to qualify that?

Mr. DINNEEN. Yes, you certainly would. There is more difficulty in compaction with some than with others. However, you should, I am sure, do it with all so you discourage the percolation of surface

waters. You certainly can do this more readily with some types than others.

Mr. SEIBERLING. Can you get adequate compaction with all types?

Mr. DINNEEN. I would have to say you can't guarantee that. With the spent shales that have been the most studied, which are Tosco and various modifications of the gas combustion, I think you can.

There may very well be others that will come along in the future that present other difficulties.

Mr. SEIBERLING. We had some testimony before this subcommittee by an engineer. He said he felt that some of the spent shale which would be in the form of a kind of lava-like clinker, would be very difficult to compact and would be very difficult to revegetate and that in either case whether it is that type or the classical type, he would expect this would be gradually breaking down and eroding for hundreds of years since it has already been fractured and heated and that you would have a water pollution problem for hundreds and possibly thousands of years. What is your reaction to that?

Mr. DINNEEN. That is difficult to answer, since the subject is not in my own field. I can't really say anything very useful. I am afraid; however, it would seem that although there is a possibility of such problems, a reasonably stable situation should be possible once you have disposed of the shale and revegetated it.

As I say, it ought to be a reasonably stable situation. This may not be. If erosion takes place, then you do have problems.

Mr. SEIBERLING. Have you done any evaluation of the placement of your spent shale back in the ground, back in the cavity, after retorting it as to the possible water problems?

Mr. DINNEEN. We have not. The Bureau organization is such that the mining of oil shale is not part of the Laramie Research Center's activities.

We are in the processing end of the business. However, compaction underground would serve two purposes. One would be to provide support so that you won't get subsidence. The second would be to improve impermeability. However, whether the problems of underground compaction can be solved readily, I don't know.

Mr. SEIBERLING. Thank you.

Mrs. MINK. Mr. Martin?

Mr. MARTIN. I have no questions.

Mr. SKUBITZ. Madam Chairman?

Mrs. MINK. Mr. Skubitz.

Mr. SKUBITZ. I am interested in your testimony, but I must confess this is the first time I have ever seen oil shale.

Under the processes we are now using, what recovery of oil do you expect out of each ton?

Mr. DINNEEN. When we talk about the average recovery of oil from a ton of shale, we normally talk in terms of 20 or 25 gallons of oil per ton or roughly two-thirds of a barrel of oil per ton of rock as being in the probable range needed to make processing economical.

If you are talking in terms of 5 or 10 gallons per ton, then it doesn't seem likely that the economics would be favorable. This is an arbitrary judgment.

Mr. SKUBITZ. From a ton of rock, would you recover 50 percent of the oil or 75 percent? I am trying to get at the waste involved.

Mr. DINNEEN. A ton of oil shale as you find it in the ground doesn't contain any oil, or almost no oil. It does contain roughly 15 percent weight of an organic material, which, when you heat it, can be converted to oil.

About two-thirds of the weight percent—about two-thirds of the 15—is converted to oil. About 16 percent is converted to gases and about 25 percent to a carbonaceous material that is left on the shale. Therefore, about 10 percent comes out as oil. So you have about 85 to 90 percent of the rock you originally took out of the ground remaining as spent shale.

Mr. SKUBITZ. In other words, there is not any oil. There is a substance that can be converted to oil; is that correct?

Mr. DINNEEN. Yes. It goes by the technical name of kerogen. It is a substance that is probably more related to coal than oil.

Mr. SKUBITZ. Could the waste material be heated and used for road construction?

Mr. DINNEEN. There have been a number of such possibilities that have been looked at, for example, making cement blocks, and similar things. Spent shale does have some uses in these areas. However, the problem comes in the quantity that you have if you are producing enough oil to be of any significance so that anybody would be interested.

Mr. SKUBITZ. I am thinking about the waste material. We have blacktop roads which is an oil-rock preparation. The waste, which contains a lot of the material that you are converting, why cannot that be ground and used for road construction or is it too expensive?

Mr. DINNEEN. It might be used for this purpose locally, but you certainly cannot afford to haul it very far. You would be hauling too much weight, and you just don't need large quantities in western Colorado.

Mr. SKUBITZ. In my section of the country, we are building electric powerplants right at the coal mine sites. Why cannot this substance be used right under the burner in place of coal? Can it?

Mr. DINNEEN. It can be and is. In the Soviet Union, they have a 1,600 megawatt powerplant at Narva that does, indeed, use oil shale as the fuel.

Mr. SKUBITZ. Is it as expensive as coal to mine?

Mr. DINNEEN. The problem is one you have already raised. It is all of this inert material that you are handling and have in your powerplant and then have to get rid of. Hence, it is normally thought of as being more expensive than oil.

Mr. SKUBITZ. If it burns, is there much waste, ash or things of that sort still left?

Mr. DINNEEN. Yes, 85 percent would be ash. You would have to handle this ash, so you normally think coal is a better fuel for the purpose.

Mr. SKUBITZ. Thank you very much.

Mrs. MINK. I have a few questions.

In the testimony that we have had previously, we were informed there was approximately 1.8 trillion barrels of recoverable shale oil

in the three Western States involved. Could you tell us what percentage of these deposits on the Federal lands in the three States would, in your view, be recoverable by in situ processing?

Mr. DINNEEN. It is very difficult to make an estimate on this sort because we would first have to assume that the various proposals for in situ processing that we now have, and on which we and others are working, will prove to be successful. If they prove successful, then they should be applicable to essentially all of the deposit. Some of the deposit may be more economically processed by mining and surface processing and, therefore, you would do it this way because of the economics.

However, as far as technology is concerned, if both techniques will work, then presumably you could apply them to all the deposits.

Mrs. MINK. Your reference to the 150-foot thickness necessary to have a workable seam makes reference to the vertical sweep?

Mr. DINNEEN. Yes, this makes reference to the vertical sweep where, in order to prepare the amount of rock needed for the operation, you would need a thick seam.

Mrs. MINK. Based upon your current knowledge and the years that you have put into this experimentation and research, what would you best estimate be insofar as the cost per ton of oil developed through the in situ process?

Mr. DINNEEN. There have been quite a number of estimates made of this. The lowest one usually is the one which utilizes nuclear fracturing. This is because you fracture such a tremendous lot of rock with each nuclear device.

The other techniques, the horizontal sweep one that we are working on is very much dependent on how many wells you have to drill and how close together you must put your well. In our development work, you have to put them quite close together. If you had to use that very close spacing, it would be quite expensive.

We would presume that the technology would allow you to space your wells much more widely, the cost down. This does not specifically say what the price per barrel would be, but the estimates that have been made range all the way from \$2 or \$3 a barrel for the nuclear up to perhaps \$8 or \$10 for more expensive in situ processes. However, these are all dependent on the assumptions you make for technology that is not yet in existence.

Mrs. MINK. With respect to this 11th experiment which you indicate will evaluate the effects of ground water, have any reports been prepared or are any expected in the future?

Mr. DINNEEN. We have just started this experiment. Thus far we have gotten only as far as the hydraulic fracturing part. As far as the water investigation is concerned, we have drilled wells for water sampling in order to get baseline data as to what the starting situation is.

The remaining part of the fracturing experiment is expected during the late spring or early summer. The recovery part of the experiment would start in late summer. It is expected to take about a year, so reports will not be expected for a year and a half.

Mrs. MINK. Is there a particular problem with subsidence in the in situ process?

Mr. DINNEEN. You would think that if the process is properly done, there would probably not be very much of a problem of subsidence because of the 85 percent or more of the rock which will be left underground. This means that the volume of rock is not greatly different from what it was originally. This is not the case with coal, for example, where you remove essentially all of the material. You are not left with a very large void space with nothing in it. You are left with a void space full of fractured rock, which should come fairly close to supporting the surface as it originally was so that subsidence should not be great.

Mrs. MINK. Is there greater or lesser hazard with respect to carcinogenic effects to our environment where we follow the in situ process in which the spent material is left underground or where we do the normal above-the-ground retorting and deposit the spent shale on the surface?

Mr. DINNEEN. I am certainly not an expert in this area. I see no reason why there should be any particular difference. You have essentially the same spent material and you should, in both cases, handle it in such a way that it doesn't get away from you.

Mrs. MINK. Is this particular aspect of the environmental consequences part of your research and study at the Laramie site?

Mr. DINNEEN. No, it is not.

Mrs. MINK. Is there anyone studying this particular aspect of the oil shale problem?

Mr. DINNEEN. The NSF and Drs. Prien and Schmidt-Collerus are studying certain aspects of this. They are studying largely the concentration in plants, which might be a factor.

Mrs. MINK. In any of your research efforts, have you undertaken the processing of the three minerals, nacholite, dawsonite, and the shale?

Mr. DINNEEN. Not as a process operation. We were the ones who originally reported the presence of dawsonite. The Bureau of Mines is looking into this at our College Park Research Center, which is a research center rather than an energy center, since our expertise is not in minerals extraction. Superior Oil Co. has a proposal for a three-product industry. We have looked into it from the standpoint of its presence and what you might do with it. We have not attempted to develop a three-product process.

Mrs. MINK. As an expert in this field, would you consider that this is feasible and economically possible?

Mr. DINNEEN. The nacholite is in itself a reasonably readily recoverable material. The dawsonite is present in small quantities. It would be a different approach to the problem of getting aluminum than our present way of going at it. Whether this would be economically achievable or not in view of the necessity for leaching a low concentration material from the rock is, as I say, out of my field.

I really don't know. We presume that if Superior Oil Co. says that they are going to do it they must think it has possibilities.

Mrs. MINK. My question was in reference to the extraction of these three minerals through an in situ process.

Mr. DINNEEN. The extraction of the minerals after in situ processing will be more difficult than the approach that Superior is taking where they will do it aboveground and have better control. This is the basic problem of all in situ processes, whether it be for oil or the minerals: Control of an underground process where you do not have the material and the process available to your hands. You have to do it through remote control. This would be so for the minerals as well as for the oil. It will be more difficult.

Mrs. MINK. In the six sites that the Department issued for the prototype, are any of these six sites not feasible for in situ technology?

Mr. DINNEEN. I think any of them would be feasible for in situ processing.

Mrs. MINK. Have you had an opportunity to evaluate the proposal which, I believe, has been submitted or at least discussed by the AEC for an accelerated \$1 billion oil shale process developed under their own auspices?

Mr. DINNEEN. No.

Mrs. MINK. Are you saying that project has not come to your attention or that you have not had an opportunity to evaluate it?

Mr. DINNEEN. I am not exactly sure which one we are talking about.

Mrs. MINK. Are there several?

Mr. DINNEEN. I don't know. There is a proposal in Dr. Ray's submittal to the President of October 1 for an accelerated in situ recovery of oil shale. This was for \$128 million for a 5-year period with \$9.3 million for 1975. I guess this is a different one than the one to which you are referring.

Mrs. MINK. What is the annual cost of your operation at Laramie?

Mr. DINNEEN. Our oil shale appropriation this year—not to us, but in the appropriation—was \$2.5 million.

Mrs. MINK. That is just for the Laramie operation?

Mr. DINNEEN. Yes, largely. We get essentially all of the oil-shale money which is in the appropriation because we are the only Center in the Bureau of Mines that is doing any oil shale work.

Mrs. MINK. This is the only operation under the Department of Interior, did you say?

Mr. DINNEEN. The appropriation mentioned for the Bureau of Mines is for oil shale processing. There are a lot of other things. There also is some mining work, there is the Bureau of Land Management work and the U.S. Geological Survey work. However, the appropriation for the processing of oil shale under the energy line of the Bureau of Mines' nearly all comes to the Laramie Center.

Mrs. MINK. How much is being spent by the Department of Interior on oil shale mining in general, not just the processing part?

Mr. DINNEEN. I cannot answer that. I am sorry.

Mrs. MINK. Are there any other questions by my colleagues?

Thank you very much. We certainly appreciate your testimony. You have provided the subcommittee with an enormous amount of information and very valuable testimony. We thank you very much for your presence.

Mr. DINNEEN. Thank you. It was a pleasure to be here this morning.

Mrs. MINK. Our next witness is Dr. Peach. I will yield to my colleague from Oklahoma for the introduction.

Before we begin Dr. Peach, I must excuse myself from the room for a few minutes. I would ask my colleague, Mr. Seiberling, to preside in my absence.

Mr. CAMP. Dr. Peach, we are happy to have you here this morning to bring us your expertise on this legislation.

Dr. Peach has been associated with the Oklahoma University for some 25 years, although the university is not mine or Mr. Jones' district. This man is well known.

Doctor, we are very happy to have you with us this morning.

STATEMENT OF W. N. PEACH

Mr. PEACH. Thank you, Congressman Camp.

I am happy to be here in general support of H.R. 12014. My reason for supporting it is that there are various estimates of how much oil there is in the shale lands of Colorado, Wyoming, and Utah. Everybody is agreed that it is somewhere in the neighborhood of $1\frac{1}{2}$ to 3 trillion barrels with current technology.

We have been experimenting in the oil shale area for 50 or 60 years sporadically. It goes in waves. I think with the current and prospective shortages relative to demand that the Federal Government could well take the initiative.

As you heard Dr. Dinneen testify, a lot of experimental work has to be done before it can be established. I think the Federal Government might well take the initiative in this. I don't have any doubt about them being able to get the oil out in a few years. However, the big problem, it seems to me, is protecting the environment. I think if the Federal Government undertook the initial work from now on, that they could set up sensible environmental standards. Then, when the experimental work is done, we would know what needs to be done to protect the environment and we would know what it would cost.

Then the private companies could come in if they want to and produce the oil shale.

This is our biggest known source of oil and gas in the United States. My own feeling is that we have to find an alternative to Middle East and North African oil. We cannot go on spending \$20 billion or \$30 billion a year for very many years buying oil from that area. I think it was a big mistake to ever become dependent on it. I think we can now take steps to make sure that we would never have this happen again.

I would say for at least the next 5 to 10 years that the Federal Government ought to go in on a massive scale.

I think of the programs associated with getting our men on the Moon. We put them on starting almost from scratch with all the technological problems. We did that in less than 10 years. I think we can do the same thing with our energy. I think we ought to start as soon as we can.

That is my statement, sir. It is not that I would have the oil industry nationalized, but that the Federal Government have some input into it!

Mr. SEIBERLING [presiding]. You have a prepared statement. Do you wish to offer that into the record without reading it?

Mr. PEACH. Yes, sir.

Mr. SEIBERLING. Without objection, it will be placed in the record along with your biography.

[The statement and biography follow:]

Dr. W. N. Peach has been a Professor of Economics at the University of Oklahoma for the past twenty-five years.

He has been a Consultant to the House Small Business Committee. During 1961-1962, Dr. Peach was an economic advisor in the Public Administration Division of the Department of State. He was a visiting professor at the University of Karachi, Pakistan in 1956-1958 through a program administered by the University of Pennsylvania Wharton School of Finance. During 1960, he was an economic advisor for the Department of State in Sierra Leone, Ethiopia and Yemen. He also worked as a Consultant in higher education for USAID in Brazil, during 1964.

STATEMENT OF W. N. PEACH

My name is W. N. Peach. I have been a professor of economics for the past twenty-five years at the University of Oklahoma. Prior to that I was on the faculty at Syracuse University and the University of Texas at Austin.

I am happy to appear here in support of H.R. 12014, The Oil Shale and Mining and Energy Corporation Act of 1974.

In my opinion the time is now ripe for the public sector to become actively involved in the energy business. This is not a new or revolutionary idea either in the United States or in other countries. The federal government has, I think, an obligation to the public to take steps to make sure that an energy shortage of the magnitude we now have never happens again. Fortunately the United States has the energy resources it needs in abundance. I think that in addition to oil shale the federal government should also participate to whatever degree seems desirable to develop other sources of energy including coal gasification and liquefaction, solar energy, helium, plasma, and tidal energy. I think, also, that the federal government can have a desirable influence in such areas as the conservation of energy.

It is not true as a lot of current propaganda would have us believe that little or nothing can be done to relieve the tight energy situation before the year 2000. Repetition of this type of propaganda a million times does not add anything to its credibility.

The federal government is already heavily involved in the energy business in such areas as price control, regulation, allocation, and leasing of public lands. The federal government plays a big role in research and development in areas such as oil shale, geothermal, solar energy, gasification and liquefaction of coal, and nuclear power. It has, since 1935, played an important role in producing and distributing electricity through the TVA. Far from having the dire consequences predicted for the electrical industry, it has had exactly the opposite effect. The federal government is also a big consumer of energy both in peace and in war. State and local governments also are big consumers of energy.

The greater role for the central government is part of a worldwide trend, not just in communist and socialist countries, but in many others. Canada, for example, plays an important role by participating with private firms, and has within the past few months established its own energy corporation. Countries such as England, France, and Italy have long played a much more important role than the United States government. For those who shudder at the thought of having the public sector being more involved in the energy business, I would like to point out that, regardless of what we wish or think, the federal government is going to play a more important role in the future than it has in past.

As we move into the production of oil from shale lands in Colorado, Utah, and Wyoming, it is significant that the federal government participate in this so that it can establish safeguards to protect the environment. There is no need to have massive degradation of the landscape such as we have had in the mining of other minerals. The federal government appropriately can set up standards which might then be followed by private industry.

Everyone agrees that there are trillions of barrels of oil in the Green River area. Everyone also knows that the technology is now available for getting a

lot of this oil out of the ground. The technology can surely be expected to improve over the next decade or two. Estimates of a maximum production of a million barrels a day by 1985 may well prove to be far too conservative. The real point is that sound steps must be taken to protect the environment. That will be expensive regardless of whether private companies do it or a government corporation. The costs of environmental protection are properly a part of the total cost of producing the oil, and should be included in its price.

This amounts to saying that in the final analysis the consumer will pay the cost of environmental protection, whether it is accomplished by private companies or a government corporation. The costs are there and cannot be avoided. The real costs are the same, whether privately or publicly incurred. The difference is that the federal government has made a massive commitment to protect the environment, whereas it will be to the interest of any private firm to spend as little on protecting the environment as possible.

Whatever the investment in production facilities and in measures to protect the environment, the government corporation, just as the private firm, will recoup its investment from the sale of the final product. H.R. 12014 includes appropriate environmental guidelines.

Once the government corporation has established sensible and firm guidelines, it may well be that the federal government will decide to permit private firms to participate in the production of shale oil. The significant point is that the federal government will know what to do to protect the environment and how much it costs. So will private firms. The experimental work will have been done and many of the risks eliminated.

The consumer at the filling station will be able to get his gas and have the satisfaction of knowing that he is not joyriding at the expense of the environment.

Mr. SEIBERLING. Mr. Camp, do you have any questions?

Mr. CAMP. Yes, I do.

To your knowledge, both in foreign countries as well as in this country, have you found any other instances besides the space program where the Federal Government has been helpful in starting new developments of resources, as I said, besides what we mentioned a minute ago?

Mr. PEACH. Aside from NASA?

Mr. CAMP. Yes, sir.

Mr. PEACH. I think the Federal Government has in the past had a lot to do with developing resources. I think Dr. Dinneen's outfit has that primarily as their function. I think that is true about TVA. What it did was demonstrate that this could be done. The result was we got lower electric rates all over the country and it did not hurt the electric industry.

Mr. CAMP. Do you think after a certain period of years after this commission would be created, then it should go back to private enterprise?

Mr. PEACH. Mostly, I think. I think the energy industry accounts for about, it varies, but 10 or 11 percent would be a good figure of our gross national product. That is something in the neighborhood of \$150 billion a year. I think the Federal Government is necessarily involved in an industry of that size which is going to get bigger.

We now have shortages. I think if the Federal Government became involved to, say, 15 percent and the rest of it was private enterprise that it might be better for everybody, including the private companies.

Mr. CAMP. Thank you.

Mr. SEIBERLING. Thank you.

Madam Chairman, I would like to ask Dr. Peach a question.

I take it you do feel there is room for both Federal and private activity in the oil shale field?

Mr. PEACH. Yes.

Mr. SEIBERLING. What you are suggesting is with respect to at least Federal lands that the Federal Government set up its own means of developing that oil shale resource. It might not necessarily be exclusive but that the Government have a strong role; is that correct?

Mr. PEACH. Yes, 80 percent of the oil shale land is owned by the Federal Government.

Mr. SEIBERLING. To what extent do you also feel that this would provide the Federal Government with an appropriate measure as to the price and profit that should be added on to the end product, in other words, the oil coming from the shale so that the consumers are getting the maximum energy for their dollar?

Mr. PEACH. In a rough, general way I think it would. However, you know they had hopes that the TVA would serve as a yardstick on the efficiency of private electrical companies. Then they got the TVA into navigation and experimental work. Then it was a multi-purpose organization and it could not be used as a yardstick.

Mr. SEIBERLING. To what extent do you feel a private corporation should get into these other social areas including planning for the urban areas that will be needed to support these operations and that sort of thing? Is that one of the advantages of having a Federal corporation, that it can also deal with some of these other problems in an integrated way instead of leaving it to a sort of unplanned process?

Mr. PEACH. That is right in the beginning. I think the costs are there. They will have to be paid for by the ultimate consumer. The main point in having the Government do it is that the Government has already made a massive commitment to protect the environment. Whereas, if I own a private company, it is clearly to my advantage to spend as little as possible protecting the environment. I get off with the question of: What has posterity done for me? This is not the Federal Government's attitude.

Somebody has to bear those costs. The Federal Government can determine reasonable guidelines and then find out how much it costs to install them. Then private industry can know what the environmental costs are and can get in.

Mr. SEIBERLING. Should we write into any legislation setting up such a corporation a requirement that in addition to its mission of extracting oil at a reasonable cost that it should also have a mission of environmental protection, of land use planning, to make sure that the social conditions in the area are sound and that sort of thing?

Mr. PEACH. I think that would be highly desirable. There are already some provisions in the H.R. 12014 to protect the environment, but not the other things.

Mr. SEIBERLING. There has been some criticism of TVA that it viewed its primary mission as being the generation of power, and therefore, it neglected its other missions. How do we guard against that?

Mr. PEACH. You have to be continuously on guard. I think TVA has been America's most successful example of regional planning. I think the criticism has virtually disappeared in the last 8 or 9 years.

Mr. SEIBERLING. Yes, except it has made no requirement in its contracts with the strip miners that they restore the land which they have stripped. As a result, hundreds of thousands of acres of Kentucky land and land in other States have been devastated. Yet, TVA in its conservation mission could have made sure that this was not done. However, it viewed its primary mission as getting cheap power.

Mr. PEACH. Yes. I do not think there is any need to devastate the Green River area if you are going to get shale.

I think only the Federal Government is capable of doing that at the present time because it is fairly expensive. However, I think they can establish guidelines which everybody would then expect to follow. Then the cost of the environmental protection would be included in the sale price of the oil that we get or the other minerals.

Mr. SEIBERLING. Thank you very much. I have no further questions.

Mrs. MINK. Mr. Skubitz?

Mr. SKUBITZ. My line of thinking is right along that line. I certainly have no desire to see the nationalization of this industry take place. By the same token, I do feel that if we appropriate billions and billions of dollars, that this country should never again be dependent upon oil from Southeast Asia or anywhere else, nor should it be controlled by several giant corporations in this country.

Mr. PEACH. My own feeling is that we can become self-sufficient, but not in an isolationist sense. Then we may be able to buy Indonesian oil or Southeast Asian oil. However, we do not want to become solely dependent on that. We say we are now, but I don't believe it.

Mr. SKUBITZ. I have my doubts, too, and I so express them. I cannot feel we ought to let this industry get into the hands of a few giant corporations that would control the production or price. That is why the Federal Government must get into the picture.

Mr. PEACH. Yes, sir; for a while.

Mrs. MINK. Mr. Jones?

Mr. JONES. Thank you, Madam Chairman.

Dr. Peach, I also want to welcome you. I began my introduction to economics with one of your texts several years ago.

I have some general questions. First of all, I want to get straight exactly what your thoughts are on the Federal Government being involved in the experimental stage of shale development. Are you saying all of the experiments should be conducted under the Federal Government?

Mr. PEACH. You have the geothermal labs which are mainly in the Southwest. The Federal Government is already involved in paying a good portion of the R. & D. work.

Mr. JONES. How do you protect the Government's interest if you then turn it over to private industry after the Government has done all the experimental work?

Mr. PEACH. I think the Federal Government could retain a small 10 to 15 percent interest and therefore could recover its investment.

Mr. JONES. I was interested in your comment that you don't believe we are totally dependent on foreign sources. Could you amplify that?

Mr. PEACH. I think we ought to open up our offshore lands for development because the oil companies have made a lot of progress in preventing oil spills.

Mr. JONES. What I was getting at is whose credibility is at stake here? Who do you not believe?

Mr. PEACH. We are being flooded with propaganda to the effect that nothing can really be done to ease this shortage before the year 2000. At least up until then—I have seen some estimates go to 2020—that it would take that long to develop alternative sources of energy.

I think that is bunk. I think we can use solar energy which we already know about, not the satellite systems that gather it up in the air and glean it down through lasers, but just simple things.

A fellow in Denver recently did this: He heated his home with beer glasses and aluminum to collect the heat.

We have 2.5 billion tons of garbage each year which, if we were to grind that up, could provide us with half our electricity.

Mr. JONES. Turning to the question of price, there is a great deal of criticism about the fact that the oil industry is not getting the price it wants and if it gets the price it wants, there will be plenty of energy.

How do you tie in price with the energy shortage? Would you philosophize on that?

Mr. PEACH. Prices are already two to three to four times as high as they were 3 or 4 years ago. We are still short in the sense of meeting our expected increases in the main. If the price of energy in most forms has to go up, if you are going to use it, we will have to pay that price.

Mr. JONES. Is it necessary to get capital investment to generate the money? Is an increase in price that bad a thing?

Mr. PEACH. No, I don't think so.

Mr. JONES. Is it inevitable?

Mr. PEACH. No, I don't think so. I think we may have a glut of energy within the next 5 years. If the Federal Government gets into some of these areas and begins to develop them, we may be able to get cheap Middle East oil or cheap Venezuelan oil.

Mr. JONES. My last question is specifically, in what areas and to what degree do you think the Federal Government should get into sources of energy other than the oil shale?

Mr. PEACH. I think it ought to get into most of the promising sources of energy now and on a big scale. There is a lot of skepticism on whether all these nuclear plants are safe.

The penalty for them not being safe may be that you cannot use that area for 25,000 years or something like that. I think the Federal Government ought to get into the geothermal energy industry to a modest extent.

I think it ought to get into the business of providing some more pipelines within Prudhoe Bay and Cook Inlet to the west coast where the market is short.

I think the benefit for that will be to everybody in the United States. Therefore, whatever it costs, I would be in favor of developing it. Then I would have a planned program for developing the most promising sources of energy, such as solar energy and plasma and helium and things like that.

Some of those sources of energy have proven to be very successful for certain uses. Then providing the electricity to light up New York, you need a massive approach. That is in the realm of the exotic sources of energy, but not the heating and cooling of houses and school buildings.

About 75 percent of it, they estimate, can be done with the solar energy they can collect by putting things to catch the sunlight on the roof. Therefore, I think the Federal Government ought to take some pretty bold steps that all of these areas, including conservation, which is still one, and the development of mass transit and bus systems and things like that.

That can be done. I think it would be cheaper for the United States in the long run.

Mr. JONES. Thank you.

Mrs. MINK. Mr. Udall?

Mr. UDALL. I came in late. I read the testimony and found it interesting. I have no questions.

Mrs. MINK. Thank you, very much. I am sure you are aware of the statement the committee received from the Department of the Interior signed by Mr. Kyl, the Assistant Secretary for Congressional and Legislative Affairs, in which he responds to our request.

He notes that the first reason the Department opposes the enactment of this legislation is that the case has not been made that a corporation is needed. Can you respond specifically to that?

Mr. PEACH. The oil shale, we know, is there. We don't know how much is there exactly, but we have a pretty good idea. We know it is enormous. We have been experimenting on a sporadic basis for 50 or 60 years.

We know they are using it in Russia and Mainland China. We could borrow technology they have developed and say these six areas that the Department of the Interior has leased to the private companies are going to be for the establishment of prototype programs. The Federal Government could get in.

I am sure we will learn a lot in the next decade. The technology will be improved. It means a whole lot of difference from having a plant that will produce 5 barrels a day or 100 barrels a day and one that will produce 100,000.

If we get into that, that is a very expensive thing. It costs about \$400 million to build one of those plants.

If the Federal Government goes into it and finds out that this technique proves not to be so good and has to abandon it, all right. We are a trillion-billion dollar economy. We can stand a mistake of \$500 million and we would have learned something from it.

I think private companies are reluctant—understandably so—to invest several billion dollars in oil shale when the techniques have not yet been proven. I think we ought not wait another decade.

That, I think, is a counsel of despair. There is something that can be done and I think we ought to get on with it. That is the main criticism I have of our whole energy policy, that we are not doing enough.

Tokenism is not enough in 1974. We ought to get in. I am sure some of the processes will turn out to be much more successful than had been anticipated.

Mr. SKUBITZ. Will you yield?

Mrs. MINK. I will yield.

Mr. SKUBITZ. What you are saying is that it is just a hope to suggest that the private companies will pour a lot of money into it. At present they can push a broomstick into the soil in Southeast Asia and hit oil. In other words they are taking leases but it is too expensive to develop, and therefore, we have to come into the picture?

Mr. PEACH. I think so.

Mr. SKUBITZ. If we do, there ought to be some protection for the American people; isn't that correct?

Mr. PEACH. Yes, sir.

Mrs. MINK. The other point that not only Mr. Kyl made in his letter, but also Mr. Morton made in his testimony, was that all this would do would be to enlarge the Federal bureaucracy without meeting any specific need.

Could you comment on that? In your response to this, I would like you to note your experience or your analysis or appraisal of the experience of the TVA and how this might tie in to an evaluation of such a structure and how effective it would be.

Mr. PEACH. There is no doubt that there would be an increase in the number of Government employees. If the Government is going to get into the oil shale business, it necessarily means that. I don't know anything that anybody can do about that.

However, I think something needs to be done. It is not that a Government corporation is more efficient than a private corporation or equally efficient or less efficient.

It is that the Government has the financial resources now to get into and do these things without waiting for 10 or 20 years. This is the main thing, I think. Also, that the Federal Government can set up the appropriate guidelines for protecting the environment. That means the land, the air, and the water. That is what I think.

Mr. SKUBITZ. What you are also saying is that not only do we have the wherewithal to do this sort of thing, but that the National Government or the Government itself must look to the future for the general welfare of its people, whereas a corporation is interested in the black and red columns.

Mr. PEACH. That is correct. I think the Federal Government can do that and must do it now. I do not think the American people are going to wait until the year 2000 or 2020 for this to develop on its own.

In the morning papers we are talking about \$100 billion worth of subsidies to guarantee prices like we did on wheat and corn in the

depression. That is one approach to it. However, this approach gets in there and gets the job done and then the American people pay for it.

The costs are the same whether they are done by a private or public company. The ultimate consumer is going to pay for it. Therefore, the experimental work has to be carried on by somebody.

I think the Government can do it much faster than private industry. Then you can let private industry get in as much as you want.

Mrs. MINK. On that short term, how urgent is it that we develop these oil shale processes to meet our energy needs?

Mr. PEACH. I think the oil shortage is going to become much more acute in the next few years than it has in the past. I think it is very urgent that the Federal Government do something about it now. I think the American people are going to demand the Federal Government do something about it fairly soon. We can certainly get by if we never get another barrel of oil from the Middle East or North Africa. We will still have four or five times as much per person as Western Europe, which has the next highest level.

The rest of the world sort of smiles when we talk of our energy shortage. Here we are 6 percent of the world's population consuming 30 percent of the world's energy. No other people anywhere do that. Therefore, we are not energy bankrupt and we are not going to be.

Mrs. MINK. In terms of cost and in terms of where we are at in the development of alternate sources of energy, which would you say would be the area in which we would have the highest yield and the most likely immediate development of an alternate source?

We hear so much about solar and other types of energy sources.

Mr. PEACH. Solar energy is not only for developing the NASA satellites, which may take several decades to develop. Although, one often speculates about what those three men did up there for 83 days. All that was reported was that they were doing scientific work.

In addition to the scientific work on the Russian armaments, one wonders if they were not looking into that plasma. As high up as they were, they were into the world of plasma. That is an unlimited source so, too, is the solar.

We have in sight enough energy to last as long as man lasts on this earth, if we don't blow us all up with H-bombs. I don't care what any reasonable rate of increase is. We have plenty of energy in sight.

You asked specifically what can we do tomorrow if you were dictator here. I would say, first of all, open up the offshore lands. This is to increase the supply. We could also talk about conservation.

The coal gasification and liquefaction ought to be pushed ahead as fast as the Government can do it right now. That would provide us with plenty of energy to meet our demands well into the 21st century.

Then we could open up our geothermal lands for development. There the Federal Government is putting in something and I think they should put in more to get that developed.

Atomic energy scientists out in Los Alamos, N. Mex., have developed another process which holds tremendous promise. They dug two holes into the ground. Into this hole, they pour cold water. Then it gets down into the earth and gets heated up and is brought up as steam or hot water.

It is used to turn the turbines. Then when it cools off, it is poured down into the hole again. That could be used not only in the Western part of the United States but it could be used almost everywhere.

We have the energy resources right now to solve this problem as fast as we can build the machines to do it. The technology for coal gasification and liquefaction is known all over the world and in the United States. Of course, it will improve the technology.

We almost always improve the technology as we get into mass production. The Germans have been using this for years. They fought World War II largely on that. The Russians have that and the English have a system. They have offered to loan it to us.

The Japanese know how to do it. Then French and Italians know how to do it. I do not know what we are waiting for. We have the coal resources to last thousands of years by anybody's guess.

We never know those things. You bore a hole in the ground and say "All right, the seam is so thick." That may be true. It may be 7 or 14 feet or whatnot.

However, nobody knows until you drill it. If you go down twice as deep, you may find seams which are 30 feet thick. The first oil well that was drilled in 1859 was 50 feet deep so all the oil that was 100 feet or more deep in the ground was not a resource in 1859 because we did not know how to get it.

We didn't even know it was there. We now drill holes 30,000 feet in the ground. Who knows but that in 1984 we will not be drilling them 60,000 feet? While it may cost more, then you might find twice as much oil per well.

I do not think we are short of the basic resources, but we are short of getting in and getting the job done in the next few years. If the United States developed some of its energy resources, then you would have a choice of whether you want to buy it from the East China Sea or the Middle East, and that has a wonderful effect on prices.

Mrs. MINK. I feel the country needs to spend an enormous amount of money in researching this whole energy area. I was concerned when I read about the Department's decision to issue these prototype visas to private enterprise without strict specifications as to the kind of technology they wished to have demonstrated at each of the sites.

All the analysis pointed to a development kind of approach. It alarmed me because it seemed to me that we were proceeding without a comprehensive plan as to how we were going to meet our long range requirements.

Mr. PEACH. That is right.

Mrs. MINK. One of the reasons I introduced my bill, recognizing the cost of establishing a public corporation, was because I felt here was a source that so little was known about that surely the Government's concern in it would yield the best results, and that the Government would be probably more concerned with the kinds

of things that people have been questioning about oil shale technology, concerning environment, the development of new communities, and so forth.

When you weigh all of the other kinds of research and experiments that we have just discussed, how do we justify the expenditure of funds in a public corporation in this one area of oil shale when people are saying you only have x number of dollars to spend?

We need also to spend it in nuclear, geothermal, and solar. How do you answer in terms of the importance and necessity of setting aside these funds for this particular kind of research approach?

Mr. PEACH. My answer to that would be that we are already spending \$150 billion. That is a good rough figure. It depends on how you define energy. \$150 billion a year is being spent on energy right now and we are in a so-called crisis. We ought to get out of that.

So if it cost \$4 billion or \$5 billion a year—which is a high figure—for experiments, you are still only talking about $\frac{1}{2}$ of 1 percent or a third of 1 percent of our gross national product.

If we don't spend that to find out what are the best things—and clearly, we don't know—but a well-planned attack on all of the promising sources would be equivalent to a one 2-cent or one 3-cent tax on the dollar on the national gross product.

Some of those sources are going to prove to be cheaper to get at than the stuff we are now buying. I would say that even to those of us who shudder that the Federal Government is getting into it. We are going to have to do these experiments so why not do them and why not do them in 1974 instead of 1994?

If we would spend a little bit of seed money, not only on the technology, but also after you get the technology, to design some of the machines and get them into operation, then private enterprise can come in and do the rest of the work if they want to.

However, to get it started, it seems to me, you ought to have the Federal Government in it. It ought to be in, I think, from here on out. We ought to have a variety of sources of energy, not only of particular kind of energy, but in particular areas of the United States that are available.

Then we will never get into this kind of bind again. We need never have gotten into it.

Mrs. MINN. What about those who say, why a public corporation? Why not commit the Federal Government into subsidizing private industry by saying it is going to cost us this much money anyway to develop and gather the knowledge and information we must have to know the value of our resources and how they can be used in the future? Why not just give it to private enterprise? This is the argument many people make against this legislation.

Mr. PEACH. The only argument has to be that it is very difficult to get a commitment out of a private company as to what and when they are going to do it. The Federal Government can start tomorrow to dig the holes in the ground. We know what needs to be done pretty well.

An awful lot of work has been done, both in the United States and around the world, on these things. If Russia can run an electric plant, as Dr. Dinneen testified earlier, on oil shale, why can't we?

Maybe we ought to send a couple of guys over to find out how they did it just as they are doing it to find out how we build a pipeline and that sort of thing.

We ought not hesitate to borrow technology where we find it more developed. That is what the world has always done. One guy in one area develops one technique and then the whole world borrows it.

Mrs. MINK. Would you say that even for those companies who will be the successful bidders of the six leases which will eventually be awarded on these prototype sites, that even with respect to this private enterprise of development of prototype technology and production in these areas, that there will be a heavy Federal subsidy in order to support the 10,000-plus individuals who will have to be gathered together to service and provide the labor and so forth for each one of the communities that will be established around the leases?

Mr. PEACH. Yes. The Federal Government is already spending an awful lot of money on energy.

Mrs. MINK. From an economist's point of view, suppose one of the sites had to support 10,000 individuals. What is the cost to the Federal Government to establish one community? What are we talking about in dollars in terms of all the socioeconomic costs of the community?

Mr. PEACH. It gets into so many things. We would have to make certain assumptions. Then the assumptions pretty well determine what your final answer is.

For example, you might want to have all of the land public federally owned or you might want to divide it up into lots. If it was federally owned, you could plan your shopping centers and parks and playgrounds for the kids. It might be much cheaper to do it that way.

I do not even have an estimate of what it would cost. However, you can do it the expensive way or a sensible way.

Let me say, though, that whatever it would cost, it will be very minor, the Federal subsidy to the towns. You would have to provide them with water.

You would have to provide them with streets. In some places, we would make them pay for the streets and sidewalks. You would have to make assumptions about which way you were going to handle each of those. However, it would not be very much.

Mrs. MINK. Could you give us an estimate what one of those sites might run to with a community of 10,000 individuals, which is the figure that has been given to the committee?

Mr. PEACH. That the Federal Government would have to put up?

Mrs. MINK. Public funds, Federal, State, and local, which would be required to develop and sustain such a community.

Mr. PEACH. Could I make a guess and then submit it to you later?

Mrs. MINK. Certainly. We would be pleased to have it.

[Note: Mr. Peach was unable to supply the information.]

Mr. PEACH. We would have to make some assumptions of the widths of the parks and other things and then we can come up

with something. If a person's work takes him from Washington, D.C. to Colorado, they are going to get a salary for it.

Sometimes the salary is enough to pay for their home so you don't have to subsidize the home. Also, you might want to build a city of 10,000 where all the homes were government owned.

Then you could just rent them out. However, the cost to the Government would not be very great. However, I will be happy to make such an estimate.

Mrs. MINK. We would appreciate your estimates of the public cost for such a community:

There has been criticism on the Department's general prototype leasing approach for the six sites in these three States.

Do you have any comment you would care to make about this approach?

Mr. PEACH. They are all going to go, I think, to \$100 million or billion corporations. This would be one thing I find wrong with that approach. The second is that there is supposed to be—there are people who doubt it—prototype.

A few gallons a day is enough. Then there are those who think they will be building them to turn out 150,000 or 200,000 barrels a day. I don't know which they will do.

I think the much more sensible approach to it would be to have the Federal Government go in and build some plants that are commercial size and use the best technology available. When they get into building those plants of that size, then they will find a lot of things.

They might find it is much cheaper to do it this way than any other way. I am not so sure it will cost more than a barrel of oil is costing today. I have seen estimates as low as \$1.25.

I think that is too low. Some of them go up to \$8 or \$10. If we are at the mercy of the Middle East, then we will be paying \$15 or \$20 a barrel. It is an awfully expensive way to do it.

Mrs. MINK. I think one of the most alarming aspects of this whole situation is the fact that we find ourselves in many situations where one single giant corporation owns not only oil but also coal.

Now we are getting into coal. I am afraid of a monopoly situation. This is one of the dangers I see on a lot-by-lot leasing program as the only method for developing our shale resources. I wonder if you would care to comment on that statement?

Mr. PEACH. Yes, I would.

I think it would help to have a greater degree of competition in the energy industry because in addition to the coal and the petroleum and the natural gas, they have most of the geothermal and now the oil shale and uranium. That is mostly in the hands of a few companies.

However, I think one of the purposes to be served by setting up a Government corporation would be that this would provide an element of real competition for the private firms, not to drive them out, but an element of genuine competition.

Mrs. MINK. To what extent did the TVA provide that element of competition?

Mr. PEACH. I think all over the United States the effect of the TVA was to reduce the price of electricity everywhere.

Mrs. MINK. Do you believe the public corporation we are attempting to establish for this one area would have that same effect?

Mr. PEACH. I see no reason why it shouldn't. It will demonstrate you can get the oil out and it will demonstrate the approximate cost of it in terms of dollars and the cost of protecting the environment.

I see no reason for degrading the environment. We have enough of that around. We are still damaging our environment in a lot of places.

Mrs. MINK. We see a growing body of support for not just this concept of an oil shale corporation, but for an all oil corporation.

The bill, as you know, is in both the House and the Senate. I wonder if you would comment on that approach treating oil and gas as a total concept, and also respond to the usefulness of the public corporation for the development of coal on Federal lands?

Mr. PEACH. I think the Federal Government ought to get into certainly coal gasification and liquefaction. I also think the Federal Government ought to drill some of those wells off the coasts in the offshore areas.

I think if we have to have these super ports 3 or so miles from the land that that will involve all kinds of negotiations with other countries.

That certainly ought not be the private property of any private corporation. That ought to be automatically Federal Government property. I think the Federal Government ought to own 100 percent of the super port facilities.

If the Federal Government owned the super port facilities, then they could introduce another element of competition because they could give preferential treatment to the independent if they wanted to or they might decide to let the independent go down the drain.

However, if the Federal Government wanted to introduce an element of competition into it, they could do it this way: by making sure that Mr. X who owned one refinery got his crude oil.

Mrs. MINK. How critical, in your view, has this lack of competition been. Has it been one of the contributing causes to our current energy crisis?

Mr. PEACH. I would like to avoid answering that question. Let me say that the noncompetitive aspects of the petroleum industry have existed at least since 1879. There has been very little price competition since that time. It is difficult to prove that in court. The information is just not available so I would like to avoid that.

We do know some of the oil companies are pretty big, not only in oil and gas but also in pipelines and distributions.

You hear all kinds of stories. One fellow in Norman last week, who owned two service stations, said that his major company came to him last year and said, "You aren't going to get any gas."

He said they convinced him and he sold out. They now operate the two service stations. However, we have too many service stations in America. 220,000 is just ridiculous.

Mrs. MINK. I noted from your curriculum vitae that you have had extensive academic experience in other countries. As a final

question, perhaps you could give us a general summary of your experiences insofar as how other governments, particularly Great Britain, Canada, and other countries are dealing with this general question of the role of government in energy development?

Mr. PEACH. I don't know of anywhere else in the world where they have such an emotional block against government participation in the energy industry.

It becomes a matter of almost religious belief that anything the Government does is necessarily bad and inefficient.

Mrs. MINK. How do we overcome this mental block, sir, where every time you talk about the Federal role in energy they use the word "nationalization." How do we overcome this when it all belongs to the country anyway?

Mr. PEACH. I just shrug. There isn't any answer to it. Why is one man a Presbyterian and one a Baptist? I doubt I could do anything to change their belief. Canada just set up their own corporation.

They have for a long time been participating with firms—U.S. firms, I might add—along with ownership. Great Britain owns approximately 48 percent of Royal Dutch Shell and a majority interest in British Petroleum.

Germany does, too. They have their own ENI, their own corporation, that is in the energy business. They make contracts with the big seven companies. Everywhere in the world, the central government is playing a much bigger role than digging a few holes to get shale oil out.

I don't know anywhere in the world where the central government doesn't play a much bigger role than it does here. Your bill to get the Government into the shale oil business would be smiled at, I think anywhere in the world.

Mr. SKUBITZ. Would the gentlelady yield?

Mrs. MINK. Yes, I will yield.

Mr. SKUBITZ. Isn't the concept of the free enterprise system insofar as large corporations are concerned fiction? Every man has the opportunity to succeed or fail, but nobody likes to fail so we protect them with government subsidy.

However, we still maintain the concept of succeed or fail for the small businessman.

Mr. PEACH. Yes. I think it is part of the great American myth. We have those things and other people have other things they believe in, such as the Koran, or something. We just believe in it though it may pass, as you say.

Mrs. MINK. We have certainly profited a great deal by your presence here today. We appreciate your taking the time to come and give us the benefit of your expertise in this area.

If there should be other material that you would like to submit to the committee, we would be very happy to insert it in today's hearing record. I would make that a unanimous consent request.

Mr. PEACH. Thank you.

Mrs. MINK. Before we adjourn, I would like unanimous consent that the statement of Louis Clapper be inserted.

Without objection, so ordered.

[The statement to be furnished follows:]

STATEMENT OF LOUIS S. CLAPPER ON BEHALF OF THE NATIONAL WILDLIFE
FEDERATION

Madame Chairman, I am Louis S. Clapper, Director of Conservation for the National Wildlife Federation, which has its national headquarters at 1412 Sixteenth Street, N.W., here in Washington, D.C.

Ours is a private organization which seeks to attain conservation goals through educational means. The Federation has independent Affiliates in all 50 States and Guam, Puerto Rico and the Virgin Islands. These Affiliates, in turn, are composed of local groups and individuals who, when combined with associate members and other supporters of National Wildlife Federation, number an estimated 3½ million persons.

We welcome the invitation and opportunity to comment upon H.R. 12014, "To amend the Mineral Lands Leasing Act to provide for a more efficient and equitable method for the exploration for and development of oil shale resources on Federal lands, and for other purposes."

Madame Chairman, as a matter of principle, the National Wildlife Federation is not opposed to the use of oil shale deposits under public lands. However, we do feel that this should not be accomplished at the expense of many other values. Consequently, we are in accord with the basic premise of this bill, which lists its purpose as assuring "that the Nation's energy requirements are met without degradation to the environment." To summarize our position succinctly, we feel that exploitation of oil shale deposits under public lands should be accomplished only after suitable research has determined: (1) identification of the least harmful practical method of extraction, including possible "in situ" retorting; (2) that existing water rights are fully protected; (3) that surface and underground waters are protected from pollution and reduction of flow; and (4) that spoil be disposed of by methods which permit reclamation of disrupted surface areas.

I should say here that we fear that new emphases on oil shale are being taken in an atmosphere approaching hysteria over current energy shortages. Like everyone else, we appropriate the need for developing additional sources of energy, particularly those which would make us as self-sufficient as possible. However, full recognition also must be given to the fact that, in all probability, even under the most ideal of circumstances, at least a decade will pass before production of oil from oil shale plays a significant role in meeting our Nation's energy needs.

Now, in all fairness and candor, we must say that the National Wildlife Federation feels that the present Federal Prototype Oil Shale Development Program is unsatisfactory. In short, we fear that the Prototype Program is oriented primarily toward developing a viable commercial enterprise for the oil industries at the expense of public interests in public properties.

Specifically, here are some of the problems which we have with the present Prototype Program:

1. In recent Congressional correspondence, Interior Secretary Rogers C. B. Morton admitted that the Prototype program is not "true research and development." In substance, the oil industry is granted blanket authority to proceed with developing ways and means of extracting the oil with no assurances that protection of the environment will be given equal consideration;

2. The final Environmental Impact Statement and provisions of the Federal leases have been consistent in emphasizing economic benefits and gearing fulfillment of environmental obligations only "to the extent practicable." Thus, economic considerations are paramount;

3. The Federal Government, the lessor, has not adhered to the land limitation of 5,120 acres set out in the Mineral Leasing Act of 1920. BLM withdrew, prior to the leasing of the Federal tracts, 6,500 acres of unleased lands west of Tract C-a for the dispersement of spoil. These lands are not included in the additional 5,000 acres requested by the lessees of Tract C-a for the dispersement of spoil. The Federal lease states that authority exists to allow waste dumping on public lands under a 1960 Public Lands Administration Act, at no cost to the lessee and not necessitating an Environmental Impact Statement. Inquiries from the General Accounting Office, however, strongly question the viability of this provision, even its legality. In short, how much land actually will be adversely affected by even those Prototype operations?

4. There are no provisions for experimental technology. The minimal environmental impact and water demand envisioned in "in situ" technology re-

quire that it be given prime consideration for development; yet, it appears that the Interior Department is placing more emphasis on commercial development than on research to identify environmentally-sound technology. The total R & D funds proposed for Fiscal Year 1975 amount to less than \$15 million for oil shale development. Of that only \$3 million have been allocated to develop "in situ" technology, the rest of the funding will be used for deep mining technology for oil shale and shale disposal, erosion control (\$5.6 million), Geological Survey (\$2.2 million) for geologic and hydrologic research with regard to environmental effects of oil shale and \$300,000 to the Bureau of Sport Fisheries and Wildlife to determine biological effects of fish and wildlife from oil shale development. Considering that the total amount bid on the two leases (of a total of six) comes to approximately \$227 million, and that the net worth of the Federal oil shale lands is at least \$600 billion, we feel that the proposed appropriations for Research and Development are meager indeed.

5. Distribution of income resulting from the Prototype Program illustrates a weakness in the Mineral Leasing Act of 1920. This Act provides that income from bonus sales and royalties of continental minerals be distributed in the following manner: 52½% to the Reclamation Fund, 37½% to the States involved, and 10% to the Federal Government. Since enormous expenses are involved in protecting the environment, and in reclaiming mined areas disturbed in exploiting oil shale, it would appear only reasonable that more than 10% of the income be returned to the Federal Government. Certainly, there is no reasonable rationale why irrigation farmers should reap windfall benefits from oil shale lands.

6. The Prototype Program will displace habitat for forms of wildlife such as the mountain lion, bear, elk, and various raptors such as eagles and falcons. Overall, surface lands which may be disturbed can have a profound effect upon wildlife. For example, the Piceance mule deer herd, possibly the largest in the world at between 30,000 and 60,000 animals, will be reduced in numbers. The Interior Department estimates the losses at 10% while Colorado experts claim 75 to 80%. This factor should be considered by less biased authorities.

7. Admitted inability of the Interior Department to accurately assess the value of lands leased in the Prototype Program reflects the haste with which efforts are being made to expedite a program in which public interests are given far too little consideration. Current estimates of the value of tract C-a are at least more than twice the \$210.3 million top bid.

8. The complex issue of water allocations remain fuzzy and unresolved. Conflicts of jurisdiction over compacts, treaties, and statutes on the Colorado River system restrict the quantity of water available to a substantially smaller quantity than that which is physically accessible. At the present time, there is no unallocated water to supply the anticipated needs of the oil shale industry. Where are the supplies coming from? Although the lessees of Tracts C-a and C-b claim they have enough water available to develop a 3,000,000-barrel-per-day industry, Dr. Charles H. Prien, a foremost expert in oil shale, testified that water availability would only suffice a 1,000,000-barrel-a-day industry. Thus the statistics are in conflict. Additional water requirements must be met by building additional storage units and buying up existing water rights. In truth, the full environmental, social, and economic impacts to result from this program are difficult to calculate.

9. Water pollution must be considered. Simple diversion of high quality water in the Upper Colorado River area for almost any use tends to increase salinity in lower reaches of the River. If no saline process water or drainage water from spent shale is allowed to return to the river, oil shale development could cause less increase in salinity than by use of the same water for agriculture. However, both of these "ifs" are difficult to achieve. Conservationists fear the Colorado River would become more saline.

10. Environmental safeguards are lacking in the lease. There are no provisions for salt-discharge standards, outside limits of air quality degradation, and water consumption.

11. The lease contains vague environmental goals, gives vast discretionary powers to the Mining Supervisor, and permits him to approve or modify a critical mining plan without review by other agencies or the public. No formal role is given the Environmental Protection Agency or the public.

As indicated earlier, the date when oil from shale will become available is highly uncertain. Originally, the lessees promised a production date of no later than 1980 or 1982. Recently, however, Indiana Standard has moved the pro-

jected date back to 1985-87. Thus, it is evident that oil from shale will have no effect on the current energy situation.

From the foregoing, it appears to us that profitable oil shale technology presently is incompatible with environmentally-sound practices. To accurately determine the feasibility of oil shale as an alternate energy resource it is necessary to develop a true research and development program—one that is objective in determining the availability of oil in shale in context with environmental considerations, economic profits, national needs, and other factors. In substance, we feel that something akin to H.R. 12014, establishing a public corporation formulated along lines of the Tennessee Valley Authority, should replace the Federal Oil Shale Leasing Program.

As the Committee is aware, estimates of the value of oil shale resources run as high as to equal the national debt. Consequently, the public's stake in these public resources is tremendous. Just as utilities which produce and market electric power and gas are regulated in the interest of public benefits, so must public oil shale resources be safeguarded by regulations. In fact, we have hoped that the Federal Government could get into research and management of its own oil shale resources in order to assure the tremendous public values, both economic and aesthetic, are protected in a business climate where demand exceeds supply to the extent that price is limited only to the extent of the public's ability to pay.

The "Oil Shale Energy and Mining Corporation" envisioned by H.R. 12014 establishes Congressional authority necessary to overseeing the massive energy program of oil shale development and assures that the public interest is safeguarded and maintained. It provides for stricter environmental standards, fosters competition inasmuch as the smaller companies are not restricted by budget allowances, and prevents monopolization of oil industries in producing fuel. We agree with the exclusion, in Section 3, of lands held in trust for Indians or owned by Indians or within national parks, forests, monuments, seashores, and wildlife and wilderness areas. In fact, we would extend the exclusions and recommend rewording of subsection 3(a)(3) to read: "within units of the National Park System, National Wildlife Refuge System, National Wild River System, National Wild and Scenic Trail System, National Preservation System, and National Forests."

We especially like the provisions emphasizing the development of "in situ" technology and the banning of surface mining techniques in the development or exploration of oil shale resources. True research and development is possible by allowing a more democratic participation of all the oil industries rather than establishing monetary resources as the criteria in the development of the shale resources.

The legislation encourages environmental considerations and insures that not "more than twenty thousand acres of federally owned oil shale lands may be used." This provision is especially important considering the lassitude displayed by the Interior in limiting the usage of federal oil shale lands.

Section 9 provides financial assistance to the States and local governments in lieu of taxation. The National Wildlife Federation long has opposed, in principle, payments in lieu of taxation in the belief that this practice can be a major inhibiting factor on the proper management of resources such as national forests, parks, wildlife refuges, and other Federal areas. However, we also appreciate what an impact could occur upon local governments when major oil shale developments begin, particularly upon roads and schools. We also appreciate that many of these impacts could come before the States (and local governments) receive benefits from Federal payments on oil proceeds, which may be delayed up to seven years. Thus, perhaps it would be possible to work out some system of advances against future proceeds and still not violate the principle of payments in lieu of taxes or, payments could be phased out.

We recommend the following amendments to assure that the program operates in the interest of the public and that environmental consideration be paramount in the development of oil shale technology and resources.

1. Sec. 7(d), p. 13. Recommend that the financial statement and complete report as to the business of the Corporation be available for public review.

2. Sec. 10(d), p. 20. Recommend that the provisions included in this section be included for public review with the financial and business report.

3. Sec. 17(a), p. 35, line 12. Recommend that the term "as far as practicable" be changed to read "as far as possible."

4. Sec. 17(c), p. 36. Recommend that the Environmental Protection Agency and the Department of Interior select the members of the environmental advisory committee, thus insuring environmental protection as well as maintaining the authority of the Department of Interior in overseeing the use of Federal lands.

5. Sec. 17(e), p. 37. Recommend that the use of environmental impact statements be expanded to provide that such a statement be prepared upon the completion of the prototype program and before the development of a commercial enterprise.

6. Sec. 18(b), p. 38, line 16. Recommend that the phrase "within the limits of practicality" be changed to read "that to the extent possible."

7. Sec. 18(b), p. 38. Recommend that the statement be expanded to insure the ban of nuclear fraction in "in situ" technology.

8. Sec. 18(c), p. 39. It is unclear as to what the word "viable" means, and who has the authority to decide whether the prototype plants are viable. Recommend a definition of the term "viable," and that Congressional review, with public participation, decide upon the viability of such plants.

9. In addition we recommend that in Section 17 provisions be included to insure the strongest protection of water resources, determine availability and need, and that environmental impact statements be included in the use of water resources.

10. We also recommend that provisions be included for a program to assist in the preparations for urban development.

Thank you again for the opportunity of making these remarks.

Mrs. MINK. The subcommittee meeting stands adjourned.

[Thereupon, at 11:50 a.m., the subcommittee recessed, to reconvene subject to the call of the Chair.]

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OIL SHALE, MINING AND ENERGY

THURSDAY, MAY 23, 1974

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON MINES AND MINING OF
THE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS,
Washington, D.C.

The subcommittee met, pursuant to notice, at 9:55 a.m., in room 1324, Longworth House Office Building, Hon. Patsy T. Mink [chairman of the subcommittee] presiding.

Present: Representatives Mink [presiding], Ruppe, and Martin.

Also present: Tom Dunmire, Tom Laughlin, Charles Leppert, and Norman Williams.

Mrs. MINK. The Subcommittee on Mines and Mining will come to order.

We are privileged to have one of our colleagues here to testify on H.R. 13363, among the bills listed for consideration in the hearings on oil shale.

Our colleague is Hon. James P. Johnson of Colorado. We welcome you to our hearing this morning and we will be pleased to have you insert your statement in the record if you wish. You may proceed in any manner you please.

STATEMENT OF HON. JAMES P. JOHNSON, A REPRESENTATIVE IN CONGRESS FROM THE FOURTH DISTRICT OF THE STATE OF COLORADO

Mr. JOHNSON. Madam Chairman, I appreciate the opportunity to appear in support of H.R. 13363, a bill which I introduced along with the other Members of the House from the State of Colorado.

Very briefly, this bill is designed to amend the Mineral Leasing Act in a manner that will lift the restrictions that have been placed on the use of those funds that are returned to the States—funds derived from royalties, bonuses, and rentals realized from the leasing of oil shale lands owned by the Federal Government.

Under section 191 of the Mineral Leasing Act of 1920, 37½ percent of these lease moneys are returned to the individual States "to be used by such State or subdivisions thereof for the construction and maintenance of public roads or for the support of public schools or other public educational institutions, as the legislature of the State may direct," and they are limited to those two purposes only.

As important as these uses are, the cosponsors of H.R. 13363 feel that restricting the use of these funds to roads and schools will only work an unintended hardship on areas where the oil shale test

lease programs are located and where fullscale commercial development of oil shale lands is a possibility.

The State of Colorado, for example, along with local subdivisions of government is already identifying the problems that will be associated with the development of oil shale and it is readily apparent that there is an immediate need for planning funds and for so-called "front end" capital, not only for schools and roads, but also for all of the people-related programs such as water and sewer facilities, health care facilities, and public safety needs such as fire and police protection.

Our bill, H.R. 13363, would simply add the language needed to permit the use of that 37½ State share for a whole range of public purposes that will arise with the kind of growth that will surely accompany the test lease program already underway in the States of Colorado and Utah.

We understand that this committee has before it other legislation affecting the development of oil shale. We commend the committee for giving its attention to a matter that so directly affects our State. We do suggest, however, that the needs to be met by H.R. 13363 are immediate and, therefore, there is an urgency attached to our bill that may not be present in the same degree with the other measures that are before you.

Following the initial commitment of funds by private industry in the test lease program, the Senate Public Lands Subcommittee, chaired by Senator Floyd Haskell, conducted hearings in Grand Junction, Colo.

At those hearings, Governor John Vanderhoof made the case for lifting the restriction on the use of oil shale lease moneys. He said, "But Congress does need to move and move rapidly to give us the tools that we can use to do the situation right for once."

As this committee may know, the Senate has passed and sent to the House S. 3009, a bill that is identical to H.R. 13363.

We, therefore, respectfully urge this committee to act favorably and expeditiously on H.R. 13363 so that the States and local governments in Colorado, Utah, and Wyoming can meet the growth problems created by potential oil shale development in a timely and effective manner.

Not by any means do we suggest that this is the ultimate solution, but it is a first step that is urgently needed and will demonstrate our support of the Federal-State-local concept of problem solving.

Madam Chairman, I am sorry there aren't more members of the subcommittee here. We have the same problems in my subcommittee, but to depart from my statement, I don't know how familiar you are with the problems of growth that we have.

I have seen so many different figures. I can't give you anything that is hard and fast. For example, a little town like Rifle, with a population of 2,000 and Grand Valley, where we have less than 1,000, are already bonded to capacity.

They are faced with the prospect in the next few years of having thousands of people pour into these areas. For one plant, I understand they project there will be 1,400 people in the Rifle area for the construction of the plant, and later on a permanent force of approximately 900 people.

This will bring in additional population problems and the towns are already bonded to capacity.

Their capacities are strained, sewage facilities are not in good shape and they do not have the where-with-all to meet this burgeoning population.

They are very apprehensive about this whole thing. Every time I go there, I try to reassure them that the whole world is not going to descend on western Colorado overnight, but they are afraid of the population booms in that there will be no facilities and they say, "We will get our tax moneys from these people later on," but there will be an 18-month to 2-year lag time before the moneys are available and they don't know how they are going to be able to face these problems.

This is one step in the right direction. Then the State will have to take these moneys and use them properly and provide advance funding for this sort of thing, so that the bonding capacity will be able to repay any loans that the State might make. We feel it is a vital step and we urge you to approve it as rapidly as you can.

Mrs. MINK. Thank you for your statement. I believe the Colorado delegation did send the subcommittee a letter signed by all of the members of the delegation, urging that these hearings include this bill which all of you have jointly sponsored.

The letter from other members of the Colorado delegation will, without objection, be included at this point in the record, together with your statement.

[The above-mentioned statements from the members of the Colorado congressional delegation follow:]

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THE STATE OF COLORADO

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As important as these uses are, the co-sponsors of H.R. 13363 feel that restricting the use of these funds to roads and schools only will work an unintended hardship on areas where the oil shale test lease programs are located and where full-scale commercial development of oil shale lands is a possibility.

The State of Colorado, for example, along with local subdivisions of government is already engaged in identifying the problems that will be associated with the development of oil shale and it is readily apparent that there is an immediate need for planning funds and for so-called "front-end" capital, not only for schools and roads, but also for all of the people-related problems such as water and sewer facilities, health care facilities, and public safety needs such as fire and police protection.

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CONGRESS OF THE UNITED STATES,
HOUSE OF REPRESENTATIVES,
Washington, D.C., May 15, 1974.

Hon. PATSY T. MINK,
Chairman, Subcommittee on Mines and Mining,
House Committee on Interior and Insular Affairs,
House Office Building Annex,
Washington, D.C.

DEAR MADAM CHAIRMAN: We are writing to you in behalf of the bill, H.R. 13363, which we co-sponsored as Members of the Colorado Delegation in the House of Representatives, and which you have scheduled for hearings this month.

The fact that you have bracketed H.R. 13363 with a number of other measures, directly affecting the development of oil shale resources, indicates that you and your Subcommittee are properly aware of the importance and timeliness of this kind of legislative interest.

We do suggest, however, that H.R. 13363 carries with it an element of immediacy that may not attach itself to the other bills on your published agenda of May 13.

H.R. 13363 proposes to amend the Mineral Leasing Act in a manner that would permit all monies paid to a State from sales, bonuses, royalties and rentals of public lands for the research and/or development of shale oil to be used for purposes other than public roads and schools.

In short, Madam Chairman, the existing restrictions on the use of such monies would be lifted by this measure so that the aforementioned funds could be used not only for public roads and schools, but also for water and sewer projects, health facilities, public safety and/or whatever other public services the Legislature of the State might designate.

As you know, substantial sums of lease monies have already been committed toward the test lease program for oil shale development by private companies. This means that the need for the implementation of these funds by the governmental subdivisions in the affected area is upon us.

As you are further aware, the companion bill in the other body, S. 3009, was passed by the Senate on May 9, 1974. We believe this indicates a confirmation of the sense of urgency that we are conveying with this letter.

Without questioning the merits of the other legislation which you have scheduled for hearings on the subject of oil shale, we would urge you to expedite the consideration of H.R. 13363, separately if necessary, so that it can be reported favorably to the full Committee at an early date.

Sincerely,

WILLIAM L. ARMSTRONG, M.C.,
DONALD G. BROTZMAN, M.C.,
FRANK E. EVANS, M.C.,
JAMES P. JOHNSON, M.C.,
PATRICIA SCHROEDER, M.C.

Mrs. MINK. I believe there are two leases, Congressman Johnson, which have already been issued by the government in the State of Colorado.

What will be the percentage of lease moneys returned to the State of Colorado as a result of these two leases?

Mr. JOHNSON. The bid on that was \$210 million for Colorado-A and \$117 million for Colorado-B.

The first payments that were made are one-third of that amount. It seems that it is approximately one-third.

The amount that was bid was \$207 million, but was accompanied by a payment of approximately one-third and then we get 37½ percent of that.

Ultimately, if the leases are paid out over a 3-year period, and there is no requirement that they make the payment next year or the year after, the State of Colorado would receive somewhere in the neighborhood \$100 million as a pay-back.

There is no assurance that this is going to happen, but we don't need all that money for roads and schools in that area. We can't build that many schools.

Many of the people in western Colorado are slightly concerned that they are not going to be able to spend this money in the area where the impact of the population is going to be felt.

They are afraid and say that the larger population areas, which have a larger representation in the State legislature, will want to use some of these moneys for schools and road programs elsewhere in the State. That is a problem we in the State are going to have to face.

Mrs. MINK. Does your bill address that problem?

Mr. JOHNSON. No, it does not. We did not feel we could do that with the National Act. They will have to solve at the local level.

Mrs. MINK. I don't feel it is appropriate to make that recommendation while the committee considers this bill, that the moneys be used in the areas where the impact exists.

Mr. JOHNSON. I think the committee might make the statement in the report. That is the reason that is being modified.

You recognize the problems in that area and they will continue if the prototype turns out to be successful.

Mrs. MINK. Have you had a chance to study Mr. Roncalio's bill, which relates to similar problems?

Mr. JOHNSON. No, I haven't.

Mrs. MINK. What is your view about the adequacies of the 37½ percent of the lease money?

Mr. JOHNSON. I think most people would like to get 100 percent. It is Federal property and it seems that if we could get more, we would like to have it, but in national terms, it seems the 37½ or 50 percent is adequate. I have even thought about the possibility of making changes.

Mrs. MINK. Mr. Roncalio's bill suggests a method of calculating 50 percent per annum.

Mr. JOHNSON. You are talking about the leases themselves. These test leases are just that. I don't believe the test leases that are being utilized for A and B are those that should be the final leases if there is full development of the area.

At that time, the committee will have to address itself to what is an adequate lease. Personally, I said as far back as 1966 that there should be a royalty program similar to what we have for other oil leases that you drill for and I think this is one of the things you will have to examine after we get some of the data back from the lease programs that we now have.

These leases were designed, I think, primarily to encourage the development rather than to obtain funds on a regular basis, and I have no argument with this approach now.

They are only 5,000 acres apiece and we have about 10 million acres that will be leased and that 10,000 acres out of the total is an insignificant amount, although they are oil shale lands.

Mrs. MINK. So, your main concern with respect to this general issue is to extend the uses of the moneys that go to the State beyond roads and schools only so that all public purposes and public facilities could be included at the discretion of the State?

Mr. JOHNSON. Yes.

Mrs. MINK. Thank you. Mr. Ruppe, do you have any questions.

Mr. RUPPE. Thank you, Madam Chairman. Thank you, Mr. Johnson. I was a little late in getting here this morning. Perhaps I will be repetitious in my questioning.

As I understand it, you would like to have your State to have an opportunity for more flexible use of the moneys that have been derived in terms of your share of the royalties of oil shale program and do not want to restrict the utilization of those funds exclusively to school or highway construction?

Mr. JOHNSON. Correct.

Mr. RUPPE. Do you feel that the funds should be general purpose, like general revenue-sharing funds, or do you feel that your State would like to use the funds for overall planning or for both planning and programming in terms of meeting the impacts of the oil shale program?

Mr. JOHNSON. I think both, Mr. Ruppe. The problem out there is that those counties like Garfield, where most of the development is going to take place, is very sparsely populated.

They are doing the best they can. They formed a council government. They have three of four counties getting together and they are trying to do the planning.

They have hired people from Denver in some cases to make studies as to the regional impact.

I am sure this committee is familiar with the water program, for example, in the Colorado River—the sewage problems, providing water and sewage service, which is a major problem if you are going to have the population double.

They simply have no bonding capacity left to put into the facilities.

Mr. RUPPE. And you don't have the funds to bring the plans to fruition?

Mr. JOHNSON. They have done a lot of planning and have enough to see that there is no way they can build these facilities. As I say, they expect to have, from one plan alone, a private plant, 1,400 people going to work between now and next year sometime. They are going to start construction of this plant in the fall.

Mr. RUPPE. Has Colorado provided an adequate mechanism for diverting the royalty funds to the various local counties and communities?

Mr. JOHNSON. That is up to the State legislature. As I discussed this with the chairman, there is some fear in western Colorado that it will not be directed to the places where the growth is coming. I don't have that fear of big city legislators that some people do.

Mr. RUPPE. If the oil shale or any type of mining operation would have a severe impact on the counties they would have the best idea as to where the money should be spent and it would seem to me that we would be well advised to give them the type flexibility to utilize the royalty moneys for the broad needs of the county.

I think your bill is a wise one that permits meeting the responsibilities of oil shale program citizenry.

Mr. JOHNSON. I feel that the State is very aware of this and that if we give them the tools that they will do as good a job as can be done.

Mrs. MINK. If the gentleman will yield, you are not recommending that the funds be directed to the local area where the impact occurs?

Mr. JOHNSON. Not totally, because ultimately these two or three counties would be receiving hundreds of millions of dollars. That would not be right, because there will be 5 or 10 or 15 years more money than you can spend in those little counties. The problem is the lead time, advance preparation for the impact.

Mrs. MINK. What kind of impact are you anticipating when you say that they would not be able to use the funds? My thought would be that it is not enough money to meet the needs of the tens of thousands of people that will be attracted to those areas.

Rather than talking about oodles of money that would not be spent wisely, my general impression is that there is not going to be enough money and Congress will have to come up with additional funds to create a special impact program. Your view is probably more accurate than mine and I would like to be guided by your judgment.

Mr. JOHNSON. I don't know who is right.

Mrs. MINK. What kinds of estimates are given in regard to numbers of new citizens that will be brought into this area, the cost of the facilities that will be required, say just for tract A?

Mr. JOHNSON. I have never seen figures that relate to tract A. There is no assurance that tract A will be developed at this point.

Mrs. MINK. We have to assume that it is. We are assuming that it will be developed and there will be moneys and on that assumption, how many people are coming in?

Mr. JOHNSON. On tract A, I have no estimates. I have seen figures predicting that thousands will move into the area.

It depends on whether it is an economically viable operation. At this point, nobody knows. If we have a \$100 million and we get 37½ percent of that, I don't see that you need to spend all of that in those two or three counties, and to restrict it to those counties would be unreasonable.

Also, there is going to be millions coming back to the State later on if there is full development. That is why I feel we should leave

the discretion with the committee and would hope that they would spend the money in advance to alleviate the population pressures.

Mrs. MINK. What about a list of priorities where we assign the first funds that are received and prohibit the legislature from spending it for other public purposes?

Mr. JOHNSON. At this time I would hate to see them make that kind of a restriction. I think the other needs are more pressing. Frankly, I believe the sewer and water facilities are at least an equal priority and perhaps higher.

It is probably going to be different in each county. Rifle and Debeque will have different problems. You don't know where the population is going to move.

Mrs. MINK. What responsibility do you think the private company has with regard to sewer and water facilities for the population that it is bringing in to serve it?

Mr. JOHNSON. We don't have any legal requirements in the State that require them to make advance contributions.

Mrs. MINK. You have no requirements with regard to subdivisions?

Mr. JOHNSON. Yes. But it is the subdivision developers. Most of these depend on the local communities. We just passed a new land use bill that gives added strength to the communities and to the county in this regard.

How that will work out, I don't know, but we are not necessarily able to say that the oil companies will come in and develop the community in which their employees live.

Mrs. MINK. I can see education, health, and probably roads as being government responsibilities which would be very hard to impose on private industry, but I balk at the idea of water and sewers, which I think are the primary responsibility of the business entity.

Mr. JOHNSON. It has people moving in. Their taxing will take care of that. The communities are concerned that the people will move in in trailers and they will overtax the existing facilities and the communities don't have the bonding capacity to build them at this time.

The lag time is 18 months to 2 years in getting tax moneys to pay for these. It is advance money that would take care of that. As the tax money comes in, it would be repaid.

Mrs. MINK. Do you have any questions, Mr. Martin?

Mr. MARTIN. Just one question: I arrived toward the end of the presentation of Mr. Johnson's and I want to clarify my understanding. You are not requesting an increase in the amount of money that would be diverted from the lease to the States and local communities. What you are asking that the restrictions which presently limit that to use for roads and schools be lifted so that the whole range of community services can be financed with this money?

Mr. JOHNSON. That is right.

Mr. MARTIN. We are talking about leases on Federal lands which means that those local communities are not able to obtain property taxes?

Mr. JOHNSON. They will be getting the property taxes from the people who move in, but they have to provide the facilities in advance.

Mr. MARTIN. But not shale development. They would get property taxes from mobile homes?

Mr. JOHNSON. Yes, the States get 37½ percent in return.

Mr. MARTIN. That is in lieu of taxes you might otherwise get.

Mr. JOHNSON. It is presently restricted to the use for roads and we need to have other facilities.

Mr. MARTIN. I appreciate your bringing this to our attention.

Mrs. MINK. If there are no further questions, thank you very much. The committee will certainly give your concerns the most serious consideration.

Mr. JOHNSON. Thank you very much.

Mrs. MINK. Thank you for coming. If there are not further witnesses with regard to H.R. 13363, I would like to move to H.R. 12014.

I have a statement here by our colleague, one of the cosponsors of the bill, Mr. William D. Ford, and I would like to ask the consent of the committee that his statement be inserted into the record at this point.

[The statement of the Honorable William D. Ford on H.R. 12014 follows:]

STATEMENT OF HON. WILLIAM D. FORD, A REPRESENTATIVE IN CONGRESS FROM
THE STATE OF MICHIGAN

Madame Chairman, thank you very much for providing me with this opportunity to present testimony on behalf of H.R. 12014, the Oil Shale Mining and Energy Corporation Act of 1974.

I am particularly pleased to join with the distinguished Chairwoman of this Subcommittee in co-sponsoring this legislation which would establish a public, non-profit corporation with the sole responsibility of exploring and developing this nation's extensive shale oil resources located on federal lands.

In 1968, when few Americans wanted to listen to our warnings of potential domestic oil shortages, I co-sponsored similar legislation which recognized the vast potential of shale oil. At that time I stated:

"... oil shale deposits contain the greatest known fossil fuel energy resource in the world, exceeding by many times over the entire known petroleum reserves in the United States.

"Very little is actually known about these oil shale deposits, and I consider it a matter of vital public interest that research and development is conducted in a sensible and orderly manner.

"We cannot afford to risk large-scale exploitation of this immense resource by a few oil companies at the expense of the American public."

I am even more convinced now that shale oil will be a primary energy source in the future.

Today, Madame Chairman, we are in the midst of what many term an "energy crisis." The word "crisis" has been used to describe the condition of the country as a result of the Arab oil embargo. However, the word has additional significance. Its origin is in the ancient Greek word "Krisis" which means a sifting or judgment. The medical profession adopted the word to designate the change in a disease that spelled either recovery or death.

H.R. 12014 is a response to this "crisis." It is no miracle drug; rather, it is a modest proposal, a sensible prescription to promote a healthy recovery for a nation that is suffering from the effects of this currency energy malady. It is a worthwhile proposal which attempts to secure the orderly development and recovery of this tremendous resource from shale rock. In broader terms, it lays the foundation upon which the concept of energy independence can be fully realized.

Approximately 8.3 million acres of federally owned lands are rich in shale oil. In fact, this land contains nearly 80% of the known oil shale reserves. It is clear that by the mid-1980's, oil shale could contribute between half a million and a million barrels of oil per day.

Because the development of shale oil is so vital to the nation, I do not feel it is wise to turn over the entire production to private interests which are, in

part, responsible for our current predicament. Therefore, what I strongly urge today is the creation of this public energy agency. It is similar in scope to the highly successful Tennessee Valley Authority project. Whereas T.V.A. is a regional energy supplier, the proposed corporation would address itself to the energy requirements of the entire country.

The corporation would have control over all federally owned oil shale reserves, wherever located. This will have the effect of nullifying the Department of Interior's prototype oil shale leasing program. It also provides for a greater measure of public disclosure and intensive scrutiny of both the short-range and the long-range implications of development in any given location.

Included, also, are stringent environmental safeguards to protect the surrounding areas. The corporation would be prohibited from using surface mining methods for extracting oil shale and would be instructed to give preference to non-nuclear "in situ" methodology, since this technique avoids removing shale from the underground strata, retorting it above ground, and eventually disposing of a large proportion of the spent shale on the surface. Studies have shown that the disposal of spent shale poses severe problems related to revegetation, soil stabilization, erosion, flood control, and surface water pollution.

I firmly believe that the public interest is best served by the introduction of this viable, competitive force into the stagnant energy industry. It would provide a yardstick by which all competing segments of the energy industry can be judged and thereby establish greater assurances that increases in price actually reflect higher production costs.

The Administration is opposed to this measure because it feels, "... the primary responsibility for oil shale development should rest with the private sector," and that "... furthermore, a case has not been made that such a corporation is needed..." Such assertions are nonsensical when compared with the facts. We need only to look at the recent profit statements of the major oil companies to realize that the controlling interests of big oil are not always in the public's interest. Rather, they are motivated by constant efforts for greater monetary profit and they seem to raise prices to whatever levels they please. The consumer succumbs to this oil company tyranny and grudgingly pays the price because he needs the fuel.

We propose to change that.

The American people should be the exclusive beneficiaries of any shale oil project operating on federal lands. They are the owners of these lands, and they should therefore expect to reap the immense benefits that will accrue from this development, without the fear of being exploited by private, self-serving interests.

I believe this legislation would do much to not only bring about an increased supply of this primary fuel product, but would help to re-adjust prices downward as well.

Madame Chairman, we owe it to all living Americans, and to our descendants for generations to come, to make certain that this immense natural resource be put to the best use possible. I believe this legislation will achieve this goal and I trust it will receive consideration by you and my colleagues on your committee.

Mrs. MINK. We have a statement from Mr. Karl Landstrom of Arlington, Va., with regard to this same legislation and ask unanimous consent that this be included in the testimony and without objection it is so ordered.

[The statement of Mr. Karl Landstrom follows:]

STATEMENT OF KARL S. LANDSTROM, ATTORNEY AT LAW, ARLINGTON, VIRGINIA

Madam Chairman, my name is Karl S. Landstrom. I am a former Director of the Bureau of Land Management and at one time I served this Committee as its consultant on public lands, mines and mining. My law practice at the present time includes lobbying activities on matters related to public lands and to geothermal energy. I am a member of several organizations whose programs relate to natural resources, environmental controls, and energy production. However the views herein expressed on this matter are my own.

I can understand that the sponsors of H.R. 12014 have in mind an earnest desire to move forward with feasible solutions to the energy crisis; and it it

natural that the alternative of public ownership and operation of the oil shale industry should have arisen.

As pointed out recently by the Ford Foundation's Energy Policy Project, public ownership is a policy tool that has been used sparingly in the United States; and I may add for good cause. The bulk of our people are wary of the ideological implications of "nationalization" of industry. In my judgment there would have to be very strong reasons to override our traditional reliance upon the freedom of the market place. I do not believe that such reasons exist at the present time, nor do they appear to me to be on the horizon.

I recognize that much of the remaining fossil fuel resources in this country, including oil shale resources, are in Federal ownership. Some have advanced this circumstance as a justification for direct government engagement in energy production, going beyond the phases of research and development. However the mere coincidence of government ownership of natural resources has not been prostituted in the past to any degree as an excuse for a socialized or nationalized industrial organization. I do not think that the present situation is such as would properly justify such a drastic departure from tradition. Barring some kind of catastrophic failure of private industry to function under appropriate governmental regulation, I believe the role of government should remain that of regulating the oil shale industry, not that of engaging in the industry as a governmental enterprise.

Under H.R. 12014, the government would not be content to enter the market as a competitor—to provide a "yardstick", so to speak. It would come into the market in what would be virtually a monopoly situation. The proposed government corporation would be authorized and directed to take title to any and all private interests in oil shale deposits which exist on lands held in the base title of the United States. No future Federal oil shale licenses, leases, or other private interests would be granted. Inasmuch as the Federal oil shale deposits generally embrace most of the more economically feasible sites in the country, these provisions of the bill would operate so as to create a near monopoly on the part of the government in the oil shale industry. I oppose this prospect as one that is out of keeping with the needs and realities of the situation.

Furthermore, I strongly oppose the transparently unconstitutional provision of the bill, at Sec. 19(a), which would attempt to recapture the outstanding private interests in Federal oil shale properties by means of compensating the owners for "the aggregate amount of the actual costs to such person with respect to the exploration and development of such interests". Such private interests, like other private property rights in Federal lands, are protected by constitutional provisions requiring just compensation. And just compensation would require payment of an amount that is equivalent to fair market value. And as we all know or should know, the fair market value of real property is not necessarily related to the costs of its acquisition or development by its current holder.

I question whether, during a time of Federal deficit spending and currency inflation, it would be appropriate to extend Federal spending into the matter of paying compensation for the questionable take-over of private interests in Federal oil shale deposits, and into the potential obligation of purchasing the proposed corporation's revenue bonds in the event the bonds should prove unattractive in the private financial market. If private capital is available to finance an oil shale industry, which now appears to be the case, I see no justification for such governmental intervention. So far as environmental aspects are concerned, I believe satisfactory results can be attained through governmental controls at local, State, and Federal levels and through cooperation which is expected from the private operators.

I particularly question the wisdom of the bill's provision, at Sec. 19(c), by which the proposed corporation could assume control of any of the Federal oil shale deposits (with some exceptions as listed in Sec. 3(c)), without opportunity for objection to be registered by the head of the department or agency which is now administering the land. The question whether oil shale development of the land should take its place ahead of other land use considerations should be a matter of bilateral attention. The head of the administering agency should have a right of dissent. A case of dispute should be resolved at some higher level, such as by the President or by action of the Congress.

In the matter of the naval petroleum and oil shale reserves, I support elimination of the existing resource management activities which are now authorized to be conducted by the Department of the Navy. However I would do this

immediately and comprehensively by abolishing the reserves and transferring the properties to the Department of the Interior, rather than by the time-consuming and piecemeal procedures which the bill would set up at Sec. 19(d).

I suppose that part of my lack of faith in the efficacy of a government oil shale corporation stems from my observation of the ineffectiveness of government management to date of its oil shale properties. As I said before this Subcommittee on February 26, I feel it was a major mistake by the government to have declined to accept the highest bid offered by industry for an oil shale lease in Colorado in 1968. This unfortunate action may have set back oil shale development in this country by some 5 or 6 years.

Having effectively closed off Federal lands from private industry oil shale development for many years, the government has now acted to allow private industry to proceed, subject to applicable environmental and other controls. We should now continue on the present course. The Subcommittee should promptly defeat H.R. 12014 or similar legislation and remove this threat to the integrity of the government's recent and current actions, a threat which is probably currently serving to delay rather than expedite the production of energy from shale.

The energy shortage is likely to continue for a number of years, depending substantially on the wisdom and timeliness of governmental decisions along different fronts. I have seen little lately that would convince me that a government oil shale company would be wise or could act efficiently in the manner its sponsors may have in mind. The new company would have no experience, no demonstrated competence, and no "profit-motive" incentive or pressure to perform. It would be involved in the realm of "politics" which is so difficult especially at this particular time.

In summary, I believe the purposes and provisions of H.R. 12014 to be without merit, and I urge that the Subcommittee vote to table it indefinitely.

Mrs. MINK. I ask unanimous consent that other cosponsors of H.R. 12014 and other similar related bills be afforded the opportunity to insert their statements at this point in the record, and without objection it is so ordered.

[Further statements from cosponsors of H.R. 12014 and similar bills follow:]

STATEMENT OF HON. FRANK E. EVANS, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF COLORADO

Madam Chairman, I am testifying in support of H.R. 13363, which would amend the Mineral Leasing Act of 1920. The need for this bill is great and its enactment into law is urgently needed.

The Mineral Leasing Act provides that the states receive 37½% of the funds derived from royalties, bonuses and rentals resulting from the leasing of oil shale lands by the Federal government. These monies are to be used "... for the construction and maintenance of public roads or for the support of public schools or other public educational institutions, as the legislature of the State may direct."

The need to support the schools and provide and maintain an adequate road system is obvious—but so is the need for other essential facilities and services that local government must provide. Amendment of the Mineral Leasing Act to permit the use of these funds for a wider range of community needs would be wholly consistent with the spirit and intent of the original act. Congress returned these funds to the states from which they were generated "to an extent intended to reimburse them for the loss of taxing values..." according to the floor debate on the Act.

This subcommittee is considering the most far-reaching and broad policy questions raised by the possibility of full scale oil shale development. I respectfully submit, Madam Chairman, that even though H.R. 13363 is related to the larger questions of oil shale development, its enactment should not be delayed until those larger questions are resolved.

Whether or not oil shale development proceeds beyond the current prototype leasing program, the prototype program is a fact and the Interior Department estimates that the population in the seven counties of Colorado affected may double in the next ten years. Such an influx of population in so short a period

of time will require a massive effort by local government to provide a variety of services in addition to schools and roads.

If full scale development does take place, the demands on local government will multiply. The development of a mature oil shale industry will add 160,000 people to the area in the next fifteen years according to a study by John H. Gilmore and Mary K. Duff of the Denver Research Institute. The non-oil shale population is likely to be around 147,000 by 1990 for a total population of over 300,000. This would be approximately three times the current population.

There is a critical need for "front end" capital, so that the necessary planning and preparation can be done to provide vital services such as water and sewer treatment plants, health and emergency services and police and fire protection. If money is not available soon, these small communities could easily find themselves overwhelmed and unable to deliver these basic services. Some areas in Alaska are now experiencing the chaos that can result when from this type of rapid growth.

The Colorado State Legislature has already passed legislation that will allow the monies returned to Colorado to be utilized in those counties where the greatest impact from leasing of oil shale lands will be felt. The U.S. Senate has passed S. 3009, which is identical to H.R. 13363. I respectfully urge this Committee to act favorably and expeditiously on H.R. 13363 so that the state and local governments in the oil shale areas will be able to effectively deal with the problems presented by oil shale development.

STATEMENT OF HON. WILLIAM L. ARMSTRONG, A REPRESENTATIVE IN CONGRESS
FROM THE STATE OF COLORADO

Madam Chairman: Large scale oil shale development is imminent in Colorado, Wyoming, and Utah. Even the present oil shale prototype program will have a profound impact on the Rocky Mountain region.

While this type of impact was foreseen by Congress with the passage of the Mineral Leasing Act of 1920, the times have changed. And it is now time to change the Mineral Leasing Act.

Under Section 191 of the Act, 37½% of the federal royalties, bonuses, and rentals are returned to the individual states, earmarked under law for road construction and maintenance and public education.

To restrict the use of these federal monies to just two uses when the development of oil shale will impact water and sewer facilities, health care, fire and police protection, natural resources, game and fish, and other areas of state responsibility is needlessly narrow definition . . . particularly at a time when the federal government finds itself overburdened.

H.R. 13363 would widen the possible use of the states' shares of the federal oil shale revenues and allow Colorado and other states the latitude to deal with the problems of shale development directly.

There may be other serious problems with shale development, and suggestions have been made to amend this legislation to include solutions to those problems. The Committee's diligence is noteworthy and should be commended.

But I feel to amend H.R. 13363 would both distort the intent of the bill and fail to deal fully with the scope of those other problems impending with the full-scale development of oil shale.

I'd also like to commend the Committee for its speed in holding hearings; I urge expeditious action on H.R. 13363. This legislation will give state and local authorities in Colorado, Wyoming, and Utah the means to meet the problems of growth in an orderly and effective manner.

And for the sparsely populated areas where shale development will be centered, the latitude created by this legislation is necessary . . . indeed mandatory.

Mrs. MINK. We are privileged this morning to have S. David Freeman, project director, energy policy project of the Ford Foundation.

We would like to welcome you to these hearings, Mr. Freeman and I believe we have a copy of your statement which we will insert in the record in full or you may read. We invite you to proceed in any manner you choose.

**STATEMENT OF S. DAVID FREEMAN, PROJECT DIRECTOR, ENERGY
POLICY PROJECT, FORD FOUNDATION**

Mr. FREEMAN. Madam Chairwoman and members of the subcommittee; I was glad to accept your invitation to testify on H.R. 12014 because of the importance of finding the best solution to the vexing problems that surround our shale oil resources.

A satisfactory public policy for shale oil seems to have eluded policy makers for decades. And now that the Nation can use oil shale, we don't even know whether its development will be a curse or a blessing.

Let me make clear at the outset that my views on this issue are personal and don't necessarily reflect any judgments by the energy policy project I direct.

I have been involved in analysis of oil shale policy in an overall energy context for a good many years, both in government and outside. I hope my views will be of some value to the committee.

Since the resource facts and environmental concerns have been presented by witnesses in your prior hearings, I shall concentrate on the policy issues that seem to be raised by H.R. 12014. The issues are, as I see them, as follows:

1. What should be the objectives of public policy with respect to the Federal oil shale resource at this time?
2. Is the current Federal program of leasing best adapted to carrying out these objectives?
3. If not, what are the ingredients of a Federal program that would best serve the public interest?

The Federal shales resource of some 600 billion barrels of oil is both a threat and a promise. A nation that runs on oil, and has run short, can hardly afford to just ignore the shale resource.

And yet even the advocates of shales development concede that methods of recovery that are closest to commercial feasibility bring with them grave environmental concerns. These environmental concerns go beyond the direct impacts at the site, and include the secondary impacts of industrialization of rural areas without the planning or the funding to avoid serious problems.

Still unanswered are such questions as to whether adequate water can be made available to support a substantial oil share industry.

In fashioning a shale oil program, we face a dilemma. On the one hand we need the shale oil "yesterday," so to speak. Yet any decent concern for the surface of the earth, water, and supply, and the life-style of the residents in the area demands that we learn more before we leap into a massive shale industry.

The Nation needs a program that would provide the fastest possible basis for appraising the shale resource both from an economic and environmental perspective. Yet is equally important in my view that the program have a built in stop—a chance for the Congress to say, "No" without having to chase a "runaway train" if the demonstration proves that the environmental damage is too great or for other reasons.

There is another objective of any Federal oil share program that must be considered—avoiding a giveaway of the publicly-owned

resource. It is an objective that is not satisfied merely by going through the ritual of competitive bidding when there are huge uncertainties about the costs and ground rules for commercial operation.

A Federal oil shale program should thus be geared to the following objectives: 1. Produce the earliest possible demonstration of oil shale production under a controlled experiment; 2. support vigorous research and development of environmentally acceptable methods such as in situ recovery; 3. provide a last clear chance for evaluating the program before a big build-up; 4. assure a fair market value return to the public treasurer; and 5. provide the planning and funds for accommodating the secondary impacts if the shale industry is given a green light.

That is a very difficult package of objectives to achieve. Listing them tells us a lot about why there is so much controversy over how we should proceed and why we have proceeded in such a healthy fashion in the past.

The next issue then is how does the Federal leasing program for shale oil stack up against these objectives. Not very well, in my opinion.

Simply leasing the Federal land does not assure the most rapid development of environmentally acceptable commercial technology. The leases do provide financial incentives for the companies to build plants but they will use technologies that raise grave problems concerning the ability to revegetate the piles of waste materials and other environmental concerns.

Private companies will proceed on the basis of the lowest cost to them and there is little confidence that the Interior Department personnel will enforce environmental safeguards in a manner that will provide satisfactory answers.

In addition, there is no real check point for evaluating the program. The leasing program is labelled prototype, but in reality a commercial industry is being given the green light.

Furthermore, the return to the Treasury from the current leasing program appears to be unpredictable and inadequate, and understandably so in view of the uncertainties that hover over commercial development. Meanwhile the research and development to perfect in situ recovery is still a modest low-key operation.

And there is no effective program to provide a well-planned infrastructure to accommodate the growth in the region that success in shale oil development will require.

It thus seems to me that the present Federal effort is misdirected. The major goal should be the earliest possible large-scale demonstration of the more innovative technologies such as situ recovery. Instead, industry is rushing ahead with plants that will undoubtedly demonstrate what a gigantic mess a shale industry can make.

And since the first plants are entirely in the hands of the companies with a special interest, people will be skeptical of the results even if the vegetation grows in the sample plots.

The Nation really needs to find out whether shale is "our Middle East" but the current program, in my view, will lead to more controversy than oil. We are selling tracts to private companies with an implied green light for a big shale industry before we really know the answer.

At the same time, there is no program to prepare the region for accommodating the growth in an orderly way if the demonstration plants are a success. In an age of scarcity of energy and environmental awareness, surely our National Government can do better than that.

That brings me to the ingredients of a better program and to H.R. 12014. We need to move faster in research and development of the shale resource and stop misleading industry that the Nation is already committed to commercial development.

Instead of a leasing program, what is needed is research and development effort controlled by people who can command public confidence that environmental values will be respected.

The shale oil is such a large resource that the Nation really cannot afford to forget about it, but neither can we afford to plunge ahead until we know how to do so without risking grave damage to our more basic resources.

H.R. 12014 does provide a vehicle for developing a public-interest oriented shale program. However, I do not believe the Nation has the knowledge today to unleash any corporation—public or private—with a mandate to develop a commercial industry.

My own observation of the Tennessee Valley Authority, where I worked for many years, is that a Federal corporation can be just as gung-ho as a private company in pushing development at the expenses of environmental concerns. I would therefore confine the corporation entity created by H.R. 12014 to the job of assuring the most rapid demonstration of shale oil production and environmental protection including a really intensive effort to perfect in situ recovery.

The environmental protection advisory committee provided in section 17 of H.R. 12014 and the veto power they are given should assure public confidence that the environmental concerns will receive the priority attention they deserve.

The shale oil plants built could then provide the Nation with a demonstration of both economic feasibility and environmental feasibility. The information would be available to all concerned, including the public.

The Congress would then be in a position to decide whether private enterprise could proceed with a commercial industry. But, I see no basis at present for an open ended green light either to private development or to a public corporation as provided in H.R. 12014.

We need an alternative to the Federal leasing program. A new Federal entity, with the job of demonstrating environmentally satisfactory shale oil technologies, as provided in H.R. 12014, could provide such an entity. Such a Federal entity should probably be made as part of a new Energy Research and Development Agency, which apparently will soon be enacted.

I think it is important that the board of directors of entity be required to reside in the shale oil region. It is important that the program be sensitive to the concerns of people in the region as well as the need to develop the resource for the Nation.

I am suggesting that the mandate of the Federal corporation created by H.R. 12014 be confined to the R. & D. of shale oil much the

same as the Government's role with respect to atomic energy and now with coal conversion technologies. But, I also believe there is an area where the mandate in H.R. 12014 should be broadened.

If the shale and coal resources of the Rocky Mountain States are to be developed in the public interest, there is a need for planning and funding to take care of the deluge of people and industrial activity that will overwhelm this sparsely settled region.

The task is beyond the ability of the cities, counties, or even the States affected. Yet the Federal Government is too remote and not presently equipped to do the job.

The entity created by H.R. 12014 should be given a charter for working with the affected States and localities to plan an orderly regional development—much the same as TVA's nonpower role in the Tennessee Valley.

It should also be given the authority to assess fees on the production of energy to pay for the schools, hospitals, housing, water supply, et cetera, that will be required.

A mandate that will require the energy companies to pay for the secondary impacts of their operations and require the development of regional plans with local governments to make sure those operations conform to environmental, water supply, and land-use concerns could be the most important work government could undertake in this area.

My own view is that it would be more important to give the government this regional development responsibility than to authorize it to build commercial shale plants. If this agency can demonstrate economical means of developing shale in an environmentally acceptable way, the commercial plants could be pursued by private companies, provided there was a strong agency in the region to shape that growth and help the localities to accommodate the influx of people.

I believe that H.R. 12014 responds to an urgent public need—to provide an alternative to the Federal leasing program which is giving us information too slowly and trading away public resources too quickly.

But, I think its mandate needs to be reshaped. Its role as an energy developer should be to bring the shale along to commercial viability that is environmentally acceptable and to provide actual demonstration so that judgments on these issues can be made.

The entity could then have the continuing role of planning and accommodating regional development which seems to me to be a missing link that badly needs to be filled.

I hope these views are of some help to the committee in charting a path in the public interest in this most difficult problem area.

Congressman Johnson's testimony illustrated my concerns and the reason why I think a broad mandate would be in the public interest.

Mrs. MINN. Thank you, Mr. Freeman. You have certainly provided the sponsor of the bill much food for thought and new considerations which should be carefully weighed in the final drafting of the legislation, which I offer this committee in the form of a model.

We are most appreciative of your comments this morning and will certainly give them complete and thorough discussion.

Of all the elements that you discussed in establishing the need for some kind of public corporation, one of the factors which I think you failed to touch upon, which was one of the very important points that I thought my legislation addressed, is the whole issue of monopoly in the field of engineering.

One of the reasons for R. & D. efforts on the part of the public corporation, which attempt to develop in this bill, is to give the corporation the kinds of responsibilities needed to create a balanced ownership pattern with regard to engineering.

As we look at the picture now, the major oil companies monopolize just about every field of energy activity—oil, gas, coal, and shale—they are in every aspect and constitute what I consider to be one of the real problems in the field of engineering.

The other concern which you did not deal with is the question of monopoly and I would like to ask if that is an important point in your view, one which we would have to deal with in legislation of this kind.

Mr. FREEMAN. It is obviously a most important point and one that should be dealt with. Interestingly enough, I have always hoped that the shale resources could be the basis for enlarging competition in the oil industry for the reason that if one pursued the R. & D. effort to the point where the grave uncertainties that hover over this resource could be eliminated, then the shale is really more like a manufacturing process than the conventional oil industry.

I think we could expect chemical companies, mining companies, and many companies who are not presently in the oil industry to enter this field and thus strengthen the forces of competition in the energy industry.

As a matter of fact, it has been often stated by some people that one of the reasons the shale industry has not been developed in the past is that the people now in the oil business did not want to hasten the day when companies that did not have their expertise in the art of going out and searching for oil in the oceans and elsewhere would be on pretty much of a competitive par with them.

We know the shale is there and much of the special expertise of the oil industry is useless in this industry.

A mining company has greater skills than Exxon or Texaco or Gulf and chemical companies that manufacture other products perhaps have at least as good a chance of learning how to cook the rock or other methods of recovery.

I think, at the moment, the uncertainties are so great that no one except companies that are making the kinds of profits the oil industries are making have the money to throw into this.

My hope would be that if we proceed with an aggressive and urgent research and demonstration program, much as we did in the atomic energy area and bring this technology to the point where the risks are minimal, the economic facts are that the shale resource could be the place where competition in the oil industry would be enhanced and perhaps there would not be a need for a public corporation to enhance competition.

I would not cross this bridge at this moment. I think that it is a consideration, but I do think there is more basis for hope that we

would get a competitive industry in shale and almost any other aspect of the energy.

Mrs. MINK. Thank you. My colleague, Mr. Ruppe.

Mr. RUPPE. Thank you for your testimony, Mr. Freeman.

I gather from your comments that you are not that enthused about the oil shale program. Would it be because you feel we should have a greater thrust in the area of conservation, or perhaps take a no-growth policy? What is your feeling about expanding energy sources in the United States today?

Mr. FREEMAN. Briefly, our project, as you know, has just issued a preliminary report entitled, "Exploring Energy Choices," where we set forth different patterns of growth and we believe that it is entirely feasible for this Nation to continue strong economic growth, virtually the same growth in GNP that we have had in the past, certainly higher than we have today. I should hope, and with a much slower rate in growth in energy through something as basically American financing.

Our studies suggest that by tightening the building codes in new construction and improving the mileage of cars and giving the industry the financial incentive, through pricing energy, to invest in conservation, that we can greatly reduce the amount of energy needed in the past.

Mr. RUPPE. So you are talking about conservation and financing.

Mr. FREEMAN. If I may, I would add one thought. Even if one assumes that we can reach a saturation point in the per capita use of energy toward the latter part of the century and reach option that we suggest as zero energy growth, you have to remember that it takes an awful lot of energy to sustain a state at those high levels. I have never suggested that we can ignore the supply side. We have tried to inject into the energy dialog the feeling that a supply oriented policy is not the complete answer, that the way to balance a budget is to cut spending as well as increase the amount available and, in effect, if we embark on these conservation programs we can buy enough time so we do not need to plunge ahead with every supply we can dream up.

Mr. RUPPE. We have a problem. Do you think, basically, that we can live with our present energy capacity, or do we now, to a greater or lesser extent, have to undertake some expansion of our energy availability? Do we have to bring on stream more energy?

Mr. FREEMAN. Obviously, there is going to be some growth and all our projections suggest that we will need some growth. Old reservoirs die. We have to have new reservoirs to replace what is being depleted.

Mr. RUPPE. The reason I say this is because I know you are interested in conservation. Would that be looking at the automobile industry, the use of a turbine engine or development of some kind of engine that heretofore we have not had that would give us more mileage per gallon?

Mr. FREEMAN. Yes. Take the lightweight diesel that has been ignored by the American automobile industry. It is an engine that, in urban driving, offers much better mileage than the engines we use.

Part of our work is to suggest that when you think of the R. & D. and the \$10 billion we are talking about spending that we recognize that there are opportunities for R. & D. for energy and conservation that can pay off more quickly.

Mr. RUPPE. Getting at your own industry, if we are going to develop a gas turbine engine that would expand mileage, do you think we should leave it to those companies to do that development or should a Federal corporation develop the engine?

Mr. FREEMAN. It is not my industry. I have no connection with the Ford Motor Co. It seems to me that the Government could use any partnership with not only the automobile industry—

Mr. RUPPE. I am talking about the auto industry. Do you think the country should develop its own corporation? Should the Government develop its own corporation, since industry has failed to meet its responsibilities in that area?

Mr. FREEMAN. I think the R. & D. program—

Mr. RUPPE. What I am getting at is should we have a Federal corporation? A Federal, not a partnership? Let us get at this turbine engine.

Mr. FREEMAN. I am in favor of the same kind of program in the automobile industry that I have been suggesting in the shale. A Federal program to take us through the R. & D. stage.

My observation is that people who are concerned about the environment will never really believe these experiments conducted by the oil companies that if they fail to grow vegetation then, obviously, shale oil is a failure and I doubt that the Nation can afford to accept that kind of answer.

Even if the vegetation grow on certain plots, there will be suspicions that this has been done especially and will not be duplicated in a commercial arena.

I feel that the experiments should be in public hands so that there would be greater confidence in results.

Mr. RUPPE. If the Government was good, the people would accept it?

Mr. FREEMAN. There has been such a relationship between the Department of Interior and the oil industry, and so many people have been going in and out of that industry, that people I speak to and that I have contact with, and my general impression is that there is a complete lack of confidence in that particular program as administered by that agency.

Mr. RUPPE. I look at Amtrak and see no great result in Amtrak that would lead me to believe that the Government could meet the Federal needs. The trains are a disgrace.

I can move to the defense, but the idea that private enterprise basically cannot be trusted, I have to say, is one I cannot support. The idea of the legislation is to get government into the picture because private industry cannot be accepted or trusted; the Government, whether it is Defense, Amtrak, post office, or the Social Security System, is the answer to our problems. I have to confess I think we are on a dangerous route.

Mr. FREEMAN. I think your statement suggests that you have gone further than I have gone in my testimony. My testimony is that we not authorize a Federal corporation for commercial develop-

ment. My testimony suggests that we should do with the shale the same thing the Federal Government has done in atomic energy and coal and carry it through the research development stage.

I don't know that we are as far apart as you suggest. I would suggest that there is no way the Federal Government can not be involved in Federal research and development that it owns.

Mr. RUPPE. It can mine it, set the ground rules in situ mining, set the vegetation rules, set the reclamation rules, which we are doing in strip mining, and can offer a variety of things. Thank you very much.

Mrs. MINK. One or several of the representatives of Gulf Oil and Standard who have appeared before the subcommittee are generally critical of the idea of establishing a public corporation to do anything, whether it is the limited concept you suggested to the committee or the proposal which I have submitted in the form of my bill, on the grounds that every government organization is inefficient. We have had experiences with TVA which compels me to ask the question whether you agree with such a conclusion, based on your experiences with TVA.

Mr. FREEMAN. I don't believe that the facts back up the assertion that efficiency is solely the province of any sector of our community. There was a Chairman of the Board of TVA, N. Gordon Clapp, that said efficiency is where you find it. I believe there is much truth in that statement.

I think that records show the Tennessee Valley Authority operates one of the most efficient electric power systems in the world and I think it is not necessarily because it is a public agency.

It was a creature of history. A lot of good people, before my time, came to TVA in the thirties. It was the depression era and there were a lot of good people unemployed and they put together a very efficient organization by any measure in the electric power field.

There are many inefficient public agencies and I respectfully suggest that some of our privately owned energy companies are not particularly efficient operations.

Some of them are now going to the State legislatures in their respective States and asking for money to be bailed out. I think we have a real problem in this country in increasing efficiency in private enterprise and public enterprise.

I would respectfully suggest, based on my own observation, having worked in one Federal corporation and having worked with private enterprises as an attorney and being in the Government, that it is a mixed bag wherever you go.

Mr. RUPPE. I understand TVA is efficient, but when I look at this bill, we are talking about R. & D. I may be confused. The testimony I have had in the surface mine bill is that TVA was one of the real reasons for the strip mining and the desecration and desolation of Appalachia.

They may have been efficient, but they ground it out of the environment of these various States. I don't know how this legislation or Federal Government could respond in a different situation.

It can be efficient in one way and not efficient in another. In other hearings they are condemned roundly for being destructive in Appalachia.

Mr. FREEMAN. I agree with this and I suggest that a public corporation can be just as gung-ho as industries. I think it is a question of mandate. TVA was given a mandate which said low-cost power period. It also suggested to my mind that it might be useful to put a death-sentence in the authorization statute for all agencies you create, so that Congress could reevaluate it after a certain number of years, but on the question that the Chairwoman put to me, the question of efficiency in terms of getting the most for the money that the corporation uses, I think TVA has an excellent record and if one wanted to use that as a yardstick, I think there would be an ample basis for going ahead with other Federal corporations in the energy field, recognizing that the energy developers, no matter what their ownership, are at odds with environmental protection and frankly, just adding this, I think there is a conflict of interest in TVA's own charter.

That is the reason I suggested to you that perhaps the more important purpose over the long haul for a Federal corporation would be the regional development purpose which TVA was authorized to pursue originally and, if you try to combine that with developers, you build a confinement into the corporate energy.

Mrs. MINK. I think that whichever way this legislation goes, the most important responsibility is with regard to the environment. Assuming the necessity for expanding our energy resources, the prime obligation which the owner has, and this is what we have been saying for 18 months with regard to strip mining, is the retention of the environment, but because they failed to assume this obligation voluntarily, we found it necessary to legislate their consciences.

Here we have a resource that is owned by the Federal Government. I don't happen to agree that because a government corporation is a public entity it is going to have per se a better feel for conservation and preservation of the environment. I regard as the most important part of this bill that which concerns environment.

Perhaps we have been too restrictive by saying that government must develop the principal technology, but as I look at the current state of technology in this area, this seems the only way to go since we know nothing about the after effects of mining or what could be done in terms of reclamation.

Contrary to the TVA experience, I would hope that the major thrust of this bill, if it ever becomes law, would be the concern of the environment.

While I agree with all the statements that have been made against TVA for their lack of concern about the environment in stripping coal out of Appalachia, it came because there was no caveat in the establishment of that corporation. I think we can meet the criticisms that my colleague from Michigan raised.

The matter of regional planning is a subject we have not really considered in developing the bill to the extent that we should. Perhaps you could amplify the extent to which we would give this authority to the same corporation.

Mr. FREEMAN. I am not sure I have thought it through in great detail myself. I just remember, from my experience with TVA that

I think its most valuable contribution was providing a regional tie-in of the concerns that affect the localities and counties and States and provided an umbrella for integrating those concerns that was not otherwise present.

I see the Rocky Mountain area as it begins this new era of industrial development in much the same way.

We heard this morning that already the particular localities adjacent to the sites are just being engulfed with people. Some of our studies suggest that if we have the kind of development that is envisioned, as many as a million people will be moving into that region in the next few decades, where they have only 8 or 9 million people today.

It is obvious that an agency which is located in the region and has a charter for examining these growth possibilities and perfecting plans to accommodate that growth and it would have the funds to put where they are needed and could do wonders in terms of a difference between the pattern of development that would occur, versus topsy turvy, unplanned, helter-skelter growth, and I don't know that it is a responsibility that requires funding, that would be any larger than might otherwise be available, but it would help the localities in the States make use of what funds are needed.

We have the problem, the obvious problem, of schools and sewers and water and supply and hospitals, et cetera, but just as one example, there is the problem of water supply for the entire region and I don't see anyone else in the Federal Government or the States that is doing the job of really developing a water plan.

We are, in a sense, while we speak of hoping for success in the development of shale and coal in the Rockies, we are not planning for success.

We are not really planning in a way that would make success possible, in my judgment.

One of the responsibilities that the entity could have would be to move beyond the speeches of water and develop a brick and mortar plan to provide the kind of water supply that would be needed if we do go to a 2 or 3 million barrels a day industry. While I am not as sure of the gigantic needs as others, or that even the advocates of massive shale development do not have as a part of their program, a program that will deliver the water supply for accommodating the influx of people in a socially acceptable way, I would think that this would be a major job that I don't see the Department of Interior doing much more than talking about at the moment.

Mrs. MINK. In terms of where we are actually today in developing oil shale, suppose we had no policy, no conservation regard for the use of this resource, how quickly do you believe the oil companies and industries could exploit this resource and pump it into our energy needs? What is the time span that we are talking about?

Mr. FREEMAN. I don't think anyone expects any commercial oil shale that would be more than a thimble full of oil before 1980.

Mrs. MINK. If we project beyond 1980, where do you think the country is going to be 10 years hence in terms of its demands for petroleum?

Mr. FREEMAN. This depends on whether the Nation adopts a conservation oriented policy. Our study suggests that we could be anywhere from having total requirements of 125 quadrillion BTU's to 90 or 95 quadrillion.

The future can be shaped by decisions of the Government and the people. To be more specific, if we decided, as a Nation today, that we wanted the average driving on the road—I don't mean the new cars—the average car, the mileage to be 22 or 24 miles per gallon, that could be made to happen.

That technology is much more real than oil shale technology. I would refer to many of the supply oriented option as pie in the ground. I think those options have great uncertainties. We know that we can build automobiles that have double the mileage of the cars today. It is a political question.

Mrs. MINK. Should it be forbidden to manufacture cars with that kind of mileage?

Mr. FREEMAN. I believe that is a very urgent piece of legislation. Obviously, one has to provide lead time, and I would suggest—say that perhaps in the next year at least 75 percent of the cars manufactured should do at least so many miles per gallon and increase that so that there is sufficient lead time.

Mrs. MINK. Is there any sense to a gradual lead time? Is the technology gradual?

Mr. FREEMAN. There is a retooling problem.

Mrs. MINK. With respect to a given car, do you retool it gradually? Do you do it or don't you do it?

Mr. FREEMAN. If the automobile industry is now geared up to making cars with engines that have mileage of 11 or 12 miles per gallon, I think it takes a certain amount of time to change the manufacturing process.

I think it is a question of looking at it from an energy point of view. I don't think I could say all 75 models would do x miles per gallon.

The thrust of my point is that we can solve that energy problem one way or the other and one way is to decide, as a nation, that we are not that hung up on the kind of engine in a car or even the size of the automobile and are willing to go toward a society in which miles per gallon approach the miles per gallon in other countries in the world.

Mrs. MINK. Is it within the framework of reasonable contemplation that in 10 years we would develop extensive manufacturing capabilities of automobiles that did not use gasoline at all?

Mr. FREEMAN. I doubt that. I do think one doesn't need to have that to contemplate that kind of solution to meeting the energy problems.

Mrs. MINK. Why not?

Mr. FREEMAN. I believe that without developing the shale, we have 9 million barrels a day of productive capacity of oil and these wells could continue to be pumped and I wouldn't think that we would need to shut in ongoing capacity. There is ongoing drilling in the Gulf of Mexico, which appears to be environmentally satisfactory.

I think the country can sustain the present productive capacity in oil, and if you think of the fact that we are a Nation consuming 110 billion gallons of gasoline a year, certainly a goal of not increasing that amount, of having enough efficiency each year to offset the growth of the population is not an untenable goal, so that the point that I am trying to make is that we can buy sufficient time to go slower than some of the energy supply options, to give us the most extreme environmental concerns.

I think one cannot focus on shale. There are many people who are more concerned about rapid expansion of atomic power. There are people on the Atlantic coast who are concerned about beginning offshore drilling and I doubt that we can stop every option and sustain the kind of economy that we have, but certainly, we can do a lot more in terms of conservation of energy than these projections of the National Petroleum Council and its other agencies that suggest that the future has to be a projection of the past.

Mrs. MINK. My argument is that even if we could and wanted to go full steam ahead on oil shale development for commercial purposes, we could not do it until the early 1980's.

People who are demanding energy today want it today or tomorrow, not in 1980. The demand for immediate development of Federal shale oil lands is not realistic nor necessary to meet current needs, so that one of the greatest arguments in support of my legislation is to take a real hard look at this resource.

We can't solve our country's problems with it anyway, so why not take a real good look at it in case we ever have to develop it. As an advocate of the bill, I am not contending that the bill is essential, but I am saying that if we have to develop this resource, let us make sure what we do is the best and the safest and the cleanest.

Mr. FREEMAN. I think your point is entirely valid, the concept that we have to panic today because of our current problems in foreclosing the future options is not a valid one, but I would like to add one thought, that the future is now and just as we ignored this problem in the 1960's, it is a problem today and unless we take some public policy actions that will reduce the demand for energy in the 1980's or increase the supply, then we will have the problems in the 1980's.

I guess my point is that the future is not going to automatically take care of itself. I agree that the shale resource is not going to help our current problem.

I think it is incumbent upon the Congress and policymakers generally to fashion a conservation oriented policy that will enable us to balance our budget that way in the 1980's, or if the country wants to pursue historical growths, that issue has to be faced today. The future will not take care of itself automatically.

Mrs. MINK. I thank you very much, Mr. Freeman, for your testimony and your response to our inquiries.

Our second witness is Charles S. Caldwell, representing the United Mine Workers of America.

We are pleased to have your presence here. We have your testimony, which we will be pleased to insert in the record in full and you may proceed in any manner you wish.

**STATEMENT OF CHARLES S. CALDWELL, UNITED MINE WORKERS
OF AMERICA, ACCOMPANIED BY DOUGLAS HARDY, RESEARCH
ASSISTANT, UNITED MINE WORKERS**

Mr. CALDWELL. Madam Chairman, the United Mine Workers of America is pleased to play a part in these deliberations.

We feel they are one step in the right direction toward creating a national energy policy that is based on the needs of the American people, and on protecting their rights, rather than a policy created by and for the energy companies, which takes into consideration only their profits and their influence.

When the Federal Government relegates to private industry its responsibilities to develop adequate resources and to safeguard the rights of the American people in such a truly vital area as energy resources, only that industry stands to gain, while the American people as a whole suffer.

It is thus our hope that H.R. 12170, introduced by Representative Patsy Mink of Hawaii, will not be an isolated effort, but rather the beginning of a broadly conceived energy policy which will include research and development efforts in the areas of coal gasification and liquefaction, Federal research and public corporations in the area of oil refining, Federal antitrust actions aimed at reducing the amount of concentration in the oil and coal industries, and Federal research and development about, and concern for, both the human and environmental facets of energy resource extraction.

Only with this kind of broad planning by the Federal Government can we hope to keep the American people provided with the energy resources which we all need without putting ourselves at the mercy of the corporate "government within a government" which runs the energy business today.

We support H.R. 12170. We think that our reasons for doing so will become clear if we state what we see to be the advantages resulting from this legislation, contrasted with what is likely to happen, in our opinion, if the development of oil shale is left up to the present system of oil company development of private lands, and the leasing of prototype Government oil shale lands.

H.R. 12170 states clearly that all strip mining of shale is forbidden and that in-ground retorting or room-and-pillar mining shall be the required technology to be used.

We think it is extremely important that the environment in the oil shale areas be protected and that the tragedies of water erosion, water acidification and salinization, the creation of huge waste areas, and the other well-known environmental hazards of indiscriminate strip mining be avoided in this new area of mineral exploitation.

This is particularly true because the geographical areas involved are so extensive and the tonnages involved are so huge, while the land is in such a delicate ecological balance due to the fact that it is desert and sagebrush terrain.

A prototype surface oil shale operation which would produce 50,000 barrels of oil a day would discard 70,000 tons of waste a day, while a "mature" oil shale industry producing a million barrels

a day would have to mine and discard a fantastic 1,400,000 tons of waste in a day in order to produce this amount.

The fact that the shale rock expands in volume by 10 to 25 percent when it is retorted to remove the oil makes the magnitude of the problems created by stripping shale oil even greater. It has been pointed out that if we were to produce oil shale primarily by this method, it would be the equivalent of digging the Panama Canal every 24 hours. This is a staggering prospect.

Because of the scarcity of water resources in the oil shale area, the choice between strip mining or underground mining and in situ shale oil recovery has ramifications which also extend far beyond the land area directly involved.

Either strip or underground mining will require the oil to be recovered aboveground in huge retorts which will require extensive water usage.

In situ recovery will eliminate much of the need of water. Strip mining will also require commitment of water for irrigation of reclamation efforts if the land is to be revegetated. Irrigation will be absolutely necessary if reclamation and revegetation are to succeed in such an arid environment.

In situ recovery will not even disturb the surface vegetation and will thus eliminate the need for any revegetation efforts and the water usage they entail. If water is wasted for oil shale development because strip mining is used, it will be denied to alternative uses such as coal gasification, agriculture, and recreation. Private profits may gain, but the public will suffer if oil shale is strip mined.

Rather than try to limit the impact of strip mining on the oil shale lands, the present leasing arrangement seems to be heavily slanted toward the conclusion that strip mining is the preferred technology for most oil shale recovery.

The Interior Department has, for instance, offered the lessees space on Government land outside the lease tracts themselves for disposal of waste shale. And the Government has estimated that on the richest tract to be leased—C-A—the difference in recovery rates for different mining processes is 4 billion barrels for the strip operation to 1.3 billion barrels for conventional methods.

Given this choice, a choice that will make a 2.7 billion barrel difference, we find it hard to believe that private industry will choose environmentally sound technology; especially since the Interior Department has encouraged them by designating the land as suitable for surface mining.

Likewise, the other rich Colorado tract—C-B—with reserves of 723 million barrels, has also been designated for strip mining, while inferior plots in Utah with estimated 244 and 266 million barrels of reserves have been set aside for underground mining and thin, deeply buried tracts in Wyoming were designated for in situ recovery technology.

Publicity from the Interior Department boasts of a leasing program which is designed to give several technologies a test and to develop several oil shale mining methods so that environmental and economic decisions for future oil shale industry can be made

rationally, but the program does not require that any specific technology be used and does not impose limits on the use of environmentally destructive methods of recovery.

In fact, the present leasing program tips the scale heavily toward strip mining by designating the most valuable and productive land as suitable for this technique while the leases with marginal value are designated for underground recovery. It is almost as if the prejudgment that in situ techniques would only be used as a last resort had already been made.

In addition, the lack of any requirement for underground mining at any of the sites, combined with the certainty that strip mining will produce the most effortless and highest short-term profits, leaves us in great doubt both about the environmental protection and the prospects for development of sound, long-run oil shale technology offered by the present leasing program.

Only a Federal, nonprofit, long-range oriented corporation stands to be the kind of operation which can develop oil shale for the benefit of the American people and not for short-range corporate profits at public expense.

Private oil shale development also leaves unanswered questions of whether meaningful R. & D. in oil shale will take place at all if it is left to private companies either on their own land or on Government leases.

There is no guarantee that oil shale production beyond the limited pilot stage will happen and that the technology for a full-scale oil shale industry will be developed in a reasonable period of time. Private industry has announced plans for several plants on private property, but none exceed a planned output of 50,000 barrels a day, which is still pilot plant size.

There is no guarantee that even those will be built if there is a drop in the price of oil or if the effects of the energy crisis wear off or any of a number of developments take place.

Most of the current oil shale activity seems to be a way to hedge on the future and if some overall understanding is reached among the oil companies, they might well all pull back from these plans. In an industry where tacit agreements to limit the effects of competition have been rampant, there is no guarantee that this will not happen again.

The shale oil leasing program is touted as a solution to this problem. It claims to be an effort to stimulate construction of pilot and demonstration plants and to be able to develop oil shale technology through these efforts.

However, the leases require only a minimal level of production, far below what is really necessary to either test or develop a large-scale oil shale exploitation. Even on the richest tract—C-A—the lease only requires a production of 22,000 barrels a day after 15 years.

Thus, even after 15 years of the leasing program, the technology could be far short of the 50,000 barrels a day required for a pilot plant, much less a demonstration plant or a full-scale commercial venture.

The levels required in the leases are as follows:

Tract	Shale grade	Thousand tons per year	
		6th year	15th year
C-a-----	30	1,130	11,300
C-b-----	30	616	6,160
U-a-----	30	208	2,080
U-b-----	30	227	2,270
W-a-----	20	215	2,150
W-b-----	20	214	2,140

Once again, the real decisions will be up to the same companies which lacked either the foresight or the interest in America's welfare to develop enough refining capacity to keep us out of an energy crisis; the same companies which declined to import oil which was available to them in the months of the oil embargo because an FEO ruling made it less profitable for them to do so; and the same companies which are getting fat on the sales of their oil and coal reserves and thus could hardly be expected to be enthusiastic about developing a rival source of energy until it ideally suits their purposes.

The present leasing program is absolutely useless as a guarantee of oil shale development—only a program of Federal development of Federal oil shale lands can provide this guarantee.

The history of the development of both oil shale technology and of synthetic fuels from coal, our Nation's most abundant energy resource, should give us some idea of the future of the oil shale industry if it is left in the hands of private enterprise, as it surely will if this legislation is not passed.

The theoretical knowledge behind oil shale development, as well as that for coal gasification and liquefaction, has been known for several decades.

The Germans developed several coal liquefaction and gasification processes prior to the end of and during World War II and used a number of them in actual production of most of the aviation fuel and other gasoline that they used in the latter part of the war. In fact, that is what kept them going for so long.

The technology became available to us during the occupation and several of the actual plants were studied by American engineers during that time.

The Bureau of Mines built and operated a demonstration plant to test coal gasification technology from 1948 to 1953, when the project was closed down by the Eisenhower administration because of strong opposition to it from the Nation's oil industry.

Another attempt to develop our coal resources, a planned coal liquefaction plant which was to explore the technology of coal hydrogenation, was quashed in 1951 when the Government succumbed to lobbying by the National Petroleum Council rather than come through with the program developed by the Bureau of Mines. The Bureau at that time was very concerned about developing pilot plants of a commercial size and readying synthetic fuel technology for a time when it might become necessary—because of a desire for self-sufficiency in energy production—or commercially feasible.

The National Petroleum Council, on the other hand, was concerned only with the dubious short-term profitability of the process, not with the long-run energy situation or with national security.

This has been—until very recently—the constant pattern of oil industry responses to the development of synthetic fuels. At that time, the oil companies didn't own coal companies and coal reserves as they do now; just as today they don't hold the vast majority of oil shale lands. There is little reason to believe that they will be more enthusiastic about developing oil shale technology now than they were about coal gasification then—at least that is the way it seems to us.

The history of the Government oil shale R. & D. programs are almost the same as that of coal-based synthetic fuels.

The Government set up its oil shale pilot plant at Rifle, Colo. after World War II. This plant—the Anvil Points facility—showed rapid and original development of new oil shale mining and retorting technology between 1944 and its closing in 1956. It developed ways of cutting underground mining costs for shale oil rock to a fraction of what it had been, developed a continuous retorting system with a much higher percentage rate of oil recovery, experimented with commercial uses for both the oil and the byproducts of the retorting process, and brought the overall costs of shale oil production to what was considered to be a competitive position with crude oil. Yet the plant was closed in 1956, primarily because of pressures from the oil industry and over the objections of the Bureau of Mines.

The oil industry recommendations were couched in terms of the lack of profit potential of oil shale, as they had been with coal gasification, but it is clear that they were far more concerned with the possibility of competition from an uncontrollable source.

They were unwilling to let the Federal Government develop shale oil technology which would then be in the public domain and which would broaden the possible competitiveness of the energy industry to include mining companies or other capital-rich, nonoil companies.

Finally, they naturally were concerned that the Federal Government would eventually develop the oil shale on public lands itself through legislation similar to H.R. 12170.

These were the reasons why the oil industry got the Federal Government out of the shale oil research field in the past. For the same reasons, the oil industry would like to monopolize and control the growth of the oil shale industry today.

And that is precisely why H.R. 12170 has the potential to produce needed oil as part of a rational energy supply mix; to provide competition in a badly monopolistic industry; and to develop the 85 percent of shale oil on public lands for the benefit of the public with the least possible environmental damage.

This bill holds out a hope of developing technology that will make oil shale an attractive and feasible energy source for years to come and not just an emergency measure in a time of shortage.

The presently ongoing leasing of oil shale lands does nothing to change the situation as we just stated it. The leases are just a small fraction of the total reserves which the Government holds in trust for the people.

Until the oil companies control much more of these vast reserves, there is little reason to believe that the oil shale leasing program will be anything more than a search for a quick profit by the oil companies. From their viewpoint, development of a long-range, environmentally sound technology for oil shale on the present leases will just serve to raise the prices for future leases.

Instead of responsible development we are likely to see the present oil shale leases used either as a wedge to open up the exploitation of all the Federal oil shale land to private companies and their attempts to make fantastic profits from yet another energy resource, or the oil companies which have the leases will hold back on production of oil from them as long as possible until they have gotten all possible profits out of their oil and gas holdings and until the potential price for the shale oil goes up as high as they foresee it going. This has been the pattern with the oil companies' holdings of coal reserves and they may well use the same tactics with the oil shale leases.

Whatever strategy the oil companies use will not help the development of meaningful oil shale technology. Neither of the familiar monopolistic tactics of buying out potential competitors and either destroying them or regulating them to a minor sector of noncompetitive marketing will help America exploit oil shale for the good of the Nation as a whole.

H.R. 12170 will also guarantee that the true value of the Federal oil shale lands will be returned to the American people. This is particularly important in light of what appears to be a serious undervaluing of the lands presently being leased.

It is virtually impossible for us to evaluate the worth of our oil shale land in the public domain and to make sure that the true value is returned to the public when exploitation of this land is done in the private sector. The one thing we do know about the value of these public lands and resources is that they have been scandalously undervalued in the past.

Only 6 months ago, before the first of the present six oil shale leases was bid on, the Interior Department decided it would accept bids of less than \$10 million for the first tract—C-A—that was to be let, according to their later testimony before the House Small Business Committee. This is the tract that was later leased for \$210 million on January 8 of this year.

The Interior Department was willing to accept less than 4.8 percent of the price which it actually got for the lease. It is now fairly obvious that even the bids which were received were practically a giveaway compared to the actual value of the oil shale involved.

The present oil shale leasing bids are being called "record high," but in fact they are miniscule compared to the potential profits which they could produce.

They also represent inflated figures because there are clauses in the leases that make it unlikely that the full amount will actually be paid. The leases can get back as much as 40 percent of the original bonus bid, plus a similar percentage of the first 8 years of production royalties, as a chargeoff against development costs.

The price of the oil on the first lease—C-A—comes to an amazingly low 5 cents a barrel even before this 40 percent discount, so it could be as low as 3 cents a barrel after the chargeoffs are made. This is a scandalously low price for oil which it is estimated could sell for as much as \$18 a barrel.

Estimates for production costs of oil shale, by industry sources, range from \$1.18 to \$1.85 per barrel at the mine site. The royalty to the Government is only in the range of 16 to 17 cents a barrel. The estimated capital cost of a 50,000-barrel-a-day plant is about \$250,000. At a price of \$10 a barrel, which is not unreasonable in today's market, especially for such high grade petroleum, and even allowing for costs up to \$4 on the west coast, the plant could be paid for and delivering high profits in a little more than 2 years.

Mrs. MINK. Is that \$250,000?

Mr. HARDY. The cost of the plant? That is right.

Mr. CALDWELL. Can you state your source?

Mr. HARDY. I think it comes mainly from articles in the Wall Street Journal which quote different petroleum sources. I could give you the exact figures.

Mrs. MINK. If you might double check that. Counsel tells me the figures we have for the capital cost for such a plant are higher.

Mr. CALDWELL. We will certainly give you our source.

Even assuming that costs might be higher and profits lower, the fact remains that we don't have enough information to make sure that the public really gets protected in oil shale leasing programs; and with the oil industry's secretiveness, we are not likely to get that information from the lessees, but the information that we do have points to huge windfall profits for the oil shale lessees.

Who are they? The only companies with the capital and the technology to bid on the oil shale leases were the same monopolistic companies which now control the energy resources of this country from oil to gas to coal. This fact is largely a result of the past industry abuses which it is the purpose of H.R. 12170 to remedy.

The fact that the oil industry giants are the only ones with sufficient technology to exploit oil shale is largely explained by the fact that the Government research at such facilities as Anvil Points was terminated due to pressure from the oil industry.

And the reason that the oil industry has been able to move forward on its own research is that it has been allowed to form wide-ranging consortiums for oil shale research in violation of, at least, the spirit of our antitrust laws. And the reason that oil companies have the capital to make these bids is, again, because they have been allowed to form consortiums.

The winners in bidding so far have included industry "teams" of (1) Phillips Petroleum and Sun Oil; (2) ARCO, Ashland Oil, and Oil Shale Corp.; (3) Standard Oil of Indiana and Gulf; and (4) Phillips Petroleum, Sun Oil, and SOHIO Petroleum.

These are the same companies which are now reporting huge profits for the last phase of the energy crisis. Both the profits and the technology of oil shale belong in the public domain.

Without this assurance that both the operations and the profits on the oil shale lands will be open and public, the American people

face too big a risk that they will end up relinquishing public resources for private gain.

The guarantees to sell the products of the oil shale lands developed by the federally-owned Oil Shale Mining and Energy Corp. to refineries which do not have their own sources of crude oil is a step in the right direction of progress toward breaking up the concentration of the oil industry.

In the future, the experiences of the Oil Shale Mining and Energy Corp. should also be used as input for further legislation revolving around the concentration of the oil industry and facing questions of how competitive the oil industry, with its high percentage of vertical integration, really is.

Some thought should be given to the possibility of the Oil Shale Mining and Energy Corp. building its own refineries for shale oil in the future.

There is little doubt that the energy industry is too concentrated and that the creation of a federally-owned oil shale corporation is one opportunity to open up some competition in the industry and to gather information for further legislation in the future.

H.R. 12170 also set a good precedent for blocking the oil industry from buying competitive energy resources. This kind of precedent might eventually be applied retroactively to force the oil industry to divest itself of the coal companies and reserves which it has accumulated in recent years.

As we stated in our introductory remarks and as we have pointed out in our testimony about the history of research and development in the oil shale industry, there are many parallels between the oil shale industry and coal gasification and liquefaction.

Although the creation of a Federal oil shale corporation may seem more pressing because the shale is largely located on Federal land, the fact that a similarly dedicated effort in the field of coal research by the Federal Government and a Federal demonstration plant for coal gasification or liquefaction technology is also vitally necessary.

Hopefully, the issues raised in justifying this project will not be forgotten and there will be more understanding of the needs for Federal leadership in all the energy producing industries and more understanding that private industry will not develop new technologies and new energy sources out of concern for our national well-being, but only out of concern for its own profits.

We should realize that just as the Nation needs rational, long-term development of its oil shale resources, it needs even more to develop the natural resource that provides roughly 88 percent of its energy reserves—coal.

And like the industry role in the oil shale, the energy monopolies are not going to develop any new energy resources which compete with their present sales and might bring the price of their present products down. It will require a Federal effort in both oil shale and coal gasification and liquefaction if we are really to develop these resources in line with the needs of the American people and not in line with the few oil barons who presently profit from the energy situation as it stands today.

Madam Chairman, we would be delighted to answer any questions you may have.

Mrs. MINK. Thank you, Mr. Caldwell, and I would like to note the presence of Mr. Douglas Hardy, who has accompanied you.

Your capacity is a legislative director?

Mr. HARDY. Legislative Assistant. There is a staff on the Hill and a young lady by the name of Miss Schwartz.

Mrs. MINK. We are most pleased to have the statement of the United Mine Workers and, I believe, it is the most comprehensive statement we have received on the legislation. We are most delighted to have the support of your union.

Mr. CALDWELL. I am more than delighted to deliver it. Mr. Hardy has done most of the research.

Mrs. MINK. I can see he has done a lot of work on the bill. I assume it comes from the fact that the chairman had to postpone these hearings on numerous occasions because of our efforts to get on with the strip mining bill.

We are pleased to have your comments. They have been thoughtfully constructive and certainly coincide with the reasons for my having the bill prepared in the first instance and I am delighted to have your concurrence.

On page 8 you note that the Anvil Point operation of the Rifle research project, Rifle, Colo., of the Bureau of Mines was cancelled in 1954 as a result of oil company pressures. Could you give us some reference or point us in the direction of any reports or any documentation which support your conclusions?

You noted that the plant was closed over the objection of the Bureau of Mines. Was there a public document to that effect? Could an inquiry be made to the Bureau of Mines or a document be made available for the examination of the committee?

Mr. HARDY. I believe that the pressure that I have cited from the oil industry is primarily in the form of a statement by the National Petroleum Council, which recommended that, because the oil shale plant or oil shale as a whole as an energy source was not feasible commercially and that this kind of research and development be dropped.

Mr. CALDWELL. Those statements have occurred each time and every time the Government is encouraged to cease and desist from research programs. It was always decided that it was not commercially viable this week.

We can provide that documentation from the Petroleum Conference.

Mrs. MINK. I assume this was an activity largely financed by the Government, the one you mentioned at Rifle, Colo.?

Mr. HARDY. Right.

Mrs. MINK. What influences would the lack of commercial feasibility at that time have on whether the Government went forward with its R. & D. activities? If we could get our hands on a committee report that could be cited, it would be most helpful in outlining for the benefit of the members of this committee the difficulties that the Government has had in mounting the kind of research and development program needed.

We always knew the shale was there. It is not something discovered yesterday, after the embargo. We have known about it and

yet failed to do the kind of research that this resource, in my view, would have merited. Any documents or references you could give to the committee which you might have in your files would be most helpful.

Mr. CALDWELL. We will provide that.

Mrs. MINK. One of the justifications that Secretary Morton stated publicly in press releases and as well as in testimony before this committee in regard to the oil shale leasing program is that there would be opportunities for all types of methods to be tested by virtue of the variability of the properties, where they are located and the kinds of deposits they contain.

In the offering of the Wyoming tracts which had been listed for in situ technology, there were not takers. Have you any comments?

Mr. CALDWELL. That doesn't surprise me considering the fact that the strip mining of these lands is much more profitable as an enterprise.

Mr. HARDY. It seems obvious that the reason that the Wyoming plantsites were so unattractive is that because they were sites which had very little or thin and deeply buried reserves to begin with.

The last tract of sites were relegated to that in situ technology and the most attractive were designed as those that were suitable for strip mining. It seems that it is pretty obvious what would happen and it has come about.

Mrs. MINK. The witness just before you, Mr. Freeman, suggested that my bill went too far. He was not very much taken by the notion that we should develop a "public corporation" like TVA which would commercially develop the oil and sell it.

His view of the kind of public corporation we need is an R. & D. type effort where there would be a specific charge given the corporation, which would take into consideration social and economic impact problems. He also suggested the inclusion of a regional development kind of mandate in the bill.

Would you care to comment on this proposal? Do you think this is an advisable step forward or do you still favor the concept proposed in my legislation?

Mr. CALDWELL. We are not prejudicial either way, frankly, on the ownership of the resources to be developed, be it the Government or a private institution.

The facts of the matter are that this country is one of the few that has extensive private development of energy resources. From the standpoint of the United Mine Workers, we got one of our best contracts and made one of our furthest relative to the health and welfare of UMW membership when the Government-owned mines in the late 1940's.

We had to press the operators to the point of the Government taking over the mines before we could get a decent health and welfare plan adopted.

We are not aware of the benefits of a Government-owned energy source. In this situation, it seems that the public already owns these lands.

It is not a question as it is in many cases in coal mines or oil companies and so forth, that are developing resources, but the public owns these lands.

Mr. HARDY. It seems that Mr. Freeman's suggestion ignores the other half of our testimony, which is the monopolistic form of the energy industry in general.

While this public corporation certainly should be very sensitive, both to the environment and the development of the areas involved, it also will have potentially a great effect in demonopolizing or providing an alternative to monopolistic control of the energy industry in this country.

Mrs. MINK. Mr. Ruppe.

Mr. RUPPE. Thank you very much. I missed parts of your statement which I regret. Basically, looking over it briefly, I would gather that you are for a number of reasons disinclined to go into oil shale development and do not look at it with a good deal of favor.

Mr. CALDWELL. We prefer that if it is to be developed, we feel that it would be better developed, since the public owns the land, by a public corporation.

Mr. RUPPE. And underground mining preferably to strip mining?

Mr. Caldwell, how do you feel on strip mining of coal? Has your organization supported surface mining coal in the West?

Mr. CALDWELL. We have supported the regulation of surface mining wherever it exists. We have stated in testimony before the Congress that the union—although it represents one-fifth of the total of our membership—that if you can repair this land and put it back and pass legislation that requires the bonds and requires the reclamation procedures, then strip mining should be able to proceed.

If you can't repair the hillsides of southern Appalachia, the company shouldn't be permitted to mine those lands.

Mr. RUPPE. So if we get a strip mining bill, then you are in favor of surface mining.

Mr. CALDWELL. We are in favor of its being regulated, that lands are not disturbed when they cannot be reclaimed.

Mr. RUPPE. You mentioned that you got one of your better contracts from the Government when it operated the mines. Does this have any bearing on your opinion?

Mr. CALDWELL. I used that as an example of our lack of intimidation by the hob-goblin of government ownership. The fact of the matter is that the coal was mined during that period of time and the country continued to operate for almost a year, but the Government had to intervene in that situation, was brought into it a labor dispute to the point where it forced the operators to sign the health agreement.

Mr. RUPPE. Would you agree that a contract could be operated more successfully with the Government, rather than private industry?

Mr. CALDWELL. It depends on the situation.

Mr. RUPPE. You mentioned substantial profits of people in the energy business. Were you referring to the people operating the coal reserves at the present time?

Mr. CALDWELL. The oil companies that control such a vast coal reserve resource in the country have not been developing it at the same ratio.

Oil companies control half the coal reserves in the country. They are the dominant owners of some 20 to 25 percent—you could probably give more exact figures of the coal operators right now. Coal operators or subsidiaries of oil companies.

Mr. RUPPE. Were you referring to the coal industry or oil industry when you mentioned profit?

Mr. CALDWELL. Coal.

Mr. RUPPE. I read that Peabody has lost money. The coal industry is in a terribly unhealthy state and they are going to have to get better prices or get the oil to enter in because coal production is declining and coal profitability for producing is declining and generally the coal industry is in a sorry state of disarray and perhaps financial chaos.

Mr. CALDWELL. We would admit that it is in a sorry state, especially when it comes to safety conditions in the mines, but the fact of the matter is that it costs a good deal for a ton of coal these days. We would like to see these books ourselves.

There are many ways of coming up with figures about what one loses and what one does not lose. I am in a couple of business enterprises myself and have some familiarity with it. I keep asking if we are doing so poorly, why have we got money in the bank, which is what I ask the accountant.

Mrs. MINK. We appreciate your testimony and thank you very much for taking the time to give us the benefit of your views on this legislation.

I would like to ask unanimous consent that the statement of the Wilderness Society be inserted into the record at this point and that the statement of the National Audubon Society on this legislation be inserted in the record at this point, and without objection it is so ordered.

[The statements of the Wilderness Society, the National Audubon Society, and the Society of Vertebrate Paleontology, follow:]

STATEMENT OF THE WILDERNESS SOCIETY, SUBMITTED BY BRIAN MASSUMI

The Wilderness Society, as an environmental organization of national purview, is deeply concerned about future energy policy and its consequences, both social and ecological. We greatly appreciate the opportunity to comment on the Subcommittee's work in the area of oil shale development, a subject of disconcerting complexity in need of full Congressional examination. Oil shale holds great promise—promise of eventual, partial fulfillment of the nation's petroleum appetite, promise of employment and regional economic enhancement, promise of wholesome profits, and, unavoidably, promise of desecration, exploitation, and tragically ill-considered developments and alteration. We think that, if oil shale is to be explored in a rational, farsighted manner, it will be along guidelines borne of the deliberations of this committee. We offer our recommendations in the hope they will assist in the evolution of wise policy, not only for our situation, but for our inheritors' as well.

PRESENT POLICY

In recent informational hearings before the Mines and Mining Subcommittee Secretary of Interior Rogers Morton was asked what could be done about the necessity of damaging lands adjacent to oil shale leases by off-site disposal of spent shale.

"Well, we will have to face this issue," he said in a remarkable display of concern. If this reaction epitomizes the Interior Department's stance on

the numerous shortcomings of its prototype leasing program, it will indubitably have a lot to face in future years. It will have to face the issue of providing great volumes of water to a voracious industry and sprawling subsidiary developments. It will have to face the issue of political squabbling over the increasing salinity of the Colorado River. It will have to face the issue of the possibly insurmountable obstacles to permanently rejuvenating tens of thousands of acres of sterile land. It will have to face the issue of compliance with the 1970 Clean Air Act, the Federal Water Pollution Control Act, and the Endangered Species Conservation Act of 1969. And, perhaps most importantly, it will have to face the issue of ordering a potentially chaotic influx of people and providing for their accommodation in a manner not in conflict with the natural environment. In short, this unprototypical prototype program will thrust upon the Department and the people of the United States the task of dealing with all the problems a true prototype program would be designed to solve.

These difficulties stem from two basic attitudes evidenced in the Oil Shale Lease itself. The Interior Department began with the unfair supposition that the immediate development of oil shale was both necessary and desirable, and that its obligation was to expedite recovery while *mitigating* side-effects. Thus, the tract-selection procedure emphasized economic considerations, all environmental stipulations were qualified by "to the extent practicable" clauses, and discretionary waiver-power was entrusted to a Mining Supervisor, who, apparently assumed competent in all fields of science, was also enjoined to judge the efficiency of the provisions of each plan ultimately required. Substantial guidelines which would have given the program at least the appearance of a research-oriented trial operation were sacrificed to expedience. But, the need for, or even the possibility of, substantial energy from oil shale in the near future has not been demonstrated; neither has the veracity of the belief that the benefits will outweigh even the lessened social and ecological costs.

The Interior Department estimates that by 1985 oil shale will yield a total of one million barrels per day, 250,000 barrels (or 1.5% of projected demand) of which will originate on public lands. These figures are undoubtedly over-optimistic. Even the National Petroleum Council considers a mere 400,000 barrels per day a likely total 1985 production rate, and even this takes for granted availability of all needed Federal land and optimum working conditions. A recent announcement by Standard Oil of Indiana (leasees on the C-A tract) that they will not reach maximum yield until at least 1987 seems to favor the NPC's position. It is crucial to note that these numbers are for the gross outflow, and do not take into consideration the immense energy consumption of the industry and its ancillary developments. No study of the net energy gain was included in the Final Environmental Impact Statement. None has even been conducted. And atop the irresponsible assertion that the potentially miniscule energy gain warrants risking irreversible and widespread destruction is added the further assumption that neither conservation, nor alternative sources of energy, nor changing economics, nor any combinations of these, will compensate for the difference. It trains credibility. Yet it satisfies Mr. Morton. His actions show his refusal to admit that there are very fundamental questions which must be answered by a legitimate prototype program, and that there is time to answer them adequately.

The approach the Interior Department has chosen is to speedily implement a large-scale commercial operation highly subsidized through liberal royalty policies and ridiculously low bid minimums and revegetation expenditure limits, while simultaneously opening the way for eventual massive development elsewhere. Up to 120,000 acres of oil shale land in Utah may be turned over to State control, making possible unlimited private activity free of Federal regulation. In an even more objectionable case, several adjacent leases for nahcolite mining are being let on some of the richest shale land in Colorado. Aside from the seeming illegality of approving applications to mine a substance of secondary value on prime oil shale lands, and of consolidating adjoining leases, are the facts that oil shale will be dug and stockpiled by the leasees, and that most of these same leasees are, or have substantial interest in, oil shale companies. The entire affair seems to be an underhanded method of promoting still more expansion in an industry which is supposedly yet to be proven through the prototype program.

THE FEDERAL OIL SHALE CORPORATION ACT

The history of the Interior Department's comportment on the subject of oil shale is one of insensitivity and mismanagement of scandalous dimensions. As the preceding cursory treatment indicates, the good of the people has been consistently forfeited to the advantage of industry. Public policy has once again been molded by private interests, and the future will see the evolution of yet another corporately controlled energy fiefdom if Congress does not act to restore public priority and ensure open, democratic administration.

Representative Mink and the Congressman co-sponsoring the Oil Shale Corporation Act merit commendation for their bold attempt to institute an equitable, measured approach to the development of oil shale on Federal land. The Wilderness Society fully supports the idea of the establishment of a Federal Corporation to oversee oil shale activities on government lands, and endorses the concepts embraced by H.R. 12014, with few reservations.

As recognized in H.R. 12014, two of the elements essential to a successful energy research and development stratagem are the provision of adequate public input, and stipulations designed to safeguard environmental integrity. The bill is lacking in neither, but can stand considerable improvement in both.

PUBLIC PARTICIPATION

The most significant vehicle of public participation in the proposal is the Environmental Advisory Committee, which is a carefully balanced panel of industry, governmental, and citizen representatives. Although it is empowered to fulfill necessary consultory functions, and has discretion over what technology is to be employed, the committee is excluded from direct influence over what is undoubtedly the most monumental decision the corporation will face: the determination of the validity of the prototype program authorized in Section 18 (c). If a full commitment to public access in governing public works is to be salvaged, the Act must be amended to include the Advisory Committee in this central debate. Subsection (c) should be reworded to require that, before large-scale operations can begin, the prototype program be deemed environmentally acceptable by a majority vote of the Environmental Committee.

In addition, review by the general public should be guaranteed through the preparation and consideration of an Environmental Impact Statement which draws on data amassed during the prototype program, and assesses the multifarious effects of a mature oil shale industry. The overall studies should be supplemented by subsequent Impact Statements on individual installations, as outlined in Section 17 (c).

Additional amendment

Section 17 (c), p. 36 line 1: Insert after "the President shall appoint", the words "... at the recommendation of concerned Federal agencies, including, but not limited to, the Environmental Protection Agency and the Department of the Interior. ..."

ENVIRONMENTAL SAFEGUARDS

Development of oil shale brings with it the potential for destruction of virtually every facet of the region's ecosystem. Hastily ill-considered exploitation, as is the ostensible goal of the Interior Department, could precipitate regrettable disruptions.

Maximum despoilation is achievable through strip-mining, which is the planned method of extracting on Tract C-A of the existing leasing program. Direct surface disturbance at the mining site is coupled with the off-site disposal of huge quantities of overburden, and spent shale sterilized during the retorting process. It is estimated one small commercial operation (50,000 b/d) would, in twenty years time, require from 5,000-7,000 acres of land in addition to the mine site itself. It is true that, with fencing, leaching, and heavy fertilization, disposal areas can be revegetated for a time, but it has not been established that the plants will persist without continuing care, or that indigenous biotic communities can be restored to a level of acceptable productivity and wildlife utility. Without compating, which is only possible using the TOSCO II retorting process when the stone is in a granulated form, saline runoff could cause a significant rise in the salt content of the area's water.

Then, of course, is added the problem of air pollution from processing and construction. Even one small plant could have significant direct adverse impact. When magnified many times to reflect the impact of extensive development, the outcome is insufferable. These same difficulties apply to underground mining, though on a much smaller scale.

H.R. 12014's ban on surface mining and unequivocal preference for *in situ* over room-and-pillar techniques are not only justifiable, but absolutely indispensable for wise administration. The adoption of these principles will do much to make oil shale development environmentally acceptable. Nonetheless, immense obstacles remain; some problems will persist regardless of the technology utilized.

Large quantities of highly mineralized water will be pumped from the ground, necessitating construction of holding reservoirs, which will again increase surface disturbance. A 250,000 b/d industry would produce enough waste water to increase the salinity of the Colorado River 10%, further complicating relations with Mexico, and increasing pressure for a destructive nuclear desalting plant in the Arizona desert.

A dramatic increase in population at an equally dramatic rate would result from an expanding oil shale industry, imposing incredible pressures upon the agricultural economy of the shale zones of Utah, Colorado, and Wyoming, and multiplying environmental hazards many fold. Growth would bring with it problems of urban sprawl, waste disposal, crime, and the necessity of providing public facilities, such as roads and schools. Secondary industries would spring up; power and water would have to be provided. The West would see an accelerated re-enactment of the systematic devastation so tragically completed in the Eastern United States.

The proper domain of an oil shale prototype program is not only to seek ways of ameliorating the adverse effects, but, through research and working experience, provide us the information sufficient to determine to what extent (or if) these effects, once ameliorated, will indeed be outweighed by the benefits. The Oil Shale Corporation Act authorizes a prototype program, but lacks regulations necessary to ensure the complete analysis so vital to the country's future. The Wilderness Society urges the amendment of Section 18 (c) to specify that the research phase shall include:

1. experimentation on, among other things: methods of desalination or demineralization of waste water; injection wells; techniques of *in situ* processing; and, if underground mining is contemplated, air monitoring and airshed characteristics, three-minerals industry, backfilling, and revegetation.

2. the production of a total energy systems model, depicting, as accurately as possible, the energy inflow, gross energy production, and net energy gain of a hypothetical mature oil shale industry and resultant development.

3. the production of an Environmental Impact Statement, based partially on working experience, which will delineate the overall regional social, ecological, and economic effects of a mature oil shale industry.

4. the production of a social-environmental cost-benefit analysis using the results of the above studies.

We believe that the prototype program is the most important feature of the entire research and development project, and we are certain that, when thus strengthened, it will serve the purposes of the Oil Shale Corporation Act to the fullest extent. It must be kept in mind that we are dealing with an issue that affects not just remote localities in the rugose Green River Basin, but one with ramifications so diffuse as to be nearly incomprehensible. Caution is due.

Additional amendments

1. Section 17 (a), page 35, line 12. Omit "as far as practicable".
2. Section 18. Add a clause stating, "The Corporation shall not use nuclear fracturing techniques for *in situ* processing."
3. Section 19 (c). Omit.

STATEMENT OF NATIONAL AUDUBON SOCIETY, SUBMITTED BY C. EUGENE KNOTER

We appreciate your invitation to present our views on H.R. 12014, a bill "To Amend the Mineral Lands Leasing Act to provide for a more efficient and equitable method for the exploration for and development of oil shale resources on Federal lands, and for other purposes."

We support the enactment of this bill, and we applaud its authors and the Congress for this sane and even-handed approach to the development of the Nation's oil shale resources. In our 1972 analysis of the Department of the Interior's Draft Environmental Statement on the Proposed Prototype Oil Shale Leasing Program we called upon the Congress to review the entire program and to re-define the public interest in modern terms—as opposed to those embodied in the archaic and obsolete General Mining Law of 1972 and the 1920 Minerals Leasing Act. H.R. 12014 contains most of the provisions we sought and which we were confident would be provided as a result of Congressional review.

The purpose of H.R. 12014 is to establish a public Oil Shale Mining and Energy Corporation with exclusive right to explore and develop oil shale energy resources on Federal lands, and to assure that the Nation's energy requirements are met without degradation to the environment, and to assume responsibility for ameliorating the adverse economic and social effects of oil shale development. We believe the provisions of this bill to attain these goals are the most comprehensive and realistic of any that we have seen advanced to control oil shale development. The strong thrust of these confident and positive legislative proposals is in direct contrast to the vacillating, diffuse and evasive provisions of the Department of the Interior's lease program.

We heartily endorse the proven administrative concept of a single designated Corporation (with statutory restraints) for the development of oil shale on the public lands. This Corporation, with the authorities and constraints provided in this bill, should prove more responsive to citizen and community needs than the oftentimes vast, unwieldy and overlapping bureaucracy of the Interior Department and its alternative lease program. This aspect alone would justify establishment of the Corporation provided for in this bill.

We also strongly applaud the many statutory measures contained in the bill for environmental protection. Some of the outstanding ones are a complete ban on surface or strip mining, promotion of acceptable mining methods and technology, establishment of a balanced and effective Environmental Advisory Committee, provision for application of NEPA safeguards throughout the ongoing development program, stipulations for land use planning and many other specific provisions for preserving and enhancing the environment. We are delighted that these many safeguards are not only being provided by statute but that in most cases they are vigorously mandated by the language of the bill.

We do have a few suggestions for clarifying and perhaps improving the bill. Section 6 (a) (12) should be revised to read as follows:

"shall have the power to engage in research directed toward the development and utilization of oil shale deposits on Federal lands and to engage in environmental and ecological research and monitoring directed toward alleviating the environmental impact of oil shale development, and may build, own, and operate research testing, or demonstration facilities, alone or on a joint or cooperative basis with any private or other public entity;"

We suggest the addition of a fourth item to Section 3(c) (1) (2) (3) as follows:

(4) or within state wildlife or game refuges which were purchased with federal aid funds.

Under Section 8 (a) we suggest the Subcommittee may wish to consider extending the Corporation's authority to include the construction and operation of refineries since shale oil probably will require special refining facilities.

In Section 10 (c), line 14 we suggest inserting "domestic" in the phrase "... and priority in such sales shall be given to domestic corporations . . .". We suggest extending the sentence ending on line 17 of this Section as follows: "... and which are not subsidiaries of or controlled by any corporation which does possess or control such facilities."

Section 19 is an absolutely essential feature of this bill because it wipes out the highly objectionable and excessively discretionary leasing program of the Department of the Interior. It is urgent that certain provisions, such as the ban on strip mining, be instituted immediately.

We appreciate the opportunity to present to the subcommittee our comments on this bill. We believe it represents a tremendous advance over the present lease program and that it will help solve one of our Nation's great energy development and environmental problems.

THE SOCIETY OF VERTEBRATE PALEONTOLOGY,
DEPARTMENT OF BIOLOGY,
ADELPHI UNIVERSITY,
Garden City, N.Y., May 24, 1974.

Hon. PATSY MINK,
Chairwoman,
Subcommittee on Mines and Mining,
U.S. House of Representatives,
Washington, D.C.

DEAR CONGRESSWOMAN MINK: Enclosed is the formal statement of the Society of Vertebrate Paleontology relative to fossils and mining.

With respect to point 3, the scientific literature is replete with examples of the intimate association of fossil materials with economically valuable minerals. Obviously, this matter goes far beyond the oil shales, the subject of H.R. 12014. We did not provide the bibliographic citations here, but will do so if they will be helpful to you.

With respect to point 5, we are in contact with the acting director of the U.S. Geological Survey, Mr. Henry W. Coulter. He has expressed interest in meeting with a Society representative to discuss the matter further.

One of the most frustrating aspects of this effort on our part is our lack of preliminary information on pending legislation and leases. We will be most appreciative if you can help us by passing on to us information that will help us function efficiently and effectively in our attempt to insure adequate utilization of the nation's paleontologic resources.

Yours truly,

ROBERT M. WEST, Ph. D.

THE SOCIETY OF VERTEBRATE PALEONTOLOGY—POSITION OF THE SOCIETY OF VERTEBRATE PALEONTOLOGY RELATIVE TO FOSSILS A NATIONAL RESOURCE, AND CONSTRUCTION AND MINING OPERATIONS

1. Fossils are an irreplaceable national resource, documenting past life and yielding information on past environments. Study of them leads to understanding of present life and environmental conditions and helps to predict the course of future developments.

2. To be preserved for study, fossils must be collected by paleontologists qualified to determine geographic and stratigraphic positions of the fossils. Unless collected, fossils will be destroyed by natural erosion or man-related activities. Once collected, fossils should be deposited and conserved in recognized repositories.

3. Frequently fossils are encountered in the course of construction or mining activities. For example, housing developments in southern California have uncovered valuable sites for fossil land and sea mammals; highway construction in the area of Cleveland, Ohio, led to recovery of vast quantities of 350 million-year-old fishes; phosphate mines in South Carolina and Florida have uncovered a record of fishes, whales, sea cows, and land mammals; the Green River oil shales of Wyoming, Colorado, and Utah are world renowned for their fossil fishes, plants, and more rarely, birds and bats; coals and coal-associated deposits in Ohio, Illinois, and Montana have provided a valuable record of life ranging from 300 to 600 million years ago.

4. Due to the accelerating pace of construction and mining operations, the nation's paleontologists need help in doing their parts to collect and preserve valuable parts of the fossil record. Paleontologists need to be advised of mining and construction activities in potentially fossiliferous areas not only well in advance but also as projects continue, in order to advise on the paleontologic importance of an area and to carry out salvage operations on sites in danger of destruction.

5. A program should be developed to assist paleontologists in protecting this irreplaceable fossil record and preserving it for study and interpretation: 1) Environmental Impact Statements and Land Use Recommendations should be required to include consideration of potential or actual paleontological sites (the Decker-Birney Resource Study of a coal-bearing area in southeast Montana is an excellent example of inclusion of paleontological sites; the Environmental Impact Statement for the Prototype Oil Shale Leasing Program is an appalling example of lack of consideration of paleontologic potential);

2) if it is determined that paleontological sites are involved in mining or construction activities, salvage operations should be undertaken, sites should be inspected regularly as excavation continues, and provision should be made for collecting of fossils with no penalty to the contractor; 3) a federal agency (logically the United States Geological Survey) or state agencies (logically, state universities with qualified personnel) should be involved in all aspects of the evaluation, inspection, and excavation program; 4) fossils recovered should be placed in recognized federal or state repositories and made available to qualified scientists for study; 5) paleontologic sites should be protected from vandalism and destruction as work progresses.

Mrs. MINK. The hearing of the Subcommittee on Mines and Mining is adjourned.

[Whereupon, at 12 p.m., the subcommittee adjourned, subject to the call of the Chair.]

OIL SHALE, MINING AND ENERGY

THURSDAY, AUGUST 8, 1974

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON MINES AND MINING OF
THE COMMITTEE OF INTERIOR AND INSULAR AFFAIRS,
Washington, D.C.

The subcommittee met, pursuant to notice at 10:05 a.m., in room 1324, Longworth House Office Building, Hon. Patsy T. Mink [chairman of the subcommittee] presiding.

Mrs. MINK. The Subcommittee on Mines and Mining will come to order.

We are privileged to have as our first witness our distinguished colleague from Wyoming, and a member of the Committee on Interior. We welcome to the hearing this morning Mr. Roncalio. You may proceed in any manner you choose.

STATEMENT OF HON. TENO RONCALIO, REPRESENTATIVE IN CONGRESS-AT-LARGE FROM THE STATE OF WYOMING

Mr. RONCALIO. Thank you, Madam Chairman.

I am grateful to observe that after yesterday's first conference on the strip mining bill I think our fortunes will be in good hands, and I am happy to report that I think you, Madam Chairwoman, handled these seven Senators competently, beautifully, and adequately, and we are on our way to a bill, thank Heaven.

Madam Chairwoman, I wish to commend the subcommittee for the interest it has taken in oil shale development and its efforts through hearings and legislation to deal with related problems. And I have copies of the statement that I would like to place in the record in full and comment upon.

Mrs. MINK. Without objection, they will be entered in the record at this time.

[The full statement of Hon. Teno Roncalio follows:]

STATEMENT OF HON. TENO RONCALIO, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF WYOMING

Madam Chairwoman: I wish to commend the Subcommittee for the interest it has taken in oil shale development and its efforts through hearings and legislation to deal with related problems.* I appreciate, too, the opportunity to appear before you today to discuss these matters and legislation which I have introduced.

Bids received for the first four tracts offered under the Department of Interior's Prototype Leasing Program demonstrate that in today's energy

situation and world oil market, the petroleum industry is ready and willing to undertake serious development of the West's rich oil shale resources. This Subcommittee is well aware of the immensity of the shale oil reserves located in Colorado, Utah, and Wyoming and the significant contribution which exploitation of these reserves could make to our Nation's energy needs. Oil shale is indeed one of the last great frontiers in development of the Nation's fossil fuels.*

It is also apparent, though, that the Department of the Interior in its implementation of the Prototype Leasing Program and its efforts to begin shale oil extraction has failed to realize the value of the resource or to develop an oil shale policy in the best interest of the public. The Department was prepared to accept bids as low as \$9 million on tracts for which bids were received of \$210 and \$117 million. It is evident that we must review our own leasing program* and respond to pending oil shale development through responsible action and legislation for the protection of the public's interest and for assurance of orderly development of the resource.

Although there remain uncertainties about the best methods of extracting shale oil, large scale operation costs and percentages of shale oil that can be removed, there is no question that there is a possibility of developers making enormous profits. Fluctuations in the price of crude may affect production but crude prices have remained high for several months and there is no indication that they will drop. We have read reports from industry that at a \$10 a barrel price of crude a return on capital of nearly 20 percent could be realized.* At even \$6 per barrel, an annual return of 11 percent would be enjoyed. The incentives, then, for oil shale production and development are provided today through the market price of crude and we should not tolerate any lease incentives or giveaways of this publicly owned resource.

I have two particular concerns which have been addressed in my bill which is before the Subcommittee. The first is that the royalty charged by the Department of Interior under the Mineral Leasing Act is unjustifiably low. The second is my concern for the related growth impacts which will be suffered by communities in the oil shale development areas.

Currently, royalties are set at 12 cents per ton for oil shale containing 30 gallons of shale oil with provisions to increase or reduce this amount depending upon the shale oil contained and the market price. Only 16 cents per barrel would be collected as royalties on 30 gallons per ton oil shale. With today's crude oil prices and the value of shale oil reaching or surpassing the value of conventionally produced crude, such a low royalty is irresponsible and contrary to the public's interest.

I am, therefore, recommending through my bill that the royalties for shale oil be increased to 12% of the value of the oil or other minerals taken from the oil shale lease.* This is the same approach taken under the Mineral Leasing Act for conventionally produced oil and gas and is a reasonable manner for collecting royalties. Not only would this percentage-of-market-value basis give a more equitable return, it would reflect any fluctuations in crude prices.

My bill also provides that there be created an Oil Shale Area Impact fund to provide loans to those communities and counties which are directly impacted by significant population growth due to oil shale development.* These loans could be used for planning assistance for providing schools, transportation and highways, medical care and facilities, water and sewage facilities, and other services. It has been estimated that the start-up of the shale oil industry will create 4,000 jobs by 1981.

One new community near Grand Valley, Colorado anticipates a population of 4,000 in just four years. These areas are now relatively sparsely populated and they are in no way prepared or do they have the financial resources to plan for the kind of growth impact which massive resource development will bring. In my own State of Wyoming I have been somewhat relieved that neither of the two Prototype tracts offered by the Department of Interior received successful bids. The nearest City of Rock Springs, Wyoming is already experiencing a boom of the worst kind in that it has doubled population since the 1970 census and has neither the housing nor services to accommodate such growth. We have people living in tents and sprawling trailer camps without any water or sewage facilities. The City of Rock Springs, and likewise the neighboring city of Green River, has done an admirable job in trying to meet the tremendous needs which this type of growth has brought. However, without the bonding capacity or outside financial assistance necessary or the time to plan, these needs simply can not be met.

Low cost planning loans which would be available under an impact fund would provide the kind of financial assistance which these small communities must have. We are discussing the development of Federal resources on Federal lands which will be contributing to the common good of the Nation. It is only proper that these communities which will have to house and provide services to those engaged in the development of these resources be given Federal assistance derived from the resource itself. My bill provides a method through which the loans will be repaid and an initial appropriation from the general treasury into the Fund until revenues from oil shale extraction are sufficient.

My bill would also open up the 37½ percent of the royalties received which go to the State. Under current law, these royalties should be available at the discretion of the State Legislature, that is the people at the lowest responsible lawmaking level to be applied wherever within their state they feel it is proper and necessary. Colorado, Utah, and Wyoming are not only looking at Oil Shale development, but also, as this Subcommittee well knows, intensive development of other energy resources.* I would hope that flexibility could be allowed in the manner in which revenues received by the States from oil shale and other minerals as well to help deal with the problems and growth impacts of extraction of our several energy resources.

Given the value and enormity of this great public resource and the impact of its development, I feel that the provisions in my bill are necessary to protect the public's interest and meet the problems associated with massive development in this unprepared region. There are also questions in what technologies should be employed,* in how to best protect the environment from serious degradation, and what role the Federal Government should play. I would hope that whatever legislation this Subcommittee might report in dealing with all of these matters that it seek to include those provisions from my bill which I do think are essential to shale oil development in the West.

Mr. RONCALIO. I do not think that there is a subject matter that has caused me more criticism in my State than the fact that I have co-sponsored legislation looking into a means by which people will get a fair shake on the income from the oil shale of the Rocky Mountains west. I am happy to cosponsor legislation with you, Madam Chairman, which is not in an effort to socialize anything. It is not an effort to communize anything. It is an honest attempt to try and set up a pilot plant in one of those prototype leases someplace to see what can be retorted and what can be processed, and just see what the Government's interest really is in assuring the people ownership of the shale is dealt with fairly and competently.

Bids received for the first four tracts offered under the Department of Interior's prototype leasing program demonstrate that in today's energy situation and world oil market, the petroleum industry is ready and willing to undertake serious development of the West's rich oil shale resources. This subcommittee is well aware of the immensity of the shale oil reserves located in Colorado, Utah, and Wyoming and the significant contribution which exploitation of these reserves could make to our Nation's energy needs. Oil shale is indeed one of the last great frontiers in development of the Nation's fossil fuels.

Shale has been a major resource for over 100 years in Sweden and other places in Europe, and I guess that it was over 50 years when there was first talk of development in the Grand Junction area, and some old hands around there still say that it will be another 50 years before we see it making actually a contribution. It is the most unusual subject matter in resource development of this country in that area.

The prototype leasing program and its efforts to begin shale oil extraction has failed to realize the value of the resource or to de-

velop an oil shale policy in the best interest of the public. The Department was prepared to accept bids as low as \$9 million on tracts for which bids were received of \$210 and \$117 million. It is evident that we must review our own leasing program, and I do not distinguish the Department from us, and respond to pending oil shale development through responsible action and legislation for the protection of the public's interest and for assurance of orderly development of the resource.

Although there remain uncertainties about the best methods of extracting shale oil, large scale operation costs and percentages of shale oil that can be removed, there is no question that there is a possibility of developers making enormous profits.

Fluctuations in the price of crude may affect production but crude prices have remained high for several months and there is no indication that they will drop. We have read reports from industry that at a \$10 a barrel price of crude a return on capital of nearly 20 percent could be realized. And even at \$6 per barrel or \$7 per barrel, I still submit you will find that most of the people in this Nation would be better off. I think \$10 crude means \$12 inflation and double-digit inflation and I think \$10 crude means 12 percent interest at a bank, and the \$7 crude which jumps from \$3 to \$7 would leave us with a better world and a better country, but it is my own opinion, and it is not shared across this country or in Casper, Wyo. But, I think it is a point to be made that these steps a little at a time are really in the best interest of the country.

I have two particular concerns which have been addressed in my bill which is before the subcommittee. The first is that the royalty charged by the Department of Interior under the Mineral Leasing Act is unjustifiably low. The second is my concern for the related growth impacts which will be suffered by communities in the oil shale development areas.

Currently, royalties are set at 12 cents per ton for oil shale containing 30 gallons of shale oil with provisions to increase or reduce this amount depending upon the shale oil contained and the market price. Only 16 cents per barrel would be collected as royalties on 30 gallons per ton oil shale. With today's crude oil prices and the value of shale oil reaching or surpassing the value of conventionally produced crude, such a low royalty is irresponsible and contrary to the public's interest.

I am, therefore, recommending through my bill that the royalties for shale oil be increased to 12½ percent of the value of the oil or other minerals taken from the oil shale lease. And I want to stress, Madam Chairman, that the one-eighth ratio has served this Nation very, very well. The oil companies have done well for over 50 years, and the people have done well with the one-eighth royalty in many, many instances and it has added an overriding 1, 2, or 3 percent to those who put together a unit, or buy the landowners involved. But, most companies can go up as high as 17, 18, 19 percent royalty or overrides and still be able to profitably be able to explore, even wildcat and make a profit.

This is the same approach taken under the Mineral Leasing Act for conventionally produced oil and gas and is a reasonable manner

for collecting royalties. Not only would this percentage of market value basis give a more equitable return, it would reflect any fluctuations in crude prices.

My bill also provides that there be created an oil shale area impact fund to provide loans to those communities and counties which are directly impacted by significant population growth due to oil shale development.

Madam Chairman, last week I drove from my home town, Rock Springs, Wyo., up to Pinedale and I saw little places at Winton, Dines, Reliance, and at one time they were little coal mining camps, and they had little parks and they had little coal company stores when I was a kid 40 years ago, but they had a park in them, and they had some schools near them, and playgrounds for the kids to play baseball in them. Today I found trailer camps, hundreds and hundreds of people living in impacted trailer camps, no parks, no library facilities, nothing for those kids to believe in, nothing but damn bars and gambling places for daddy to go after work, and the deterioration of the quality of life in Wyoming is terrible today. And I do not think we can have and we should not have that in shale oil in the West. We should have schools, highway, water facilities, and other services. And it has been estimated that the startup of the shale oil industry will create about 4,000 jobs by 1981.

One new community near Grand Valley anticipates a population of 4,000 in just 4 years from now. Not too many miles from there, northwest of there by 150 air miles, the town of Rock Springs has doubled in population in the last 4 years and has gone from about 17,000 to about 34,000 people. These areas are now relatively sparsely populated and they are in no way prepared nor do they have the financial resources to plan for the kind of growth impact that massive resource development will bring.

I have been relieved that neither of the two prototype tracts offered by the Department of Interior received successful bids, because they would have had the impact even more on Rock Springs that has already been experienced in the towns I have already alluded to. Green River is no better off, and the towns west are a little better off because they have water, and they have agriculture, and at least the kids can have the trailer set back in the pasture where they can see some hay, and some cows and a little bit of the natural life that Wyoming can be.

Without some kind of capacity or outside financial assistance necessary, these towns simply cannot meet this growth impact, and low-cost loans would be available under this kind of impact and would provide the kind of financial assistance which these communities need.

My bill would also open up the 37½ percent of the royalties received which go to the State. Under current law, these royalties may be used only for highways and schools. These funds should be available at the discretion of the State legislature, that is the people at the lowest responsible lawmaking level to be applied wherever within their State they feel it is proper and necessary. Colorado, Utah, and Wyoming are not only looking at oil shale development, but also, as this subcommittee well knows, intensive development of other energy resources. It has hit in uranium, it has hit in coal, in

bentonite, and in some parts of the States there are reserves going on for taconite, which may even bring iron into some parts of the State, and quite possibly Wyoming could become the richest per capita State in America in a decade if this keeps up. But, the impact on the rest of the State, the quality of life for the people there is a matter which this committee must concern itself with, and I would hope that flexibility could be allowed in a manner in which the revenues received by the States from oil shale and other areas as well could help to deal with the problems and the growth impacts of the extraction of our several energy resources.

Given the value and enormity of this great public resource and the impact of its development, I feel that the provisions in my bill are necessary to protect the public's interest and meet the problems associated with massive development in this unprepared region. There are also questions in what technologies should be employed. We have been through some of that.

I will never forget with delight the schedule we had there, Madam Chairman, last January 4 to the 10th or something like that, and when we got there in Grand Junction, Colo., the weather was 20 below zero, and we were all in arctic and ski clothes, and a telegram came saying, "I'm sorry, can't be with you; in Hawaii, signed Patsy Mink."

So, I am glad to see that some of the other members did come in, but anyhow, we went ahead and got our fingers frosted, but we learned the difference between the various procedures, and I think we can again make a trip there to see what Occidental is doing with in situ, and is in situ, in fact, the answer, and what is Colony doing with spreading its processed shale, and is there a better way of compacting it, and find out if so far there is some way to keep from having to, and I do not want to use the word desecrate, but having to jeopardize 5 or 6 square miles for every 5 or 6 square miles being mined, to use it to deposit the processed shale.

I am not satisfied that there is adequate reclamation on shale. I do not think ranchers are, either, and I would like to hear from some farmer or agriculturalist if he thinks this will help. And I hope that whatever legislation the subcommittee might report in dealing with all of these matters that it will seek to include those provisions from my bill which I do think are essential to shale oil development properly in the West.

And I referred to USCA sections 32 and 36, and it should be 42, and I know that it is just clerical and that the staff will take care of it.

Thank you very much, Madam Chairman, and I will be glad to answer any questions.

Mrs. MINK. Thank you very much, Mr. Roncalio.

With respect to the 12½ percent value of oil royalty which you refer to in your bill as distinguished from the royalties that you now receive, to what use would you put that 12½ percent? Would that be the same as what you are recommending under the 37½ percent royalty provision in the Mineral Leasing Act?

Mr. RONCALIO. I would be amenable to whatever formula this committee wishes to work out, Madam Chairman. I think the 12½

percent royalty would inure to the Treasury and the 37½ percent would inure to the State of Wyoming, and if these figures can be increased, fine and dandy. We have a lot of people in Wyoming who say we ought to have 90 percent of this returned, but I recognize that the ownership of that resource is not in Wyoming, but in all of the people of all of the States, and I think that this is a good balance. And I would try to get the 90 percent back if I could, but I realize that that is asking more than is realistic now.

Mrs. MINK. To what is the increase in population of Grand Valley and Rock Springs attributable to?

Mr. RONCALIO. Grand Valley, the increase is attributable to great things by two men whose names I should remember, and they were friends of Jerry Dinneen at Laramie, Wyo., and Johnson and Best are the names, names like that, and someone may know the two great researchmen in shale, and one of them has gone to work now in the old Navy pilot plant out of Rifle a few miles with maybe 75 to 100 employees there. We went through their operation and they were just getting in shape, and our colleague, Mr. Steelman, may remember that they were just getting into condition, rewiring it, and it was the old Navy installation.

Mr. OWENS. I think maybe the gentlemen that you are searching for is Hollis Dole.

Mr. RONCALIO. No; he is a different man. He is with Atlantic Richfield and Colony, not too far from there, but it is the combination of Hollis Dole and these men who are impacting on Grand Valley and Rock Springs, and they are really not yet into shale production right now.

Mrs. MINK. To what do you attribute the failure of the successful bids for in situ prototype development in the two Wyoming tracts?

Mr. RONCALIO. I rather suspect Secretary Horton may have better answers than I because he was at the table when the bids came in and maybe talked with some of the professional people. My thought was one, it is relatively level ground and it does not have the vast elevation differences which it looks like are so necessary to successful in situ. That is, you drill in from the bottom, put your installation in, like Occidental is doing on their plant No. 2, and second I suspect there has been some core drilling and they do not find it as valuable as other places. But, I would imagine that the Department's technical people have better answers than I am able to give you. And I would also say that I have never walked the ground on the two prototypes in Wyoming.

Mrs. MINK. Do the members of the subcommittee have any questions they want to ask?

Mr. CAMP. Madam Chairman?

Mrs. MINK. I think one of the things that came out of the Colorado hearings that we had that transpired later to some of us, anyway, was the effect it would have on the local community. You mentioned a minute ago of the overnight establishment of the trailer camps and so forth without any facilities of any kind. Now, you know, we went through this down in our county some years ago in the energy business and we had towns that sprung up overnight too, and with no facilities whatsoever, and then after a short length of time when

it leveled off, why then we did not have this problem. But, I can visualize areas as you are talking about, and from what we experienced in the trip that we had out there, this could be for a period of time like the mining areas in Pennsylvania, West Virginia, or Ohio that we witness up there today.

I think this is one of the things that if we get involved in this that we need to come up with, and that is the money that you are talking about that will be paid back to the county, or the State, whatever it might be, which should be available in those areas, and particularly the ones that are affected so that they can lay out a good, substantial policy program for the people that live within the area, in the new area as well as the old area, as far as hospitals are concerned, sanitation, water, heat, and so forth are concerned. And I think if we get into this, as we do I think this is one of the main things that we are going to have to take into consideration when we talk about moneys that would be returned to the State or the local area from any royalties that we might receive under a bill that we would write that would have to do with oil shale.

Mr. RONCALIO. I could not agree with you more, and I think that you speak with some authority on it, because as I remember, your son-in-law is the city manager at Glenwood Springs, and we talked with him and learned from his experience some of the things that can happen. I could not agree more. Maybe we could put the money back in the counties or even the State legislature, but it ought to go back as close to the people who suffer the impact of the development.

Mrs. MINK. Any further questions? Mr. Steelman?

Mr. STEELMAN. I think in some of our prior discussions we have had some of the same concerns about disposal of the spent shale, and revegetation. Do you have any opinion about some of the proposed legislation with respect to creating a Federal corporation to commercially develop this? I am opposed to that sort of thing. I have felt that in the R. & D. phase we ought to have some kind of objective study, and I think that ought to be obtained from some kind of R. & D. effort. I wonder, talking now about the commercial development of the shale resource, if you have any opinion about that?

Mr. RONCALIO. Yes; I have an opinion on that. I do not regret that I cosponsored the Patsy Mink oil shale bill. It has probably caused me the most severe criticism I have had in Wyoming over the last few years, which has not been too much, I am proud to say, except for the editorials from the Casper papers that continually say that I am trying to socialize the oil shale industry, and that Patsy Mink's bill is an abomination because it socializes the shale industry. Well, that is the last thing we have in mind, socializing it. We simply believe that with a COMSAT formula or a TVA kind of formula, they were not socializing, and they helped free enterprise very, very much in that area, and something might be found to establish somewhere in one of the tracts in Colorado where the richest stuff is, or in Wyoming, for the development of the shale that gives us a measure, gives the Government a measure of what can be gotten from the resource, and still I think of a pilot plant of some kind by the Government as not being a bad thing to do.

We did it in shale 40 years ago and it was not successful. Maybe it will be this time. We made possible this Exxon operation now with the Navy operation site, and I have forgotten the name, but it is straight up the road from Rifle, Colo., and that was made possible in the Navy operation and the Bureau of Mines for 20 years, and the people that have it now are some of the top 10 oil companies of the country. And they are doing well.

We can start as a prototype form at this time, and then after 6 or 7 years we can spin it off to Exxon, or Atlantic Richfield. This is not a socialist concept, and I am happy to report that I am still happy to go along with the Mink bill, although I admit that my life would be a little more pleasant if I had not cosponsored it. But, that is the way things are.

Mr. STEELMAN. Another portion of our concern, as I know it is yours, are the questions having to do with the disposal of the spent shale, revegetation, and population expansion which you mentioned. The TVA had one of the worst environmental records of any agency, public or private, and I do not know that we could look to that as any sort of a prototype and expect to do any better. I just think we can require environmental responsibility of those developing this without having to create some TVA sort of affair.

Mr. RONCALIO. Well, I think you are right.

Mrs. MINK. Mr. Cronin.

Mr. CRONIN. First of all I would like to thank the gentleman for an excellent statement. One of the things that concerns me when I hear testimony about the overnight trailer camps growing up, and all of the problems that that creates, is that we have just gone through the strip mining bill, and we have set up a large number of criteria that a person has to meet before they start. In the oil leasing we are getting to the point of offshore drilling where we are finally starting to require that the technology that we have available be utilized before they start. This makes me wonder if, as opposed to just guaranteeing money to the area, would it not be more productive if we required as a part of an application, before they start, the people have to show how, or the applicant would have to show how people would be handled, the number of people that it would take or that would be added to an area to make this system work, where they would live, how they would be treated, and work within a certain type of framework for logical planning of an area before they began, so that when that money came back it would not be just to put out brush fires, it would be to support a larger, more logical effort that was providing sanitary housing, schooling, and all of the rest to the people directly affected by it?

Mr. RONCALIO. Yes; that is true and a point very well taken. And some of the companies with real vision and modern appreciation of problems have done that. Atlantic Richfield in particular came out with a tremendous study about 2 years ago of what the impact would be in the Powder River Basin, the Black Thunder Mine that it is in the process of developing. And we do not want company stores any more, and we do not want this type of an impact. And here is what is going to happen. It has suggested locations of new towns, new concepts, new schools, and things that can ease the public prob-

lems that will attach to starting up these mines, so companies are responding. I just hope that the Government can keep pace with that response.

Mr. CRONIN. Would you think it would be the proper function of the Government to require that before they were granted a permit to develop, as opposed to leaving it up to them to do what they wish to?

Mr. RONCALIO. Yes; I do, but I also think that a lot of people have come alive in the last few years in this area, and we will have their cooperation in doing a good bit of this.

Mr. CRONIN. One of the reasons that brings this to mind was I was just made aware a couple of days ago in another committee on which I serve of how NASA is taking some of these potential people and putting them into cities, and putting them into other areas of the country, and utilizing some of this knowledge we have learned from space to effectively run some of our communities. And it just seems to me this might be a logical tie-in, if we are going to have to have Government involvement, that we might get NASA involved in planning some of these different communities and prevent the problem before it happens.

Mr. RONCALIO. I think it would be excellent to coordinate their better heads on these matters.

Mr. CRONIN. I thank the Chairwoman.

Mrs. MINK. Mr. Seiberling?

Mr. SEIBERLING. I would like to say a few words. I want to commend our colleague for an excellent statement. And following a little further along the line that Mr. Cronin developed, I wonder whether the focus of the money that would be made available from this impact fund should not be on land use planning, as the core around which, or the criterion on the basis of which the loans for the other facilities would have to be approved. It seems to me that to just give them funds to build these services and facilities without requiring a sound job of land use planning, which means zoning all of the other things, all of the other things that the community would have to do, would be just taking a shot in the dark, because the money could be spent wisely or could be spent unwisely. And I just wonder what the gentleman would think about that?

Mr. RONCALIO. What I think about that, I would like to say to my good friend and colleague, is that about what we commented on in the first conference in which the three of us or the four of us were yesterday, Mr. Camp, the Chairperson, and you and I, and that is that if we are going to mention those words, they still have the connotation of a red flag being waved to certain people if you do this in some of the western areas, and to include it in either the strip mining bill or to include it in legislation of this kind might raise objections that might not thereafter be raised, and not serve the purpose intended.

Mr. SEIBERLING. Well maybe.

Mr. RONCALIO. The land involved in mostly Federal land where we can proceed to set up parks, playgrounds, schools, and do a good job of land use planning because nearly all of this is on the Federal domain or Federal surface in any event. So, I do not think a bill

to assure proper return of royalties on oil shale may be the place for it. That is my thought, but I could be wrong.

Mr. SEIBERLING. Maybe we have to come up with a verbal formula that will bypass these, but it seems to me that in principle we ought to build in this bill a provision that no money is going to be made available unless the thing is going to be done on a sound land use plan basis.

Mr. RONCALIO. No question about that being right. That is good law and it ought to be reflected in some way, somehow.

Mr. SEIBERLING. And I would wonder if we should not also provide them grants for the purpose of doing such a planning job, or whatever we may call it. In other words, take some of the money from this fund and provide for regional or county or whatever planning agencies, or the equivalent to be able to do this job.

Mr. RONCALIO. You may have a point. This may yet be done without having to excite the community.

Mr. HOSMER. Will the gentleman yield?

Mr. SEIBERLING. Yes, I will yield, if after I can ask one more question.

Mr. HOSMER. I was wondering why it does not require the approval of the EPA to be issued at least before action under a lease could be carried forward. Would that not get to the gentleman's purpose?

Mr. CRONIN. Would the gentleman yield at that point?

Mr. SEIBERLING. Yes.

Mr. CRONIN. I think you get the EPA involvement in all of these things, but if you go one step further, is not what we are really talking about human impact?

Mr. SEIBERLING. That is exactly what I am talking about.

Mr. CRONIN. I think the phrase that would cover the concerns of the gentleman, without lifting the concerns of the gentleman who is testifying would be that really what we are after, we are after the environmental impact, but we are after the human impact, and if the two of them are met, then we solve the problems before they happen.

Mr. SEIBERLING. We keep talking about no more Appalachias, but unless we do this kind of a job, I don't care how much money you give them, you are going to end up with something perhaps even worse than Appalachia.

Mr. HOSMER. Would the gentleman yield?

Mr. SEIBERLING. Yes.

Mr. HOSMER. Well, if there is going to be this human impact, why don't we just prevent the leasing and then we will avoid that?

Mr. SEIBERLING. Well, no, because the leasing, presumably, if it is handled soundly, is going to help the human beings who are involved.

Mr. HOSMER. Well, if it is going to have an adverse impact, according to the implications of the gentleman from Wyoming—

Mr. RONCALIO. Could I respond to that?

Mr. HOSMER. As a consequence, and if a special fund has to be established to allay that, then certainly there is no assurance that there would be any fair amelioration in relation to the horrendous damage that might be done to these humans.

Mr. SEIBERLING. That all depends on how it is handled. Let me just point out that we went out and looked at some of these beautiful little valleys that led up to where the oil shale is. Now, you can fill that valley up with honky tonks and neon lighted nightmares, or you can do a sound zoning job and say that this valley is going to remain agricultural or it is going to have a residential section here, and is going to have to meet certain requirements as to the kind of housing that goes in. You can turn it into a nightmare or a paradise. It is up to the people who are spending the money.

Mr. HOSMER. But beauty is in the eye of the beholder, and some people like honky tonks.

Mr. SEIBERLING. If you like a honky tonk, live in one, but I do not.

Mr. HOSMER. Your will should not be imposed on me or somebody else.

Mr. SEIBERLING. Except everytime someone puts a honky tonk in that place where it should be, he is imposing his will on other people that have to look at it. But I would like to get back to one other question to the gentleman. And that is whether or not this money should not be given at least in part in the form of grants rather than loans, because here we are taking this resource which is producing wealth, and we ought to use it to offset the possible adverse effects of the development of the resource. Should it not be a grant, really?

Mr. RONCALIO. Yes. I have no objection to grants and would welcome them.

Mr. HOSMER. If the gentleman would yield, only half of a loan has to be repaid under the gentleman's bill, so that would be half of a grant I guess, would it not?

Mr. RONCALIO. Madam Chairman, could I comment on what my friend, Craig Hosmer, raises?

Mrs. MINK. Please.

Mr. RONCALIO. He says let us not have any leasing on this land because of the adverse impact, and I do not doubt, seriously, but what there will soon be a school of thought comparable to that that we find with Ken Hechler and a school of abolitionists, and its is coming, and let us just have three or four more Congresses which do nothing in this shale oil field, and then you will meet these voices coming in and saying let us leave it alone.

There is nothing more beautiful than the Piceance Basin and the Compadre Range and leave it alone, and a fellow who is raised in the West can believe that.

Mr. HOSMER. Of course, you can't disturb the environment to take care of those people.

Mr. RONCALIO. I am nonabolitionist, but there are those in the West now who will say we do not want strip mining or shale mining, go away and leave us alone, and we will go back to the old oil lamp and we have to—

Mr. HOSMER. And we will go back to the cave.

Mr. RONCALIO. You bet, and a better way of life, with less unsanitary, less filth in earth, and a better quality of life.

Mr. HOSMER. And more bugs.

Mr. RONCALIO. But I do not agree with them.

Mr. HOSMER. So let us vote.

Mrs. MINK. If my colleagues will please refrain from bickering.

Mr. SEIBERLING. Madam Chairman, may I just give an example of the kind of effort it seems to me needs to be made to preserve a livable environment. The gentleman from California may contest this, but as I recall, in the field of uranium mining, for a long time tailings were used for building blocks and earth fills in communities, and years later they discovered that the radioactive elements in the tailings were causing serious health problems, and whole houses in the Grand Junction area had been built with mine tailings and they had radioactive walls and that sort of thing, and the stuff was blowing all around in the air.

And I recall a few months ago reading about a couple of professors at I believe it is the University of Colorado or one of the leading Universities, who had found three very strong carcinogens in tailings from oil shale operations. And they indicated they expect to find more.

So, we just cannot treat this thing lightly from a health standpoint. Forgetting about the beauties of nature, if we do this without adequate planning and foresight, we risk creating a monster that is going to devour a lot of people and ruin a great section of this country.

And I am sure the gentleman from California does not want that any more than anyone else.

Mr. HOSMER. If that is the case, then let them get approval from the Food and Drug Administration before they are allowed to go ahead.

Mr. SEIBERLING. That might not be a bad idea.

Mrs. MINK. Does the gentleman from California have any questions?

Mr. HOSMER. Just that I would ask the gentleman from Wyoming if he is going to go forward in oil shale mining or retard it?

Mr. RONCALIO. Let me say I believe we can forward oil shale mining. It reminds me a little bit—well, I do not think any man in private industry is going to welcome, no company is going to welcome having its royalties raised from 13 cents a barrel to 12½ percent of market value. They know that cuts into their overall profit.

I only have to ask my friend from California that we have got to be equitable with everybody here, and most reasonable people in shale will accept the one-eighth royalty. They have lived with the one-eighth in oil and gas for 50 years and it is not a bad percentage.

Mr. HOSMER. Well, if I may say to the gentleman, that may be true, it may not be true. It might not be taken from the profit. It might be running up a loss if it is based on value. Most people have some suspicion that it is going to cost a lot more to produce this oil shale than to produce regular petroleum out of oil wells. To arbitrarily fix in law a percentage on value would seem to be quite inhibitory.

If anybody wanted to move forward in this business it would seem proper that it be left to the discretion of the Secretary so that whatever the situation might be, at least you would not discourage this industry by trying to make it operate at a loss, which, of course, it would not do.

Mr. SEIBERLING. Would the gentleman yield?

Mr. RONCALIO. We differ on that.

Mr. HOSMER. I would like to hear the views of the gentleman from Wyoming on that. The 12½ percent, plus 50 cents per acre, which cannot be waived, that rigidity, and it can be with respect to petroleum leases.

Mr. RONCALIO. I do not think I can respond to that in any way that could ever reconcile our positions, because I differ categorically with any feeling that this is going to create losses to the companies operating there.

These are energy companies and in every case they are in the oil business already. In every case they are operating in cooperation with the Justice Department to make sure that they are not violating any antitrust provisions. And you know—

Mr. HOSMER. They still cannot operate at a loss, and that is what I am getting at. And we have this Project Independence floating around now, which is to encourage domestic production and you cannot encourage domestic production if the law would have the effect of making an enterprise lose money.

Mr. RONCALIO. Congressman Hosmer, I do not think that this Nation was created for its people to elect officials to guarantee that the free enterprise system has to make a profit. The free enterprise people have always done pretty good on their own to make sure that they make a profit, and we are elected to look after the people's interest.

Most all of these companies, I think, have made a fine and a mighty handsome profit with cooperation from me.

Mr. HOSMER. But in Wyoming, as well as other States—

Mr. RONCALIO. I am willing to recognize that the managers of our enterprises are part of the people and they are part of the public that we serve, but the people should not be dominated by their lust for profits through the development of the Western resources anymore. This is my only point.

Mr. SEIBERLING. Would the gentleman yield?

Mr. HOSMER. Yes.

Mr. SEIBERLING. It seems to me the gentleman from Wyoming has made a very excellent case in his statement that this industry, with the kind of royalties he is talking about, would have a very, very substantial margin of profit. So, it seems to me that the gentleman from California, unless he can prove that the gentleman from Wyoming is wrong, is just talking about some sort of hypothetical situation for which we have no basis.

Mr. HOSMER. I will say to the gentleman that the gentleman from Wyoming has made no such proof at all. He has not given us one single figure.

Mr. SEIBERLING. I beg to differ.

Mr. RONCALIO. May I do it, Madam Chairman? May I offer a figure?

Mr. HOSMER. To make his case.

Mr. RONCALIO. May I offer one case. Shale is still what the professional oil men call fuzzy. They are not sure about shale, and we know I think maybe the Secretary may allude to this pretty soon, a few years ago bids were put out on two prototypes and some of these bids came in as low as \$9 million.

Two years later those bids were \$210 million for the same ground. Now, there is the private enterprise, and that is the point I raised with you, that no one knows that the margin of profit might be in some of those areas.

Mr. HOSMER. Well, how can you put a fixed value and then be sure that you are not driving the guy broke?

Mr. RONCALIO. If you pick a percentage of value, these people should not complain, and it is not that much, and they have always had the one-eighth royalty.

Mr. SEIBERLING. If the gentleman will yield further, I would like to say, as far as this member is concerned, if the marketplace is not able to sustain as internal costs, the total costs of development and of preserving a healthy and livable environment for the people who do the job, then the resource should not be developed.

That is my position, and I think that is the only humane and sound position, because other alternative sources of energy that can bear that kind of cost will be available.

Mrs. MINK. The subcommittee members will have an extended period of time to debate their various views on the subject when we mark up the pending legislation.

We do have another witness. And unless we have a pressing question, I would like to conclude the testimony of our colleague from Wyoming.

Mr. HOSMER. Fine, Madam Chairman.

Mrs. MINK. Thank you.

I would like to call as our next witness Assistant Secretary Jack Horton, Assistant Secretary for Land and Water Resources, of the Department of the Interior.

And if you would like to bring your staff colleagues to join you at the table, you may.

Mr. OWENS. Madam Chairman?

Mrs. MINK. Our colleague, Mr. Owens.

Mr. OWENS. I would just like, as Mr. Horton is getting seated, to introduce into the record my own statement in support of my bill, which is presently before the committee, H.R. 13465, which deals primarily, almost exclusively with in situ shale technology,

The statement is in front of the members and I ask that it be inserted into the record.

Mrs. MINK. Is there an objection? If not, it will be so ordered and inserted in the record at this point.

[The statement of Congressman Wayne Owens follows:]

STATEMENT OF HON. WAYNE OWENS, A REPRESENTATIVE IN CONGRESS FROM THE
STATE OF UTAH

I appreciate the opportunity to express my views on the legislative proposals to further research and development efforts on the extraction of oil from shale. I am glad that our Subcommittee has conducted such a thorough review of development of the Nation's oil shale resources, and I hope we will continue our efforts and investigate other synthetic fuels, especially the large deposits of U.S. tar sands which are located primarily in the State of Utah.

I wish to organize my presentation in the following manner. I shall review selected comments dealing with *in situ* oil shale technology which were presented during previous hearings of this Subcommittee and during the oil shale hearings of the Subcommittee on Energy of the House Committee on Science

and Astronautics. Then, I shall pinpoint specific problems with existing Federal programs for *in situ* research. Finally, I shall propose one legislative solution which would establish a concerted and accelerated program to further *in situ* processing of oil shale. I deliberately have avoided any legislative proposals to further above-ground processing of oil shale, because considerable efforts by private industry have already proved the technical feasibility of this approach. Also, I have not addressed the policy option of a Federal Corporation which would enter the oil shale business, because such an alternative is contrary to the free enterprise system which is so basic to our country.

Past testimony before this Subcommittee has shown that oil shale is one of the most abundant but undeveloped U.S. energy resources. High grade oil shales found in the Green River Formation of Colorado, Utah, and Wyoming contain the equivalent of 600 billion barrels of oil. This quantity of oil is approximately equivalent to known world reserves of oil.

The Subcommittee is well aware that the problems associated with oil shale development are not related to lack of an adequate resource base. Major road-blocks to large scale development (over 1 million barrels per day) of oil shale include limited water supply and adverse environmental impacts associated with oil shale processing. Technologists have informed the Subcommittee that *in situ* (or in place) processing of oil shale requires significantly less water than above ground processing of oil shale. Consequently, if an economically competitive and environmentally acceptable *in situ* process is proven successful on a commercial basis, the contribution of shale oil to the U.S. energy supply could be increased. Also, I know that the Subcommittee is aware that *in situ* processing may prove to be the most environmentally acceptable means of extracting oil from shale.

In order to get a perspective on *in situ* processing of oil shale, let me summarize a few selected comments which were presented during previous hearings on oil shale development.

Dr. Glen Weaver, a noted oil shale expert at Colorado State University, told the Subcommittee on Energy of the House Science and Astronautics Committee that "The best prospect for producing shale oil appears to lie in developing an economic and environmentally acceptable *in situ* technology." He stated that the potential use of *in situ* bioleaching technology should be studied. Dr. Weaver warned the Subcommittee that there are still many environmental problems which must be worked out with currently existing *in situ* technologies.

Dr. Charles Prien, a senior oil shale expert at the Denver Research Institute, stated before the Subcommittee on Energy that the "state-of-the-art" of *in situ* research is at least five years less advanced than mining and surface retorting. Dr. Prien emphasized that because of the potential impact for less environmental problems resulting from *in situ* processings, active research on *in situ* processing should be continued. Furthermore, Dr. Prien suggested that the proposed Shale Oil Development Corporation (HR. 9693), originally proposed by Congressman McCormack, with nine co-sponsors, could perhaps underwrite the high costs of further *in situ* research.

S. David Freeman testified before our Subcommittee that we must learn more before we leap into a massive shale industry. He stated that the major goal of the federal effort in oil shale development should be the earliest possible large-scale demonstration of the more innovative processing technologies like *in situ* recovery, and that the corporate entity created in H.R. 12014 should be confined to such an objective.

In written testimony which the Department of the Interior presented before the Subcommittee on Energy the following points were established:

1. *In situ* processing is in an experimental phase, and commercial application is not expected prior to 1980.

2. *In situ* processing is the single approach that is prospectively attractive for development of most of the 1.2 trillion barrels of oil shale which are characterized as containing 15 to 20 gallons of oil per ton of shale.

3. The presented Federal research program on *in situ* technology needs to be expanded in the areas of liquefaction and gasification to ensure availability of these options by the early 1980's.

Thus, the testimony which the Subcommittee on Energy and the Subcommittee on Mines and Mining has received so far clearly indicates that *in situ* processing of oil shale deserves careful consideration and needs to be furthered.

I wish to emphasize that we must develop a technology for processing shale at a rate which will contribute significantly to our future energy supply without undue environmental damages. We must develop a technology for processing shale which will produce a barrel of oil at the least cost for the American consumer. The best means of achieving these objectives may prove to be the processing of oil shale in place with minimum surface deformation.

I maintain that we cannot afford to depend primarily on the private sector for development of an economically competitive and environmentally acceptable *in situ* technology. Nor can we depend on the low priority which the Department of the Interior has assigned to the development of an *in situ* technology. The low priority which I am referring to is reflected by the low key and small *in situ* program which Interior maintained during the fiscal years 1972-1975. In fairness to the Department of Interior, I must point out that they intend to ask for significantly larger allocations for their *in situ* program for FY 76-FY 79, but the Congress has no assurance of any major commitment to *in situ* processing.

As part of Interior's Prototype Oil Shale Leasing Program, two tracts of federally owned oil shale in Wyoming were offered for lease. *In situ* processing was projected to be the most likely means of extracting oil from these shale deposits. The Department of the Interior had hoped to stimulate development of *in situ* processing by offering these leases, but no bids were received mainly because the quality of the shale was poor, roughly 20 gallons per ton. Failure to receive any bids on these two tracts in Wyoming is another indication of the Department's failure to expedite the development of *in situ* processing.

Another major portion of the Federal program to further *in situ* research for oil shale development is the work being undertaken by the Atomic Energy Commission. I frankly am very concerned about the possibility of development of a nuclear *in situ* fracturing technique by the AEC.

Major questions associated with the current Federal programs on *in situ* processing include:

1. Can the Congress depend on the Department of the Interior to expedite the development of an economically competitive and environmentally acceptable *in situ* technology?
2. Do the two or so research grants funded by the National Science Foundation represent an adequate role in oil shale development for this important scientific agency?
3. What degree of cooperation and coordination exists between the Department of the Interior, NSF and the Atomic Energy Commission in oil shale development?
4. Will the AEC use its funds for *in situ* research to develop nuclear fracturing technology which might result in contamination of underground aquifers in the Piceance Creek Basin and possibly the Colorado River System?
5. If Interior's and AEC's shale programs are brought under the ERDA umbrella, what priority will *in situ* processing receive?

I raise these questions to highlight specific problems with existing Federal programs related to development of a competitive *in situ* technology. My objective in doing so is to assure that *in situ* processing of oil shale receives a high priority in any future energy R & D strategy. I emphasize that research and development work for *in situ* processing deserves serious consideration by the Subcommittee on Mines and Mining.

What is the rationale for a Federal Program to expedite the development of an environmentally acceptable and economically feasible *in situ* method of extracting oil from shale?

1. Exploitation of oil shale would supplement liquid and gaseous petroleum for many decades to lessen a growing energy shortage.
2. Indigenous resources are not exposed to the uncertainties of foreign energy;
3. Nearly 80 percent of the total U.S. shale oil resources occur on public lands;
4. Private industry has not yet expedited the development of this resource on the timetable some critics judge desirable;
5. A competitive U.S. oil shale industry would help place a long term upper limit on imported crude oil prices; and
6. Exploitation of oil shale in the American West would create many new job opportunities in a less developed part of the Nation.

After considering these concepts and reviewing the current state of the Federal Government's R & D program for *in situ* research, I decided to introduce the "In Situ Oil Shale Technology Act of 1974". Fourteen co-sponsors have signed this bill. The legislation would establish a Government industry corporation to further the technology required for commercial development of non-nuclear *in situ* processing of the oil shale resources located within the United States.

The proposed Corporation would allow the technical and managerial expertise of Government and industry to work together to provide a better basis for evaluating and directing research and development on *in situ* processing. The legislation is designed to expedite development of an economically competitive and environmentally acceptable technology. Transfer of technology to the private sector would be emphasized. The patent structure of the bill is designed to stimulate participation by the private sector.

The "In Situ Oil Shale Technology Act of 1974" is very similar to HR. 9693, the "Shale Oil Development Corporation Act", introduced last year by Mr. McCormack and nine co-sponsors. I would support HR. 9693 provided that the legislation specified that *in situ* technology would be furthered by the Corporation.

A variety of organizational schemes to further development of an economically competitive and environmentally acceptable *in situ* technology exist. Perhaps, the administrative and organizational arrangement of the "Geothermal Energy Research, Development, and Demonstration Act of 1974" might serve as a model for an accelerated Federal program for oil shale technology. Alternatively, the House Interior and Insular Affairs Committee might request the Office of Technology Assessment to perform an analysis which would assist the Congress in deciding which type of arrangement would best further the development of oil shale technologies. The primary, secondary, and tertiary impacts of instituting different organizational schemes could be studied.

In introducing the "In Situ Oil Shale Technology Act of 1974," my primary concern was not the optimal organizational framework to further development of *in situ* processing. My objective was to stimulate interest in the Congress in the potential benefits from furthering *in situ* research. Nevertheless, I designed my bill to include specific guidelines which this committee might include in any R & D bill on oil shale development. These guidelines are:

1. Management and technical expertise of government and private industry should be joined together to expedite the development of *in situ* technology.

2. Any organizational arrangement should allow a great deal of flexibility. A Corporation established in an oil shale R & D bill should be able to perform in-house R & D, to contract out work, to hire consultants, and to be allowed to meet its objective by a variety of means.

3. The Corporation should have a definite research mission directed at expediting development of a technological option.

4. In order to accelerate development and transfer of technology, dissemination of technical information and know-how is a must. Active industrial participation should be a prerequisite. The government-industry corporation outlined in my bill has these features.

5. The organizational framework should include specific incentives to stimulate private industry to enter into the Corporation. As provided for in my legislation, a royalty-free license could be offered to those companies in the Corporation which work on developing an *in situ* technology.

6. Any specific program to accelerate oil shale R & D should not compete with the Prototype Oil Shale Leasing Program, but rather, should supplement its progress.

7. The Federal Government should enter into an arrangement which will provide equitable protection to the rights of public and private participants. The Federal Government should be able to recover a large portion of its investment. The "In Situ Oil Shale Technology Act" allows the Federal Government to sell its share in the Corporation after a ten year period.

Because I took the liberty to offer these guidelines, I am obligated to discuss the possible problems of an accelerated program for *in situ* research. Processing of oil shale by *in situ* means may prove to be economically prohibitive and/or environmentally unacceptable. It must be recognized that investment in research and development is never a sure thing. The possibility of gain is good, and the character of the technology makes the magnitude of the possible gain large.

The Subcommittee is aware that the economic costs for an accelerated research and development program would be significant. It must be recognized that scientific progress is only one element among many in the portfolio of congressional problems and opportunities. But, within budgetary constraints, the Congress should take the leadership role to assign a new priority for *in situ* research.

In summary, we have seen that *in situ* processing of oil shale deserves increased attention by the Congress. Possible advantages associated with this technology include:

1. *In situ* processing reduces some of the adverse environmental impacts of extracting oil from shale, e.g., with *in situ* processing the quantity of spent shale which must be disposed of above ground is reduced by roughly 80%.

2. *In situ* processing requires much less water than above-ground processing of shale. Accordingly, if shale oil is produced by a combination of underground and aboveground technologies, the potential contribution of shale oil to the U.S. energy supply will be greater than if we depend solely on aboveground processing. It is estimated that an early successful demonstration of a commercial scale oil shale processing plant along with other government incentives such as a guaranteed loans or guaranteed product pricing, could result in production of one million barrels per day of shale oil by 1983 and possibly 2 years sooner if in-place processing is successful.

3. *In situ* technology allows the exploitation of a much larger portion of our oil shale resources. Thick and deep formations not readily amenable to conventional mining methods and deposits which are considered to be poor quality oil shale may be exploited with *in situ* means.

In conclusion, I have indicated that existing programs are limited in view of the tremendous potential which *in situ* processing offers. I have offered the Subcommittee several guidelines which I hope will be useful in your deliberations on the best procedure for expediting development of *in situ* processing of oil shale.

Our role in the Congress should be to ensure that the federally-owned oil shale resources are developed in the most environmentally acceptable and economically feasible manner. We must ensure that *in situ* technology is advanced to the point where it would be able to contribute significantly to our Nation's energy supply. Furthermore, we must ensure that the Federal Government receives a return for its investment in research and development in oil shale processing technologies. A close examination of the "In Situ Oil Shale Technology Act" will show that this legislation would accomplish these objectives.

Mrs. MINK. Mr. Horton, we have a copy of your statement which has been distributed to the members of the subcommittee, and you may proceed in any way you wish.

STATEMENT OF JACK O. HORTON, ASSISTANT SECRETARY FOR LAND AND WATER RESOURCES, DEPARTMENT OF THE INTERIOR

Mr. HORTON. Madam Chairman and members of the committee, it is a pleasure for me to personally appear before you with the members from the Department, representatives that we have from various elements and agencies in the Department.

Mr. Frank Edwards, who is Assistant Director of the Bureau of Land Management; Mr. Reid Stone of the Geological Survey, who has been associated with the oil shale problem for a number of years; and we have Dr. John Morgan from the Bureau of Mines, and Fred Ferguson, the Assistant Solicitor, Department for Minerals and Gary Bennethum, a member of my staff, who has been following the oil shale prototype program and the Oil Shale Environmental Advisory Panel.

It is a particular pleasure for me to follow the distinguished Congressman from Wyoming, Mr. Roncalio. I think overall we in the

Department share with the committee many of the same objectives, the long-range goals of oil shale.

I think our differences are matters of professional and honest differences, and I think our hearing today will bring some of these differences up.

With your permission, because of the large number of bills that we are considering, I will not outline the contents of each bill. This is done in our reports instead.

But, I will comment and state the position of the administration on each bill or groups of similar bills.

With respect to H.R. 12014 and identical bills that concern the Oil Shale Mining and Energy Corporation Act of 1974, we oppose enactment of this bill.

The primary responsibility of oil shale development should rest with the private sector—subject to adequate Federal and State control to protect environmental and other Federal interests.

We believe that private enterprise, under appropriate regulation, can more efficiently provide for the Nation's energy needs. We do not believe that the creation of a Federal Energy Corporation is a necessary or wise use of scarce national financial resources.

To develop oil shale on Federal lands, the Department, through the Bureau of Land Management, has recently undertaken a prototype oil shale leasing program of six tracts in Colorado, Utah, and Wyoming.

Six competitive lease sales were held after thorough study which included the development of strict environmental safeguards and a comprehensive set of leasing regulations. All six lease offers have now been completed and leases have been issued for the two tracts in Colorado, and the two tracts in Utah.

The Wyoming tracts received no bids. Colorado tract C-a was offered on January 8 of this year and attracted a high bid of \$210 million. Colorado tract C-b was offered February 12 and received a high bid of \$117 million.

Utah tract U-a was offered March 12 and a high bid of \$75 million was received. Utah tract U-b was offered April 9 and attracted a high bid of \$45 million. Each tract embraces about 5,120 acres, as you know.

Based on these leases, indications of private interest and industry's demonstrated ability to undertake large scale and sophisticated operations, there is no reason to doubt that private industry can satisfactorily bear its traditional responsibility for developing this resource in an efficient and environmentally sound manner.

However, we intend to pursue vigorously the Department's responsibility for strong enforcement of the environmental stipulations and lease conditions.

The need for such a corporation stated in the bill rests on the assumption that direct Federal participation would be more likely to lead to satisfactory development of synthetic fuels technologies (than traditional market mechanisms).

It further presupposes that market mechanisms have inadequacies or imperfections, or that there exist higher national goals not adequately reflected in fuel price or other market indicators, which justify departing from the standard market mechanisms.

It might be expected that the corporation, given the advantages which the bill would provide with respect to public lands, financing, and profit considerations, would preempt entirely the development of synthetic fuels from oil shale by the private sector. As such, the effect of this would be opposite to the prior mandate of Congress, expressed in the Mining and Minerals Policy Act of 1970, to foster and encourage private enterprise to develop the Nation's energy minerals resources.

We do not believe that a case has been made that such a corporation is needed. Such a corporation would enlarge the bureaucracy of the Federal Government.

In addition, enactment of the bill would most likely place a financial burden on taxpayers that we believe should be assumed by the private sector.

In addition to our general objections to enactment of H.R. 12014, there are numerous specific objections to its provisions.

For example, we question the justification for assigning net oil shale revenues to Indian tribes, nor does there appear to be any basis for the complex financing provisions of the bill. The corporation's powers appear to authorize its intrusion into other aspects of the petroleum industry, for example, the bill provides authority for the production, distribution, and refining of other hydrocarbon and mineral products by the corporation.

Turning now to the bill relating to the dumping of spent oil shale, the numbers of which are H.R. 12127, H.R. 12923, and H.R. 13013, we are opposed to the enactment of any of these bills.

Since sufficient environmental research has not been completed, the best solution for the disposal of spent shale has not been determined. Therefore, it is desirable for the Secretary of the Interior to have discretionary authority and flexibility in the matter of the disposal of spent oil shale.

There may be instances, for example, where it is more practicable and less harmful to dispose of or temporarily store spent shale in a site other than the leasehold. There may be ways that spent shale can be used for beneficial purposes. For example, in the FEA hearings in Denver this past Tuesday, the possibility of using spent shale for road or other building materials was presented.

While the administration's proposed Mineral Leasing Act of 1973, introduced as H.R. 5442, would specifically authorize the use by the lessee of the surface of lands outside the leased tract, it is our belief that onsite disposal or underground mine disposal may represent viable alternatives. Further study is necessary to determine the optimum disposal method.

Turning to the establishment of an Oil Shale Area Impact Fund, as outlined in H.R. 13178 and identical bills, the administration objects to the enactment of these bills.

The provisions relating to royalties unnecessarily limit the discretion of the Secretary of the Interior in these matters. In may result in less than maximum utilization of available mineral resources.

The Department favors giving the Secretary maximum flexibility to establish royalty rates. Particularly with respect to a new program, where knowledge of the costs of mining is limited, such as

that for oil shale, it is essential that those administering the program be given broad discretion in setting royalty rates.

A statutory minimum royalty rate which is too high may preclude development or force premature abandonment of a lease, with producible resources left in the ground. In the present state of knowledge, we cannot state with certainty what a proper minimum royalty rate for oil shale should be, and the proper rate, we believe, can only be determined by experience.

A statutory requirement would be too restrictive in our judgment at this stage of the game. We prefer the provisions of the Department's proposal, H.R. 5442, which would leave the royalty rate to the discretion of the Secretary and would permit waiver of royalties under certain conditions.

We believe the question of distribution of receipts and of uses to which States can put their share of the revenues warrant study and consideration. If the distribution of receipts is to change, in our judgment it is preferable that it be done in a broad base and not piecemeal, mineral by mineral.

The administration's proposed Mineral Leasing Act of 1973 eliminates all restriction placed on the State's share of oil shale revenues, as well as other mineral leasing receipts. We urge adoption of this proposal and early passage of this legislation.

The Oil Shale Area Impact Fund which would be created by this legislation could result in a proliferation of demands for similar programs by any area impacted by an industry developed to meet a national requirement; for example, coal mines and nuclear powerplants.

Federal assistance to solve special problems such as a rapid community growth from oil shale development should be handled by means of existing Federal programs and facilitated by the Federal regional councils. If these types of programs are desirable, we believe they should be applicable to energy impacted areas without restriction.

I would add here, Madam Chairman, and members of the committee, that the Department shares with you a very strong concern about the socioeconomic impacts, the human impacts, as Congressman Hosmer has called them. We believe that these can be minimized in ways other than the creation of this impact fund.

For example, through the Federal Regional Councils, and our representative Mr. Bill Rodgers, we are working with the State of Colorado to find ways and programs that are directed by the State of Colorado toward planning the growth of some of the communities that will be affected toward minimizing the adverse impacts. I would bring to the committee's attention that the State of Colorado can expect to receive, on the basis of their 37½ percent of the bonus for the two Colorado tracts, about \$74 million.

It is our understanding that the State of Colorado is putting this into a special planning fund, to be used for socioeconomic and land use planning in the Piceance Basin, among other places. It is our position that the primary responsibility for land use planning very properly belongs with the State, and the Department and the administration and the executive branch position should be supportive of that, but it should not be in a leadership capacity.

Turning to a bill relating to the status of oil shale revenues, H.R. 13363, we strongly agree with the concept of this bill, which is contained in the administration's proposed Mineral Leasing Act of 1973.

We view the restrictions as to the State's use of its share of revenues from mineral leasing under the Mineral Leasing Act of 1920 as no longer either necessary or desirable. Overall, we prefer enactment of the administration's legislation, instead of legislating only as to receipts from research and production of oil shale.

As to the in situ Oil Shale Technology Act of 1974, H.R. 13465 and identical bills, we object to these bills for the reasons discussed earlier in relation to H.R. 12014, and for these additional reasons:

These bills would favor one method of processing—in situ—the economic and environmental feasibility of which has not been proven. The Department is now seriously considering methods by which in situ development could be encouraged under the prototype program.

And it is my hope and expectation, and I bring this particularly to Congressman Roncalio's attention, that the Department would have an announcement within perhaps the next 6 weeks as to what we could expect in terms of new initiatives by the administration on in situ processing.

We believe that we should give the oil shale prototype program, established under the Mineral Leasing Act, that is to say, the present program now ongoing in Utah and Colorado, the opportunity to prove itself before we propose a new method for minerals management. Moreover, the bill itself raises serious problems.

For example, although the Secretary of the Interior could subject the corporation to regulations and conditions related to environmental and other resource protection, he could not refuse use of any lands to the corporation, nor could he limit acreage or location or collect rentals or royalties.

Land use and mineral development planning systems, now being operated by the BLM, would be bypassed. Administration of other use of lands would be rendered more difficult because of the uncertainty that would result.

The bills are vague as to the type and extent of private industry involvement in the corporation's programs. They would deprive the States involved of revenues ordinarily generated from mineral leasing.

In conclusion, we recognize the need for modernizing the mining and mineral leasing laws, to encourage research and development, and to assure maximum protection of the environment and other resources of the land.

We believe a broad, comprehensive approach to mineral development in a single piece of legislation is preferable to a piecemeal patchwork of individual bills designed to address problems that are broader than the scope of each individual bill.

H.R. 5442 is such broad, comprehensive legislation. It will give uniformity to minerals management by addressing problems relating to all minerals development in a mutually consistent manner. We look forward to testifying before the committee on this important legislation next week.

Madam Chairman, this concludes our formal presentation by the Department, and we are happy, with my colleagues from the Department, to respond to whatever questions the committee may have.

Mrs. MINK. We thank you very much for your testimony.

As I interpret your statement, although you do not favor piecemeal legislation, with respect to the list now being considered, all relating to oil shale, you have no objection to the enactment of H.R. 13362, which is identical to H.R. 13363, broadening the purposes for which the moneys that the States receive from royalties are used.

Mr. HORTON. That is correct. They are now, of course, only for roads and public schools, and we believe that those restrictions should be released.

Mrs. MINK. And I also understand that you see no reason to limit the broadening of the act to oil shale revenues?

Mr. HORTON. That is correct.

Mrs. MINK. Did you have a question?

Mr. HOSMER. Just that I want to ask, as far as that relates, the State can do what they want with the money?

Mr. HORTON. That is our position, Mr. Hosmer.

Mrs. MINK. Do my colleagues have any questions?

Mr. Steelman?

Mr. STEELMAN. Mr. Secretary, I think you make a good point, and I certainly agree that the creation of a Federal Energy Corp. is unnecessary and will not be a wise use of national financial resources.

You do make reference to what you consider to be strong environmental requirements in the lease agreement, and you talk about the Department's resolve to be sure that the environmental responsibilities are observed by the companies buying leases.

What are these strong environmental stipulations in the lease conditions that you refer to?

Mr. HORTON. They are both categorical, Mr. Steelman, and specific. Categorically, the companies, the lessee, can do nothing until they present the Department, the Secretary, with a mining plan, which will then be submitted to a Federal-State Oil Shale Advisory Panel, which is very active in the field, a very active panel, and this mining plan and all components of it must be approved by the Secretary before mining can begin.

Now, an integral part of that plan must be a design for how the land will be reclaimed, how vegetation will be replanted, how the waters will be protected and what not, so we have extra assurance built in that while we receive as we required, within 48 hours of the lease acceptance, a general plan, we expect upwards of 1 to 2 years to get the final, specific, detailed, comprehensive plan, which will then go to the Secretary for his approval.

Actions resulting from that cannot happen without it.

Mr. STEELMAN. Does a mining supervisor in the field chair this panel you talk about?

Mr. HORTON. No. That is completely separate. This is an advisory panel, which is chaired by the Secretary's representative in Denver, Mr. Bill Roders. It is composed of representatives nominated by

the three respective Governors of Wyoming, Colorado, and Utah. It has public environmental representatives and, of course, representatives from the concerned Federal agencies that are not, however, in the chain of command. They are totally in an advisory capacity.

Mr. STEELMAN. Well, there is nothing in the lease having to do with disposal, having to do with revegetation, having to do with mining techniques.

Mr. HORTON. Very definitely there is.

Mr. STEELMAN. Do you not lease to the highest bidder without respect to what kind of a technology is going to be used, what kind of revegetation is going to be done? That at least was my understanding.

Mr. HORTON. No, I am sorry. Those are built into the terms and conditions of the lease.

Madam Chairman, may I, if the committee desires, either insert these in the record or simply read over some of the titles of the terms and conditions of the lease with respect to protection for fish and wildlife.

Mr. HOSMER. I think we should make that an exhibit, a copy of the lease, for our records or files, as appropriate.

Mr. HORTON. They have been submitted, Mr. Hosmer, to the committee before, but at this point I want to assure Mr. Steelman that these environmental protective stipulations are built into the lease itself.

Mr. STEELMAN. Well, what are they, though? That is what I am trying to get. There is nothing having to do with the mining techniques in the bill or the lease, and nothing to do with how shale is disposed of. We are trying to get at both of these questions here in some of these bills.

And I do not have any preconceived notion as to how it should happen. That is what we are groping for here. But, I think, as far as I know, the Department has no grip on them either.

Mr. HORTON. Your point is very well taken, and as you can appreciate, the prototype program, by the very definition of prototype, leaves many questions unanswered, and that is the reason for adopting this kind of a lease.

For example, the lessee has to rehabilitate the affected land, and return it to a condition consistent with or equal to preexisting land uses. But when you look at the specific site of Colorado tract *a* or Utah tract *b*, it is up to the developer of the specific plan and mining plan to adapt into the specific plan these conditions for the hydrological area, et cetera.

Mr. STEELMAN. If this were a general prototype program, however, would we not be setting these various mining techniques side by side, in situ, the others, and try to see which is the most productive, which we can use with the least amount of environmental damage. And by any definition that I have seen, these are minimal stipulations that these people have to comply with, and I do not think that we are going to get anything out of this that we do not already know.

But, we are trying to push Project Independence, and that is going to put solar and shale and nuclear and all of these forms of energy side by side, and if we do not have them side by side

to see their affect on the environment in the next couple of decades, we are not going to get anything out of this prototype program, this so-called prototype program, I should add.

Mr. HORTON. I would remind you that the prototype oil shale leasing program, as developed, was announced and decided upon before Project Independence. This is not part of Project Independence. This was an initiative by the Secretary to find ways to develop oil shale, safely, in a controlled manner.

As I look at the terms here in the lease for environmental protection, I would say they are not minimal, but they are extremely restrictive and these must be adapted to each.

Mrs. MINK. Would the gentleman yield?

What real relevance is it to this committee's understanding of the current situation that this was developed before Project Independence?

Mr. HORTON. It was my interpretation of Mr. Steelman's former remarks, Madam Chairman, that this was a program which came along being embraced by Project Independence as a way to maximize the production of energy from oil shale. And I am trying to say that the philosophy, the derivation of this program preceded the discussions of Project Independence, and I am trying to use that to emphasize that to the extent possible we have detailed the environmental protective stipulations.

Mr. STEELMAN. The point I wanted to make was that we have had various initiatives going on in various fields—nuclear, solar—for several decades, and what we are trying to do now is to focus national attention on these various forms so that we can compare them. We can see that the fossil fuels are not going to be reliable beyond 2000, or thereabouts. We are not going to get this comparison with this shale program as now designed.

And it does not matter. This initiative has been going on since 1946, or thereabouts, when we had the first Federal involvement, and it seems to me that it ought to be coordinated with the other forms, or this prototype will not give us any comparison.

Mr. HORTON. Well, I might say I think we were all disappointed that the two tracts in Wyoming, which could be mined only by in situ processing were not bid upon. We are now looking at ways to stimulate those in terms of R. & D. and in terms of other leasing initiatives within the prototype program, to see how we can stimulate the further examination of the in situ process.

Mr. HOSMER. Will the gentleman yield?

Mr. STEELMAN. Yes.

Mr. HOSMER. Does or does not this leasing formula prohibit leases for the extraction of oil shale on alluvial valley floors?

Mr. HORTON. Mr. Hosmer, I think the matter of the alluvial floors came up in the strip mining legislation, and I do not think it is pertinent with respect to the oil shale leases themselves.

Mr. HOSMER. You mean that there is no oil shale underneath the alluvial valley floor?

Mr. HORTON. Well, with the permission of the chairwoman, I will ask Mr. Fred Ferguson whether, in our lease forms for oil shale, there is any reference to alluvial.

Mr. FERGUSON. Not that I remember.

Mr. HORTON. I am correct. We remember none being in the lease forms themselves.

Mr. HOSMER. Well, perhaps it might be illuminating to all of us if you would tell us what is an alluvial valley floor.

Mr. HORTON. I think that must be defined in the strip mining legislation.

Mrs. MINK. It is.

Mr. HOSMER. Well, I do not understand what it is from the definition. I would really like to know what an alluvial valley floor is. I wake up at night wondering.

Mr. HORTON. I am sorry, Congressman Hosmer. I cannot elucidate on that. I would simply say you have to rely upon the definition that would be in the proposed legislation on strip mining.

Mrs. MINK. The Chair will respond by saying that she will provide the gentleman from California with a very lengthy dissertation on the subject.

Mr. HOSMER. Good.

Mrs. MINK. Have you concluded? Mr. Steelman?

Mr. STEELMAN. One final comment. I thought back after our field trip, our field hearings out in Colorado, our colleague, Mr. Roncalio, referred to one of the bidders on the Colorado tract. I talked with the oil company that came in second to the successful bidder, and I was trying to probe them on what sort of a technique they planned to use, what their plans were with respect to revegetation, with respect to disposal of this material.

Their plans were, and their entire bid was being based upon being able to strip mine the entire project and dispense the spent shale in the valleys. Now, that is what I mean, you see. If they had been successful, there would have been nothing to prevent them from pursuing that and that would have been devastating to that particular area.

That is what I mean when I say this prototype is not that at all.

Mr. HORTON. Let me respond to that by saying the reference to strip mining, it is our understanding that the four tracts we have leased will be underground mining only, and not strip mining.

Mr. STEELMAN. I understand, but what I say is had this bidder been successful, this is the technique that they had planned on using.

Mr. HORTON. Well, they may have planned that, but they certainly would have been prohibited from using any method until it had been approved by the Secretary. The point is now that we do not know whether it should be disposed of onsite or offsite. And in fact, I was at the FEA hearings that started in Denver on last Tuesday, and the White River Oil Corp. is now saying one feasible alternative is to put the spent shale back in the mine.

The one qualification on that is that if at some future period, they wanted to go back into the mine with the in situ process that might have been refined then, they would have put the spent shale back and that would prohibit it. But, the companies now, themselves, are looking at a wide array of alternatives as to what to do with this spent shale.

Mr. STEELMAN. I think all of the testimony we have had before the committee is that you still have a 40 percent expansion of the mined material under the best of circumstances. You can only restore 60 percent back in any sort of underground site. What are you going to do with the other 40 percent?

Mr. HORTON. Well, we asked the companies that testified before us what their present thoughts were now that they have looked at this for 4 or 5 months. They said we are now looking at constructive uses of the shale. We believe that we can turn some of it into material for roads and we believe we can use some of the material for dam construction.

But we are awaiting the proposal of the specific mining plans before we reach a judgment on what to approve and what not to approve.

Mr. STEELMAN. I yield to the gentleman from Massachusetts.

Mrs. MINK. The time of the gentleman has expired.

Are there any other questions on this side?

Mr. Seiberling?

Mr. SEIBERLING. Thank you.

Mr. HORTON. You made a very strong plea to give the Secretary great discretion in these matters and particularly in setting what proper criteria would be for operations on leased lands.

I just wondered, what criteria is the Secretary using in deciding what conditions should be met by the lessee?

Mr. HORTON. Do you mean environmental conditions?

Mr. SEIBERLING. Environmental, just take environmental, yes.

Mr. HORTON. Well, the environmental stipulations which are in the lease now were the result of almost a 4-year effort, analytical effort by the Geological Survey, the Bureau of Mines, the Bureau of Land Management, and to some extent, the Bureau of Reclamation.

Mr. SEIBERLING. I am not talking about what is in the lease, but the lease is fairly general in its terminology, and you indicated in response to Mr. Steelman's questions that the Secretary, for example, in the case of this operator that was considering strip mining and dumping the spent shale in the valley, that the Secretary would have not approved that necessarily.

Now, what standards are you using, besides the very general ones in the lease?

Mr. HORTON. Well, we have not reached any specific standards on the disposal question. As I indicated to Mr. Steelman earlier, we do not have the best answers and it may well depend on a specific area.

Mr. SEIBERLING. Well, it is a little puzzling to me that on the one hand the Interior Department's position is that they do not want us to tie the hands of the Secretary, but give him discretion, and yet we are, in effect, asked to just give him a blank check.

Mr. HORTON. I think I could not agree with the blank check. It says the lands must be reclaimed.

Incidentally, once again, this is not strip mining. It is underground mining.

Mrs. MINK. Will the gentleman yield on that point?

Mr. SEIBERLING. Yes.

Mrs. MINK. You keep referring to the fact that you are not permitting strip mining in these leases, that it will be by underground methods. Still the large issue that remains unresolved, at least in my mind, and certainly in the public's mind, is what do you do with the spent shale.

You are going to have huge tonnages of this excess material and I would certainly hope that you would not put it back underground. Should that be your judgment, I do not know what the long-range consequences would be, but in disposing of it, most of it would have to go on the surface, which to a large extent would ruin the surface, whether you strip or not.

And this is the issue, I believe that we simply have to resolve. I do not think you can postpone a decision. And what the gentleman from Ohio is seeking in the way of response, which I also am very much concerned about, is what standards will the Department use for the approval of this specific project plan, which is required to be submitted by the lessee within 3 years? What are the criteria for judgment? If you can tell the committee, this would be most helpful in understanding exactly what will be occurring.

Mr. HORTON. Well, the standards, Madam Chairman, are in the terms and conditions of the lease, which are not specific, according to the method or a specified method according to location, but they are certainly specific in terms of intent, in terms of—

Mrs. MINK. If the intent is to require reclamation, how do you accomplish and ever achieve the purposes of reclamation, if you must put this horrible stuff on the surface?

Mr. HOSMER. Would the gentlelady yield?

Mrs. MINK. Yes.

Mr. HOSMER. I think it must be implicit in what the Secretary says that some kind of a cost benefit trade-off is being made here between the value of the energy and of leaving the mined area in some kind of a deteriorated state.

Now, you had not anticipated returning it to a pristine condition and eliminating any—

Mrs. MINK. If the gentleman will yield, he read a paragraph from the lease which requires that it be returned to the condition in which it was found.

Mr. HORTON. But, I would continue, because I only read, in fact paraphrased, I simply paraphrased from the first sentence of what is section 11 in the lease form, and I will just continue, because I think this will answer what I think are your very appropriate concerns for rehabilitation methods, which include but are not limited to the following:

*** leveling, backfilling, covering the surface with top soil, revegetating with spoiled banks and pit areas consistent with sound restoration methods. The lessee shall leave reclaimed land in a useable form that is nonhazardous, and such that erosion and water pollution are avoided.

Then this goes on to further elaborate on that.

Mr. SEIBERLING. Well, if I may pick this up, let us get to the question of determining the sound disposal method. What is the Interior Department's program for determining the best method for the disposal of the spent shale?

Mr. HORTON. Well, apart from the section I have referred to, and the lease itself, and what is contained in the environmental impact statement, we are awaiting the proposal from the industry as to how they see the best disposal methods in that particular area.

Mr. SEIBERLING. Well, if you will pardon a bit of skepticism, having been out and looked and talked with the industry people, I do not think that they are the most objective source to make that determination. It seems to me that the Department of Interior itself ought to be running some kind of a program to make an independent and objective analysis as to the best method of disposal of spent shale, bearing in mind all of the considerations, but certainly the environmental ones ought to be one of the prime considerations.

Mr. HORTON. Well, we have an ongoing monitoring responsibility right now, which is to say, what are the base line conditions at the present time.

Mr. SEIBERLING. But the thing that bothers me is that by the time industry finishes the job of dumping enormous quantities of shale in a particular area, and with a particular technique that they have developed, if it turns out that that does not do the job—and I know a lot of scientists are concerned about some of the techniques proposed—then it is too late.

And it seems to me that the Interior Department is not carrying out its responsibilities unless it, itself, conducts some sort of independent program to make decisions. You meet yourself coming backwards, if you are going to say you are going to set up a standard whereby you judge industry, and then you are going to use industry's own program to decide what the standard ought to be.

Mr. HORTON. Let me respond in two areas, the first of which is that the industry now does not have authority or permission to either mine or dispose of anything. They must get the direct authority of the Secretary to do that.

Second, we are conducting R. & D. efforts through the Bureau of Mines, through the Bureau of Land Management, with respect to environmental disposal problems of oil shale. Dr. Morgan has just brought my attention here to a \$600,000 program that the Bureau of Mines is conducting at its Laramie, Wyo., research center to develop means to reclaim lands mined for oil shale and to minimize introduction of ground and air pollutants from oil shale mining.

But, I would also draw the Congressman's attention to a number of other programs that are happening in the Northern Great Plains and elsewhere with respect to reclamation and revegetation.

Mrs. MINK. Would the gentleman yield? While we have Dr. Morgan here, how long will that study last before you will have conclusions which can be reported to this committee?

Dr. MORGAN. Madam Chairman, these studies obviously require a long period of time. On the other hand, the Bureau of Mines has long been engaged in research in oil shale. I do not think this type of work is ever concluded. You are constantly running into new conditions, new problems, and additional information is added.

Mrs. MINK. Sir, we were just told that based upon your findings and the study that you are conducting, the Secretary will be able to evaluate the best method of disposal.

Now, which is going to come first, the decision with regard to disposal before you have a conclusive report, or will the Secretary be constrained to wait for your report and, therefore, approve a disposal plan before there are some definitive recommendations by you or the Bureau?

Mr. HORTON. Well, Madam Chairman, there are reports now in existence that demonstrate almost conclusively in certain areas of coal, at least, that reclamation not only is feasible but very probable, given certain conditions of watering, certain conditions of fertilizer, and certain species of grass.

The Forest Service is now concluding a study in the Northern Great Plains, the results of which I have seen on the ground, that they have something in the area of 20 species of grasses.

Mrs. MINK. Is this in oil shale or coal?

Mr. HORTON. I am speaking in terms of coal.

Mrs. MINK. My specific inquiry is with regard to oil shale disposal.

Mr. HORTON. But much of the research is applicable. There may be differing species of plants and differing fertilizers, but it is not a matter that we do not know anything about on revegetation, and must wait for a 20-year study.

We know a good deal about reclaiming the lands.

Mr. SEIBERLING. If I may interject, revegetation is only part of the problem. Having looked at some of these piles of spent shale, you have got the problem of what is underneath and the percolation of the water down through it, and the eventual erosion. It just seems to me that revegetation is only a very small part, and I wonder what is being done to look at the whole problem?

Dr. MORGAN. Sir, the Bureau of Mines has an increased appropriation this year for work in the oil shale area on deep-seated deposits. And while I do not not have at my finger tips the details of the work in the Geological Survey, which is a sister agency, it is my understanding that they are engaged in baseline surveys, so as to be able to ascertain the effects of pollutants in the water, and in the air, and in the ground, including trace elements that have been mentioned, as well as the principal elements in the oil shale.

I believe that we need a continual cut and try process here. That is why we have a prototype leasing program. We obviously do not know all of the answers, and research, on a limited scale, cannot provide all of the answers.

But each day, or each week, some information is provided, and there will be back and forth refinement, which will lead to ultimate viable solutions.

Mr. SEIBERLING. I yield to the gentleman from Wyoming.

Mr. RONCALIO. Thank you. I might add and admit that I appreciate, Dr. Morgan, that we do not know all of the answers, and Lord knows we on the committee do not know all the answers.

But, if we do not know all of the answers, and we go on into the fee land where the Secretary has no responsibility, and Hollis Dole, a friend of ours, will say, now, you sign this form before you can walk on these premises, and the form says you do not ask any

questions about anything here, and our processes are our own business, and we are not telling you what we are doing and finding out.

That is what the industry is saying to the Secretary. How then can you come before us with a statement to oppose a Federal corporation because the corporation might learn something that we cannot get from the industry? This is the question that I want to pose. Do we not have to have a prototype of our own where we can go and find out our own answers, if industry will not tell us what they are learning on the fee lands? That is my thought, and I hope you can appreciate my thought. You do not have to answer that, but did you appreciate my thought, because that is what we were told.

We were told that what we found out in the Colony operation is proprietary proper of Colony and Atlantic Richfield, and we cannot discuss this with anybody, and you sign this form saying that whatever you see here is private property and you are not to come back with it.

All right, that is their property, but you have a responsibility for tens of thousands of acres of Uncle Sam's own around this area, and so that is why I say let us find out, take a few acres and put up our own operation, and find our own answers, if we cannot find them from private industry.

Can you appreciate that thinking which prompted the bill, H.R. 12127?

Mr. HORTON. I certainly appreciate your settlement. I think we are all going in the same direction with respect to our desires to control the environment.

I would respond further, however, to say that in our experience the companies have been very ready and forthcoming with information. We have had these companies, upon an invitation basis, addressing the Oil Shale Advisory Panels and they have been very ready to present to the Department the results of their studies and what not.

Mr. RONCALIO. I appreciate that too. But in their processes, they reserve the right, and it is certainly understandable, that it is a trade secret, and what they return in the retort is their own business, and the difference from retort at Colony and retort in 10 other companies engaging in research may be different.

May I ask one or two more questions?

Mrs. MINK. The time of the gentleman has expired. Mr. Hosmer?

Mr. HOSMER. Mr. Secretary, you came down pretty hard against the special energy corporation idea?

Mr. HORTON. That is correct.

Mr. HOSMER. And you cited the Mining and Minerals Policy Act as requiring the prospering and promoting of private enterprise in developing the Nation's energy and mineral resources.

Is that the basis for your opinion?

Mr. HORTON. That is the substantial basis, yes, sir.

Mr. HOSMER. If it were not for this Mining and Mineral Act, then you would be favorable to the Federal Energy Corp.?

Mr. HORTON. We would still be strongly unfavorable, but that is a legal referential basis for our opposition.

But, we believe there are economic issues, efficiency issues, that would still be substantial grounds for opposing it.

Mr. HOSMER. Would you just oppose any Federal Energy Corporation, no matter what for?

Mr. HORTON. Well, our remarks and comments today are addressing the proposal on H.R. 12014 with respect to the Oil Shale Energy Corp.

Mr. HOSMER. Well, now, I have in mind a need of a product that is in short supply, that is environmentally compatible, that is only produced in one part of the United States, and a lot of other people are being deprived of it, and I am thinking of a Federal pineapple corporation.

You would not be opposed to that, would you?

Mr. HORTON. I am not sure.

Mr. RONCALIO. Would the gentleman yield? Would the gentleman yield?

Mr. HOSMER. Yes, I yield.

Mr. RONCALIO. Thank you for that.

I am not a member of this subcommittee and I appreciate, Madam Chairman, having a chance to sit with you today because I am not a member of the subcommittee.

Secondly, on pineapples, Mr. Secretary, you were in charge a few years ago of a larger program of all of the energy of the country where there was an energy gap and uranium and it was going to put us in an embarrassing spot again in 1982, and the only way it could be solved was for a U.S. Enrichment Corporation to build plant No. 4 to augment the three wholly owned Government plants right now, would you oppose that, or it that too technical for you?

Mr. HORTON. I would agree, and I would believe that private industry should provide the initiative in these areas. There may be instances, and a good one, as a matter of fact, is that the Federal Government should strongly support R. & D. funding for these programs.

Mr. RONCALIO. I appreciate your answer, because the very thing I asked you is the very corporation that my friends from California wanted created, which was a quasi-public corporation, and so you see, it is not always the Democrats, but sometimes the Republicans too, when it is really needed to fill a gap.

Mr. HOSMER. I thank the gentleman for the encouragement.

I also would appreciate having pineapples on Pike's Peak.

Mr. RUPPE. Will the gentleman yield? Would you say the activities of the TVA have been one of the great benchmarks in a strip mining?

Mr. HOSMER. TWA or TVA?

Mr. RUPPE. TVA.

Mr. HOSMER. Okay.

Mr. RONCALIO. If I may have another minute, I want to thank you for coming this morning, and I want to ask you, do you have some reason as to why the two Wyoming prototype bids appeared less attractive?

Mr. HORTON. I think I would outline for the committee, Mr. Roncalio, three main reasons, the first of which is the locality of the

resource base of the Wyoming tracts. They had 20 gallons of oil per ton or less, much poorer quality oil shale than, in fact, exists in the Piceance Basin and in Utah.

Second, the total reserve figure is much less by a figure of about a fourth from the richest tracts in Colorado. The reserves under tract C-a, in our best judgment, of 1.3 billion barrels of oil, and in both Wyoming tracts they were in the vicinity of 350 million barrels, approximately one-quarter and one-third and finally, it is our judgment that that shale could be mined only by in situ processing and I think it is a good judgment that the refinement of the in situ processing simply had not been demonstrated at that time, and the companies were very reluctant.

I think those were the three main reasons.

Mrs. MINK. The time of the gentleman has expired.

Are there any other questions?

Mr. RUPPE. Just one comment.

Mrs. MINK. Mr. Ruppe?

Mr. RUPPE. Thank you.

Did you indicate in your testimony that you had offered a site for the mining using in situ, the in situ process, and that bids were not received for mining in that particular tract?

Mr. HORTON. Well, we did not specify or stipulate the type of processing that would be required. We simply offered the tracts up for leasing, knowing a good deal of the conditions of the geology, the ground water and resource base. It was generally accepted by industry and the Department that the two Wyoming tracts would have to be developed by in situ process.

Mr. RUPPE. The reason I am curious is that Occidental Petroleum had a presentation before this committee indicating that in situ was a very viable and a most economical way of approaching the oil shale question. And I was rather curious why they did not carry out their presentation to the point of actually bidding or asking for the right to mine in that particular area.

No indication was given by that company?

Mr. HORTON. Well, they did not bid, and obviously it is not our posture to go out and ask companies why they did not bid. I think we can speculate that there may have been financial reasons that the Occidental Petroleum Co. did not bid. It could be that they have sufficient reserves under their private holdings. And it could be they thought the oil shale was too poor a quality.

Mr. STEELMAN. Would the gentleman yield?

We saw the Occidental site out on the field trip and I think their feeling is that with their private tracts, they have in place there an adequate setting in which to test this, and they wanted to try to refine it there, rather than go out into new areas.

Mr. RUPPE. In the leases that you have given, the six leases, have you retained a royalty for the Federal Government, or have you permitted an exception or a waiver in these particular instances?

Mr. HORTON. No. We have granted only four leases, not six, and the royalty is 12 cents a ton on 30 gallons of oil per ton.

Mr. RUPPE. Is that to the Federal Government, the State, or on a sharing basis?

Mr. HORTON. I think the State's share is 37½ percent of that.

Mr. RUPPE. Thank you very much.

Mrs. MINK. Any further questions. Mr. Roncalio?

Mr. RONCALIO. Yes. Thank you, Madam Chairman, for recognizing me, even though I am not a member of this committee.

I would like to say that this member of the full committee wants to go on public record to state an appreciation of Mr. Horton's position regarding the leasing of resources in the coal area of the northwest Plains and in your Department's answer to this committee, there are differences of opinion, and sometimes they are basic and fundamental. But, I want to express my appreciation for what you have done there, and that you hand in and carry on your good work in that Department regarding the orderly, proper development of these resources, and not any pell-mell rush into these total releasing of the resources.

Mrs. MINK. Mr. Cronin?

Mr. CRONIN. Just one quick comment, Madam Chairman, and it ties in with the line of questioning of my colleague, Mr. Steelman.

I think that if the Department had standards that they used for evaluation, and I think the example that you gave of, for example, not allowing strip mining and having all of these under deep mining processes, while I do not disagree with the standards that the Department set, I think that it would help everybody a great deal if the Department outlined those standards in their original form.

I think it helps to eliminate the suspicion on both sides that something is not exactly up to standard that it should be held to, and I think that this procedure is going to be absolutely necessary as we get into things like deep water drilling offshore, where if we do not require the newest technology, much of which has been developed by NASA from their report on deep water drilling, and just in our initial application forms, that the best form of technology be utilized, without saying what that actual technology is, we are opening the door to a good deal of criticism when there is absolutely no need to do that, because the Department is in agreement that this type of thing should be done.

And I think that where the Department is in agreement that they should spell it out on the initial application form as completely as possible.

Mr. HORTON. Mr. Cronin, I think that your suggestion is a good one. And I would say to dispel at least in principle any apprehension that you have that there will be any backing away from any sort of environmental consciousness, when it comes to the approval of any specific mining plan, I think I have been at fault here for not taking the time to detail to you some of the standards that are now in the lease form.

I can provide that either for the record or I can go over it orally here. B, let me give an example; with respect to the stabilization of disturbed area, it indicates the types of practices that shall include the needs of the specific site, including seeding, planting, rock, and gravel blankets.

There are a pretty specific set of standards when you read into the language of the terms and conditions of the lease.

Mr. STEELMAN. Madam Chairman?

Mrs. MINK. We would appreciate having that for insertion into the record at this point, Secretary Horton.

[The material mentioned will be inserted in the record at this point.]

Attached is a sales announcement published in the Federal Register and an oil shale lease. These examples enumerate some of the standards which are part of the terms and conditions of the leases. These standards are based on environmental impact statements and therefore vary according to the parcel of land.

[From the Federal Register, Vol. 39, No. 8, Friday, January 11, 1974.]

DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

COLORADO

Competitive lease offer of oil shale lands

Notice is hereby given that on February 12, 1974, Colorado TRACT C-b, as hereafter described in paragraph 1, will be offered for oil shale lease by sealed bids to the qualified bidder submitting the highest amount per acre as bonus for the privileges of leasing the lands in accordance with the provisions of the Mineral Leasing Act of February 25, 1920 (41 Stat, 437), as amended (30 U.S.C. 181-263), and the general Notice of Sale of Oil Shale Leases published in the FEDERAL REGISTER of November 30, 1973.

1. *TRACT C-b:*

T. 3 S., R. 96 W., 6th P.M.,
Sec. 5, $W\frac{1}{2}SE\frac{1}{4}$, $SW\frac{1}{4}$;
Sec. 6, lots 6 and 7, $E\frac{1}{2}SW\frac{1}{4}$, $SE\frac{1}{4}$;
Sec. 7, lots 1, 2, 3, and 4, $E\frac{1}{2}W\frac{1}{2}$, $E\frac{1}{2}$;
Sec. 8, $W\frac{1}{2}NE\frac{1}{4}$, $NW\frac{1}{4}$, $S\frac{1}{2}$;
Sec. 9, $SW\frac{1}{4}$;
Sec. 16, $NW\frac{1}{4}$, $W\frac{1}{2}SW\frac{1}{4}$;
Sec. 17, All;
Sec. 18, lots 1, 2, 3, and 4, $E\frac{1}{2}W\frac{1}{2}$, $E\frac{1}{2}$.

T. 3 S., R. 97 W., 6th P.M.,

Sec. 1, $S\frac{1}{2}$;
Sec. 2, $SE\frac{1}{4}$;
Sec. 11, $E\frac{1}{2}$;
Sec. 12, All;
Sec. 13, $N\frac{1}{2}$;
Sec. 14, $N\frac{1}{2}NE\frac{1}{4}$.

The area described aggregates 5,093.90 acres.

2. *Lease terms.* The lease will be issued on a form the full text of which is published as Appendix "A" to the general Notice of Sale published in the FEDERAL REGISTER on November 30, 1973. The lease will be issued for a period of 20 years and so long thereafter as production is had in commercial quantities, subject to readjustment of terms at the end of each 20-year period. The lessee will be required to pay royalty on production in the amount and manner prescribed in section 7 of the lease, and to maintain a bond as provided in section 9. The terms of the lease as published in the FEDERAL REGISTER are solely for leases issued under the prototype oil shale leasing program and will not necessarily be included in any oil shale leases not issued pursuant to that program.

	Shale grade (gallon/ton)	6th year production rate (thousand tons/year)	15th year production rate (thousand tons/year)
Tract C-b.....	30	1, 130	11, 300

3. *Minimum royalty.* Section (7) (e) (1) of the lease form requires the payment of a minimum royalty for the sixth and each succeeding year which shall for the sixth and each succeeding year which shall for this tract be based upon the following production rate and oil shale grade:

4. *Bidding procedures.* The lease will be offered competitively through sealed bidding. A lease will be issued only to the qualified bidder submitting the highest amount per acre as a bonus for the privilege of leasing the lands. No specific form of bid is required but all bids must identify the lease sale and must show the total amount bid, the amount bid per acre, and the amount submitted with the bid. Oil and Gas Bid Form No. 3120-17 may be adapted for this purpose. No telephonic or telegraphic bids will be accepted, and no oil payment, overriding royalty, logarithmic, or sliding scale bid will be considered. Bids shall not be modified after they have been submitted. Bids must be for the full tract described in this Notice of Sale. Bids must be submitted in sealed envelopes plainly marked "Sealed Bid for Oil Shale Lease. Not to be opened before 10 a.m., local time on February 12, 1974." Bids may be mailed or delivered in person until 10 a.m., local time, February 12, 1974, to the State Director, Colorado State Office, Bureau of Land Management; Room 700, Colorado State Bank Building, 1600 Broadway, Denver, Colorado 80202. Bids received after that time will be returned unopened. Bidders are warned against violation of section 1860 in Title 18 U.S.C. prohibiting unlawful combination or intimidation of bidders.

5. *Payment of bonus and advance rental.* All bids must be accompanied by a certified check, cashier's check, bank draft, money order, or cash for one-fifth on the bonus bid payable to the Bureau of Land Management, which amount shall be returned to the bidder after the lease sale should he be an unsuccessful bidder. If the bidder, after being notified that his bid has been accepted and that he will be awarded a lease, fails to comply with the applicable regulations or the terms of this notice, or if he fails to execute the lease within 15 days after receiving the lease form, his deposit will be forfeited.

Each bid must also be accompanied by a certified check, cashier's check, bank draft, money order, or cash for the first year's annual rental of \$2,547.00. This amount shall be returned to all unsuccessful bidders after the lease sale.

6. *Evidence of qualifications:* Each bid must be accompanied by a statement over the bidder's signature or that of his authorized agent with respect to his qualifications. The statement shall contain the following information:

(a) If the bidder is an individual, a statement as to whether native born or naturalized; if an association, it must submit a certified copy of the articles of association and a statement by its members as to their citizenship. If the bidder is a corporation, it must submit statements showing: (i) The State in which it is incorporated; (ii) that it is authorized to hold leases for oil shale deposits, and the names of the officers authorized to act in such matters in behalf of the corporation; (iii) the percentage of the corporate voting stock and of all the stock owned by aliens or those having addresses outside the United States; and (iv) the name, address, and citizenship of any stockholder owning or controlling 20 percent or more of the corporate stock of any class. If more than 10 percent of the stock is owned or controlled by or in behalf of aliens, or persons who have addresses outside the United States, the corporation must give their names and addresses, the amount and class of stock held by each, and to the extent known to the corporation or which reasonably can be ascertained by it, the facts as to the citizenship of each. The bid of a corporation also shall be accompanied by a copy either of the minutes of the meeting of the board of directors or of the by-laws indicating that the person signing the bid has authority to do so, or, in lieu of such a copy, a certificate by the Secretary of the corporation to that effect, over the corporate seal, or appropriate reference to the record of the Bureau of Land Management in connection with which such articles and authority have been furnished previously; and

(b) The certification required by 41 CFR 60-1.7(b) and Executive Order No. 11375, on Form 1140-8 (November 1973) and Form 1140-7 (December 1971).

7. *Bid opening.* The bids will be opened at 10 a.m., local time, February 12, 1974, at the Colorado State Office, Bureau of Land Management. The opening of bids is for the purpose of publicly announcing and recording bids received and no bids will be accepted or rejected at that time. If the Department is prohibited for any reason from opening any bid before midnight, local time, February 12,

1974, that bid will be returned unopened to the bidder as soon thereafter as possible.

8. *Acceptance or rejection of bids.* No bid for this tract will be accepted and no lease for this tract will be awarded to any bidder unless the bidder has complied with all requirements of this Notice, his bid is the highest for the offered tract, and the amount of the bonus bid has been determined to be adequate by the United States. The Government reserves the right to reject any or all bids. Any cash, checks, drafts, or money orders submitted with the bid may be deposited in an unearned escrow account in the Treasury during the period the bids are being considered. Such a deposit does not constitute and shall not be construed as acceptance of any bids on behalf of the United States.

9. *Preliminary development plan.* Within forty-eight hours after being informed that his bid has been accepted and that lease will be issued to him, the successful bidder must transmit a preliminary development plan, in duplicate, to the Officer conducting the lease sale. This plan will be made public upon issuance of the lease, and, therefore, confidential information relative to the lessee's operations should not be included in the submission. Confidential information should be submitted in the same manner, but under separate cover. The submission or acceptance of these plans will not be binding on the lessee or lessor and will not authorize any action by the lessee, but the plan is required for the lessor's guidance in establishing initial supervision of the lessee's activities. The preliminary development plan should include the method of development, the proposed location of on and off-site facilities, the schedule for development, and monitoring programs to determine environmental criteria.

10. *Further information.* Information concerning this oil shale lease sale may be obtained from the Oil Shale Coordinator, Room 5623, Interior Building, Washington, D.C. 20240; the Deputy Oil Shale Coordinator, Building 56, Denver Federal Center, Denver, Colorado; the Chief, Division of Upland Minerals, Bureau of Land Management, Room 7146, Interior Building, 18th & C Streets, NW., Washington, D.C. 20240; and the State Director, Colorado State Office, Bureau of Land Management, Room 700, Colorado State Bank Building, 1600 Broadway, Denver, Colorado 80202.

GEORGE L. TURCOTT,
Associate Director,
Bureau of Land Management.

[FR Doc. 74-996 Filed 1-10-74; 8:45 am]

U.S. DEPARTMENT OF THE INTERIOR, BUREAU OF LAND MANAGEMENT, OIL SHALE
LEASE

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Oil Shale Lease

In consideration of the mutual promises, terms and conditions contained herein, and the grant made hereby, this lease is entered into on March 18, 1974, to be effective on April 1, 1974, (hereinafter called the "Effective Date"), by the United States of America (hereinafter called the "Lessor"), acting through the Bureau of Land Management (hereinafter called the "Bureau"), of the Department of the Interior (hereinafter called the "Department"), and ATLANTIC RICHFIELD CO., Box 2679 T.A., 515 South Flower St., Los Angeles, California 90071, ASHLAND OIL, INC., 1409 Winchester Ave., Ashland, Kentucky 41101, SHELL OIL COMPANY, Box 2463, Houston, Texas 77001, and THE OIL SHALE CORPORATION, 10100 Santa Monica Blvd., Los Angeles, California 90061 (hereinafter called the "Lessee"), pursuant and subject to the terms and provisions of the Mineral Leasing Act of February 25, 1920 (41 Stat. 437) as amended (30 U.S.C. ss181-263) (hereinafter called the "Act"), and to the terms, conditions, and requirements (1) of all regulations promulgated by the Secretary of the Interior (hereinafter called the

"Secretary") in existence upon the Effective Date, specifically including, but not limited to, the regulations in 30 CFR Part 231 and 43 CFR Part 23 and Group 3000, all of which are incorporated herein and, by reference, made a part hereof; and (2) of all regulations hereafter promulgated by the Secretary (except those inconsistent with any specific provisions of this lease other than regulations incorporated herein by reference), all of which shall be, upon their effective date, incorporated in and, by reference, made a part of this lease.

SECTION 1. DEFINITIONS

As used in this lease:

(a) "Oil Shale" means a fine-grained sedimentary rock containing: (1) organic matter which was derived chiefly from aquatic organisms or waxy spores or pollen grains, which is only slightly soluble in ordinary petroleum solvents, and of which a large proportion is distillable into synthetic petroleum, and (2) inorganic matter which may contain other minerals. This term is applicable to any argillaceous, carbonate, or siliceous sedimentary rock which, through destructive distillation will yield synthetic petroleum. The products of Oil Shale include both shale oil and other minerals;

(b) "Leased Lands" means:

T. 3 S., R. 96 W., 6th P.M.

Sec. 5: $W\frac{1}{2}SE\frac{1}{4}$, $SW\frac{1}{4}$

Sec. 6: Lots 6 and 7, $E\frac{1}{2}SW\frac{1}{4}$, $SE\frac{1}{4}$

Sec. 7: Lots 1, 2, 3, and 4, $E\frac{1}{2}W\frac{1}{2}$, $E\frac{1}{2}$

Sec. 8: $W\frac{1}{2}NE\frac{1}{4}$, $NW\frac{1}{4}$, $S\frac{1}{2}$

Sec. 9: $SW\frac{1}{4}$

Sec. 16: $NW\frac{1}{4}$, $W\frac{1}{2}SW\frac{1}{4}$

Sec. 17: All

Sec. 18: Lots 1, 2, 3, and 4, $E\frac{1}{2}W\frac{1}{2}$, $E\frac{1}{2}$

T. 3 S., R. 97 W., 6th P.M.

Sec. 1: $S\frac{1}{2}$

Sec. 2: $SE\frac{1}{4}$

Sec. 11: $E\frac{1}{2}$

Sec. 12: All

Sec. 13: $N\frac{1}{2}$

Sec. 14: $N\frac{1}{2}NE\frac{1}{4}$

situated in the County of Rio Blanco, State of Colorado containing 5,093.90 acres, more or less;

(c) "Leased Deposits" means all deposits of Oil Shale lying within or under the Leased Lands;

(d) "Anniversary Date" means the anniversary of the Effective Date of this lease; however, if operations under this lease are suspended pursuant to section 39 of the Act (30 U.S.C. §209), the next Anniversary Date of this lease after the suspension shall follow the previous Anniversary Date by a period of time equal to the sum of one year and the period of suspension, and subsequent Anniversary Dates will be measured from that Anniversary Date;

(e) "Lease Year" means the period of time between two successive Anniversary Dates of this lease;

(f) "Ton" means a measure of weight of 2,000 pounds avoirdupois;

(g) "Mining Supervisor" means the appropriate mining supervisor of the United States Geological Survey (hereinafter called the "Geological Survey"), as defined in 30 CFR 231.2(c); and

(h) "Commercial Quantities" means quantities sufficient to provide a return after all variable costs of production have been met.

SECTION 2. GRANT TO LESSEE

The Lessee is hereby granted, subject to the terms of this lease, the exclusive right and privilege to prospect for, mine by underground or surface means and process by retorting or by *in situ* methods or otherwise, as he may reasonably choose and in accordance with approved plans, utilize, and dispose of all Leased Deposits together with the right to construct on the Leased Lands all such works, buildings, plants, structures, roads, powerlines, and additional facilities as may be necessary or reasonably convenient for the mining, processing, and preparation of products of the Leased Deposits for market and the housing and welfare of the Lessee's employees, agents, and

contractors, and to use so much of the surface of the Leased Lands as may reasonably be required in the exercise of the rights and privileges herein granted.

SECTION 3. LESSOR'S RESERVED INTERESTS IN THE LEASED LANDS

The Lessor reserves the following:

(a) The right to lease, sell, or otherwise dispose of the surface of the Leased Lands or of any surface or mineral resource in the Leased Lands (or of any interest therein) under existing laws or laws hereafter enacted, subject to the rights of the Lessee under this lease;

(b) The right, upon such terms as it may determine to be just, to permit for joint or several use, such easements or rights-of-way, including easements in tunnels upon, through, or in the Leased Lands, as may be necessary or appropriate to the working of the Leased Lands or other lands containing mineral deposits subject to the Act, and the treatment and shipment of the products thereof by or under authority of the Lessor, its Lessees, or permittees, and for other public purposes; and

(c) The right to conduct and to authorize geological and other investigations on the Leased Lands which do not interfere with or endanger operations under this lease.

SECTION 4. LEASE TERM

This lease shall for a period of 20 Lease Years from the Effective Date and so long thereafter as there is production from the Leased Deposits in commercial quantities, subject to the provisions of section 23 with respect to the readjustment of terms and conditions and the right of the parties to terminate the lease.

SECTION 5. BONUS

In addition to all other payments required hereunder, the Lessee shall pay to the Lessor the amount \$117,788,000.36 as a bonus. This bonus shall be due and payable in five installments as follows: Receipt of \$23,557,600.08 at the time of the sale as the first installment is hereby acknowledged by the Lessor; the balance shall be paid in four equal annual installments of \$23,557,600.08 due and payable on each of the first four Anniversary Dates of this lease. In the event the Secretary accepts a surrender or relinquishment of this lease filed by the Lessee at any time prior to the third Anniversary Date, the Lessee shall be released from any obligation to pay the fourth and fifth bonus installments required hereunder. That release shall not relieve the Lessee of the obligation to pay installments which had accrued prior to the filing of the surrender or relinquishment of the lease, but had not been paid prior to the Secretary's acceptance of that surrender or relinquishment. The Lessee may credit against the fourth bonus installment any expenditures prior to the third Anniversary Date directly attributable to operations under this lease on the Leased Lands for the development of the Leased Deposits, but not any expenditures attributable to the preparation of a development plan under section 10 of this lease. Upon the credit of an expenditure, the Lessee shall be relieved of the duty of paying the equivalent amount of the fourth bonus installment. Similarly, the Lessee may credit against the fifth bonus installment any expenditures prior to the fourth Anniversary Date directly attributable to operations under this lease on the Leased Lands for the development of the Leased Deposits and not credited against the fourth bonus installment, but not any expenditures attributable to the preparation of a development plan under section 10. Upon the credit of an expenditure, the Lessee shall be relieved of the duty of paying the equivalent amount of the fifth bonus installment. The Mining Supervisor shall have the duty of determining whether expenditures credited by the Lessee are properly attributable to such operations, and, if the Mining Supervisor determines that any reported expenditure is not attributable to such operations, the Lessee shall not receive credit for that expenditure.

SECTION 6. RENTALS

The Lessee shall pay the Lessor an annual rental which shall be in the amount of 50 cents for each acre or fraction-of an acre of the Leased Lands.

The Lessee shall pay the rental for each subsequent Lease Year on or before the first day of that Lease Year. Rentals for any Lease Year shall be credited by the Lessor against any royalty payments for that Lease Year.

SECTION 7. ROYALTIES

(a) The lessee shall pay to the Lessor a royalty on all Oil Shale extracted by the Lessee from the Leased Lands which is either processed or sold by the Lessee. The royalty on Oil Shale shall be computed separately for shale oil and for other minerals as follows:

(1) The royalty on shale oil shall be computed on the basis of the shale oil content of the Oil Shale; the method of computing the royalty shall depend upon whether the Oil Shale is extracted by mining methods or processed by *in situ* methods.

(i) If the Oil Shale is extracted by mining methods, the Lessee shall pay the Lessor a basic royalty rate of 12 cents on every Ton of Oil Shale which the Lessee either processes under this Lease either on or off the Leased Lands or sells prior to processing. This basic royalty rate shall be subject to the following adjustments:

(A) If the shale oil content of the Oil Shale mined is less than 30 gallons per Ton, the basic royalty rate per Ton of Oil Shale shall be reduced by one cent for each gallon or fraction thereof that the shale oil content is less than 30 gallons per Ton, but in no event shall the royalty rate be less than four cents per Ton. If the shale oil content of the Oil Shale mined is more than 30 gallons per Ton, the basic royalty rate per Ton shall be increased by one cent for each gallon or fraction thereof that the shale oil content is more than 30 gallons per Ton.

(B) For the calendar year in which the Effective Date occurs and for each calendar year thereafter, the Secretary shall determine the combined average value per barrel of all crude oil and crude shale oil produced in the States of Colorado, Utah, and Wyoming. The basic royalty rate applicable to the second and each succeeding Lease Year shall be adjusted by an increase or decrease of the same percentage as the percentage of increase or decrease in the combined average value for the calendar year during which that Lease Year begins as compared with the combined average value for the calendar year during which the previous Lease Year began. However, in no event shall the basic royalty rate for shale oil be decreased to less than 4 cents on every Ton of Oil Shale mined under the lease.

(C) The shale oil content of the Oil Shale shall be determined either by the Modified Fischer Assay method or by such other method as the Lessor and the Lessee adopt, and the royalty shall be based on the monthly average of shale oil content of all Oil Shale processed under this lease or transferred from the Leased Lands for processing or sale by the Lessee. Computations of quantities, assays and royalties shall be rounded to the nearest hundredth, or within the limits of the standard deviation for commercial testing equipment as approved by the Mining Supervisor.

(ii) (A) If the Oil Shale is processed by *in situ* methods, royalty shall be paid at a basic royalty rate of 12 cents per Ton. The number of Tons processed shall, for purposes of computing royalty, be determined by: (I) establishing through calorimetric tests designated by the American Society for Testing and Materials as "Standard" or "Tentative," the total gross heat of combustion in BTUs of all oil and gas products at the well head, adjusted downward by the total gross heat of combustion in BTUs of combustible fluids (gases or liquids) injected as heat carriers, but not for fuel purposes, into the formation being processed; (II) dividing the adjusted total gross heat of combustion in BTUs by 152,700 BTUs (shale oil and gas recovered by Modified Fischer Assay of Oil Shales, containing approximately 30 gallons of shale oil per Ton, has a heating value of 152,700 BTUs per gallon of shale oil and associated gas), to arrive at the equivalent number of gallons of shale oil produced; and (III) dividing the equivalent number of gallons of shale oil produced by 30, to arrive at the number of Tons of Oil Shale processed by *in situ* methods.

(B) The basic royalty rate applicable to shale oil from Oil Shale process by *in situ* methods shall be adjusted in the same manner as that provided in paragraph (a)(1)(i)(B) of this section for the adjustment of the basic

royalty rate applicable to shale oil processed from Oil Shale extracted by mining methods.

(C) Computations of quantities, assays and royalties relating to tonnage of Oil Shale shall be determined by the same standards as used under Section 7 (a) (1) (i) (C).

(2) The Lessee shall also pay a royalty on all minerals other than shale oil contained in Oil Shale produced from the Leased Deposits which the Lessee processes, either on or off the Leased Lands, or sells. This royalty shall be computed on the basis of the gross value of the other minerals at the point of shipment to market, and shall be at a rate of 3 per centum for the first ten Lease Years, 4 per centum for the eleventh year through the fifteenth Lease Year, and 5 per centum beginning with the sixteenth Lease Year.

(b) The Lessee shall determine accurately, on the Leased Lands, the weight or quantity and quality of all Oil Shale produced from the Leased Deposits by each method used and shall enter the weight or quantity and quality thereof accurately in books which shall be kept and preserved by the Lessee for such purposes.

(c) Payments for royalties due under this lease shall be payable monthly on or before the last day of the calendar month following the calendar month in which the Oil Shale is processed or, if it is not processed, is sold.

(d) If the Lessee shall show that compliance with the requirements for environmental protection prescribed in the detailed development plan (or amended, supplemental, or partial plan) required under section 10 of this lease, and as approved in accordance with the regulations in 43 CFR Part 23 and 30 CFR Part 231, now or hereinafter in force, or imposed by legislation enacted after the effective date of that plan (or of an amendment or supplement to that plan), has engendered or will engender extraordinary costs in an amount which is in excess of those in the contemplation of the parties, as determined by the Lessor, on the effective date of that plan (or amendment or supplement to that plan), the Secretary, if he deems it desirable, may, in order to offset such costs, adjust the royalties that would otherwise become due and payable thereafter under subsection (a) of this section by allowing a credit against those royalties in such an amount, and for such a time as he determines is warranted in the circumstances.

(e) (1) For the sixth and each succeeding Lease Year the Lessee shall pay a minimum royalty which, to the extent that royalties on production during that Lease Year in that amount have not been previously paid, shall be due and payable on the Anniversary Date at the end of that Lease Year. For the sixth Lease Year, the Lessee's minimum royalty shall be equal to the royalty due on shale oil under subsection (a) (1) (i) of this section on an annual production rate of 616 Tons of Oil Shale containing 30 gallons of shale oil per Ton of Oil Shale. The annual production rate for computing minimum royalty for each subsequent Lease Year up to and including the fifteenth Lease Year shall increase in an amount of 616 Tons of Oil Shale per year for each subsequent Lease Year; for the fifteenth and each subsequent Lease Year the annual rate shall be 6,160 Tons of Oil Shale. The Secretary may excuse the Lessee from compliance, in whole or in part, with the requirements of this paragraph (1) of subsection (e) during any year in which the Lessee is prevented by circumstances over which he has no control from implementing a development plan submitted under Section 10 of this lease.

(2) The Lessee may credit against any minimum royalty due on the sixth Anniversary Date or any subsequent Anniversary Date up to and including the tenth Anniversary Date the amount of any expenditures which are made between the approval of the development plan under Section 10 of this lease and the tenth Anniversary Date and which are directly attributable to operations on the Leased Lands pursuant to that development plan for the development of the Leased Deposits and which were not credited against the fourth and fifth bonus installments. The Mining Supervisor shall have the duty of determining whether expenditures credited by the Lessee are attributable to such operations, and, if the Mining Supervisor determines that any reported expenditure is not attributable to such operations, the Lessee shall not receive credit for the expenditure. Upon the credit of an expenditure against the minimum royalty due, the Lessee will be relieved of the duty of paying the equivalent amount of minimum royalty: *Provided, however,* that, if there is actual production in the sixth or any subsequent Lease Year, the Lessee

shall not be permitted to credit expenditures against the first \$10,000 of minimum royalty due for that Lease Year.

(f) If the Lessee enters into production prior to the eighth Anniversary Date, and the royalty due in the eighth or any previous Lease Year exceeds the minimum royalty due under subsection (e)(1) of this section for that Lease Year, the Lessee shall be relieved from the payment of one-half of the difference between the actual royalty due for that Lease Year, the Lessee shall be relieved from the payment of one-half of the difference between the actual royalty due for that Lease Year and the figure set in subsection (e)(1) for minimum royalty due for that Lease Year. This relief from the payment of royalty shall be in addition to any crediting of expenditures under subsection (e)(2) of this section, but no crediting of expenditures against minimum royalty shall reduce the figure for minimum royalty used in the preceding sentence.

SECTION 8. PAYMENTS

All bonus installments shall be paid to the appropriate State Office of the Bureau. All rental payments shall be made to the appropriate State Office of the Bureau until this lease enters a producing status or minimum royalty is required to be paid on it; thereafter the rentals and royalties shall be paid to the appropriate Mining Supervisor with whom all reports (including any reports on expenditures deductible under section 5) concerning operations under the lease shall be filed. All remittances to the Bureau shall be made payable to the Bureau of Land Management; those to the Geological Survey shall be made payable to the United States Geological Survey.

SECTION 9. BOND

(a) The Lessee shall file with the appropriate Bureau office and maintain a bond in the amount of \$20,000 for the purpose of ensuring compliance with the provisions of this lease, except those provisions for compliance with which a separate bond is required under subsection (b) of this section.

(b) (1) Upon approval of a detailed development plan under section 10 of this lease, the Lessee shall file with the appropriate Bureau office and maintain, in addition to the bond required under subsection (a) of this section, a bond (in an amount determined pursuant to paragraph (2) of this subsection) which shall be conditioned upon the faithful compliance with the regulations in 30 CFR Part 231 and 43 CFR Part 23, the provisions of sections 10 and 11 of this lease, the Oil Shale Lease Environmental Stipulations attached to this lease pursuant to section 11, and any approved development plan (or approved, amended, supplemental or partial plan), to the extent that it relates to the preservation and protection and conservation of resources other than Oil Shale during the conduct of exploration or mining operations, and the reclamation of lands and waters affected by exploration or mining operations.

(2) During the first three Lease Years after the approval of a detailed development plan under section 10 of this lease, the bond shall be in an amount equal to (i) \$2,000 per acre for all portions of the Leased Lands which, pursuant to the plan, will be used for spent shale disposal sites and sites for actual mining operations during that three year period and (ii) \$500 per acre for all other portions of the Leased Lands upon which operations will be conducted or which will be directly affected by operations during that three year period under the plan, but the total bond shall in no event be less than \$20,000. After the first three Lease Years the bond shall be renewed at intervals of three Lease Years. Each renewed bond shall be for three Lease Years and at such a total figure as shall be determined by the Lessor to be needed to provide for the reclamation and restoration of all portions of the Leased Lands which have been affected by previous operations under this lease or which will be affected by operations under this lease during the ensuing three year period. The amount of the bond shall be increased at any time during the three-year period at the demand of the Lessor if there is a change in the development plan which, in the opinion of the Lessor, increases the possibility of environmental damage.

Upon request of the Lessee, the bond may be released as to all or any portion of the Leased Lands affected by exploration or mining operations during the

three year period covered by the bond when the Lessor has determined that the Lessee has successfully met the reclamation requirements of the approved development plan and that operations have been carried out and completed with respect to these lands in accordance with the approved plan.

(c) Prior to the approval of any plan for exploratory work under section 10(d) of this lease, the Lessee shall file with the appropriate Bureau office and maintain, in addition to the bond required under subsection (a) of this section, a bond in such an amount as the Mining Supervisor shall require, but in no event less than \$20,000, which shall be conditioned upon the faithful compliance with regulations in 30 CFR Part 231 and 43 CFR Part 23, the provisions of sections 10 and 11 of this lease, the Oil Shale Lease Environmental Stipulations attached to this lease pursuant to section 11, and any approved plan for exploratory work, to the extent that it relates to the preservation and protection of the environment (including land, water, and air), the protection and conservation of resources other than Oil Shale during the conduct of exploration operations, and the reclamation of lands and waters affected by exploration operations.

The bond required by this subsection shall apply only to actions taken prior to the date of approval of the development plan under section 10(a) of this lease. However, with the consent of the Mining Supervisor, the Lessee may modify this bond in such a manner as is necessary to meet the requirements of subsection (b) of this section, and the bond so modified may, with the consent of the Mining Supervisor, be maintained as the bond required under subsection (b).

SECTION 10. DEVELOPMENT PLAN AND DILIGENCE REQUIREMENTS

(a) The Lessee shall file with the Mining Supervisor on or before the Third Anniversary Date a detailed development plan. This plan shall include: (1) a schedule of the planning, exploratory, development, production, processing, and reclamation operations and all other activities to be conducted under this lease; (2) a detailed description pursuant to 30 CFR Part 231 and 43 CFR Part 23 of the procedures to be followed to assure that the development plan, and lease operations thereunder, will meet and conform to the environmental criteria and controls incorporated in the lease; and (3) a requirement that the Lessee use all due diligence in the orderly development of the Leased Deposits, and, in particular, to attain, at as early a time as is consistent with compliance with all the provisions of this lease, production at a rate at least equal to the rate on which minimum royalty is computed under section 7(e)(1).

Prior to commencing any of the operations under the development plan in the Leased Lands, the Lessee shall obtain the Mining Supervisor's approval of the development plan. The Mining Supervisor shall not delay unnecessarily in the consideration of a development plan, but he shall take time to consider both technical and environmental provisions of the plan thoroughly prior to approval, and shall hold public hearings on the environmental provisions to assist him in his consideration of the detailed development plan. If the development plan submitted by the Lessee is unacceptable, the Mining Supervisor shall inform the Lessee by written notice of the reasons why the development plan is unacceptable and shall give him an opportunity to amend the plan. If an acceptable development plan is not submitted to the Mining Supervisor by the Lessee within one year after the Lessee's receipt of that notice, the Mining Supervisor shall send a second written notice to the Lessee concerning the unacceptability of the development plan. A failure by the Lessee to submit an acceptable plan within one year after his receipt of the second written notice, without reasonable justification for delay, shall be grounds for termination of the lease, if the Lessor so elects.

Upon approval of the plan, the Lessee shall proceed to develop the Leased Deposits in accordance with the approved plan. After the date of approval of the development plan, the Lessee shall conduct no activities upon the Leased Lands except pursuant to that development plan, or except for necessary activities following a relinquishment under section 28 of this lease or for the disposition of property after termination pursuant to section 32 of this lease.

(b) The Lessee must obtain the written approval of the Mining Supervisor of any change in the plan approved under subsection (a).

(c) The Lessee shall file with the Mining Supervisor annual progress reports describing the operations conducted under the development plan required under subsection (a).

(d) Prior to undertaking any exploratory work on the Leased Lands between the Effective Date and the date of approval of the detailed development plan required by subsection (a) of this section, the Lessee shall file with the Mining Supervisor a plan showing the exploratory work which he proposes to undertake and he shall not commence that work until the Mining Supervisor has approved the plan.

Exploratory work, as used in this subsection, shall include, but not be limited to, seismic work, drilling, blasting, research operations, cross-country travel, the construction of roads and trails and other necessary facilities, and the accumulation of baseline data required under section 1(C) of the Oil Shale Lease Environmental Stipulations. Prior to approval of the detailed development plan under subsection (a) of this section, all exploratory work on the Leased Lands shall be conducted pursuant to a plan approved under this subsection.

SECTION 11. PROTECTION OF THE ENVIRONMENT; ADDITIONAL STIPULATIONS

(a) The Lessee shall conduct all operations under this lease in compliance with all applicable Federal, State and local water pollution control, water quality, air pollution control, air quality, noise control, and land reclamation statutes, regulations, and standards.

(b) The Lessee shall avoid, or, where avoidance is impracticable, minimize and, where practicable, repair damage to the environment, including the land, the water and air.

(c) The Oil Shale Lease Environmental Stipulations are attached to and specifically incorporated in this lease. A breach of any term of these stipulations will be a breach of the terms of this lease and subject to all the provisions of this lease with respect to remedies in case of default.

SECTION 12. OPERATIONS ON THE LEASED LANDS; WATER RIGHTS

(a) The Lessee shall exercise reasonable diligence, skill, and care in all operations on the Leased Lands. The Lessee's obligations shall include, but not be limited to, the following:

(1) The Lessee shall conduct all operations on the Leased Lands so as to prevent injury to life, health, or property.

(2) The Lessee shall avoid, or, where avoidance is impracticable, minimize and, where practicable, correct hazards to the public health and safety related to his operations on the Leased Lands.

(3) The Lessee shall avoid wasting the mineral deposits, and other resources, including but not limited to, surface resources, which may be found in, upon, or under such lands.

(b) The Lessee shall conduct all operations on the Leased Lands whether they are surface or underground mining operations, and whether they are in lands in which the Lessor owns the surface or those in which the Lessor has disposed of the surface, in accordance with the provisions of 30 CFR Part 231 and 43 CFR Part 23. Both 30 CFR Part 231 and 43 CFR part 23 are specifically incorporated by reference into the provision of this section. The provisions of 43 CFR Part 23 are hereby expressly made applicable to the Lessee's underground mining operations with equal force and effect to that given to those provisions in their application to surface mining operations and to operations on lands in which the Lessor owns the surface.

(c) The Lessee shall take such reasonable steps, and shall conduct operations in such a manner, as may be needed to avoid or, where avoidance is impracticable to minimize and, where practicable, repair damage to: (1) any forage and timber growth on Federal or non-Federal lands in the vicinity of the Leased Lands; (2) crops, including forage, timber, or improvements of a surface owner; or (3) improvements, whether owned by the United States or by its permittees, licensees, or lessees. The Lessor must approve the steps to be taken and the restoration to be made in the event of the occurrence of damage described in this subsection.

(d) All water rights developed by the Lessee through operations on the Leased Lands shall immediately become the property of the Lessor. As long

as the lease continues, the Lessee shall have the right to use those water rights free of charge for activities under the lease.

SECTION 13. DEVELOPMENT BY IN SITU METHODS

Where *in situ* methods are used for development of Oil Shale, the Lessee shall not place any entry, well, or opening for such operations within 500 feet of the boundary line of the Leased Lands without the permission of, or unless directed by, the Mining Supervisor, nor shall induced fracturing extend to less than 100 feet from that boundary line.

SECTION 14. NUCLEAR FRACTURING

No nuclear explosive may be detonated on or in the Leased Lands without the express written approval of the Secretary. The Secretary may approve the detonations of such explosives only after the preparation of an environmental impact statement pursuant to section 102(2)(c) of the National Environmental Policy Act of 1969 (42 U.S.C. § 4332(2)(C)).

SECTION 15. INSPECTION AND INVESTIGATION

The Lessee shall permit any duly authorized officer or representative of the Department at any reasonable time:

(a) to inspect or investigate the Leased Lands and all surface and underground improvements, works, machinery, and equipment, and all books and records pertaining to operations and surveys or investigations under this lease; and

(b) to copy and make extracts from any books and records pertaining to operations under this lease.

SECTION 16. REPORTS, MAPS, ETC.

(a) At such times and in such a form as the Lessor may prescribe, the Lessee shall furnish a report with respect to investment and operating costs under this lease. The Lessee shall also submit to the Lessor in such form as the latter may prescribe, not more than 60 days after the end of each quarter of the Lease Year, a report covering that quarter which shall show the amount of each respective mineral or product produced from the Leased Deposits by each method of production used during the quarter, the character and quality thereof, the amount of products and by-products disposed of and price received therefor, and the amount in storage or held for sale. This report shall be certified by the superintendent of the mine, or by some other agent having personal knowledge of the facts who has been designated by the Lessee for that purpose.

(b) The Lessee shall prepare and furnish at such times and in such form as the Lessor may prescribe, maps, photographs, reports, statements and other documents required by the provisions of 30 CFR Part 231 and 43 CFR Part 23.

SECTION 17. NOTICE

Any notice which is required under this lease shall be given in writing. Where immediate action is required, notice may be given orally or by telegram, but, where this is done, the oral notice shall be confirmed in writing. Wherever this lease requires the Lessee to give notice, notice shall be given to the Mining Supervisor unless this lease requires that notice be given to another officer. The Lessee shall inform the Bureau State Office and the Mining Supervisor of the Lessee's officer to whom notice shall be given.

SECTION 18. EMPLOYMENT PRACTICES

The Lessee shall pay all wages due persons employed on the Leased Lands at least twice each month in lawful money of the United States. The Lessee shall grant all miners and other employees complete freedom of purchase. The Lessee shall restrict the workday to not more than 8 hours in any one day for underground workers, except in cases of emergency. The Lessee shall employ no person under the age of 16 years in any mine below the surface. If

the laws of the State in which the mine is situated prohibit the employment, in a mine below the surface, of persons of an age greater than 16 years, the Lessee shall comply with those laws.

SECTION 19. EQUAL OPPORTUNITY CLAUSE; CERTIFICATION OF NON-SEGREGATED FACILITIES

(a) *Equal Opportunity Clause.* During the performance of this lease the Lessee agrees as follows: (1) The Lessee shall not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The Lessee shall take affirmative action to insure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, or national origin. Such action shall include, but not be limited to the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Lessee shall post in conspicuous places, available to employees and applicants for employment, notices to be provided by the Lessor setting forth the provisions of this Equal Opportunity clause.

(2) The Lessee shall, in all solicitations or advertisements for employees placed by or on behalf of the Lessee, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin.

(3) The Lessee shall send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice, to be provided by the Lessor, advising the labor union or workers' representative of the Lessee's commitments under this Equal Opportunity clause, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

(4) The Lessee will comply with all provisions of Executive Order No. 11246 of September 24, 1965, as amended, and of the rules, regulations and relevant orders of the Secretary of Labor.

(5) The Lessee shall furnish all information and reports required by Executive Order No. 11246 of September 24, 1965, as amended, and by the rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the Secretary of the Interior and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

(6) In the event of the Lessee's noncompliance with the Equal Opportunity clause of this lease or with any of the said rules, regulations, or orders, this lease may be canceled, terminated or suspended in whole or in part and the lessee may be declared ineligible for further Federal Government contracts or leases in accordance with procedures authorized in Executive Order No. 11246 of September 24, 1965, as amended, and such other sanctions may be imposed and remedies invoked as provided in Executive Order No. 11246 of September 24, 1965, as amended, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

(7) The Lessee shall include the provisions of Paragraphs (1) through (7) of this subsection (a) in every contract, subcontract, or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order No. 11246 of September 24, 1965, as amended, so that such provisions will be binding upon each contractor, subcontractor or vendor. The Lessee shall take such action with respect to any contract, subcontract or purchase order as the Secretary may direct as a means of enforcing such provisions, including sanctions for non-compliance: *Provided, however,* That in the event the Lessee becomes involved in, or is threatened with, litigation with a contractor, subcontractor or vendor as a result of such direction by the Secretary, the lessee may request the lessor to enter into such litigation to protect the interests of the lessor.

(b) *Certification of non-segregated facilities.* By entering into this lease, the Lessee certifies that Lessee does not and shall not maintain or provide for Lessee's employees any segregated facilities at any of Lessee's establishments, and that Lessee does not and shall not permit Lessee's employees to perform their services at any location, under Lessee's control, where segregated facilities are maintained. The Lessee agrees that a breach of this certification is a

violation of the Equal Opportunity clause in this lease. As used in this certification, the term "segregated facilities" means, but is not limited to, any waiting rooms, work areas, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive or are in fact segregated on the basis of race, color, religion, or national origin, because of habit, local custom, or otherwise. Lessee further agrees that (except where Lessee has obtained identical certifications from proposed contractors and subcontractors for specific time periods) Lessee shall obtain identical certifications from proposed contractors and subcontractors prior to the award of contracts or subcontracts exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity Clause; that Lessee shall retain such certifications in Lessee's files and shall make them available to the Secretary at his request; and that Lessee shall forward the following notice to such proposed contractors and subcontractors (except where the proposed contractor or subcontractor has submitted identical certifications for specific time periods): Notice to prospective contractors and subcontractors of requirement for certification of nonsegregated facilities. A Certification of Non-segregated Facilities, as required by the May 9, 1967, order (32 F.R. 7439, May 19, 1967) on Elimination of Segregated Facilities, by the Secretary of Labor, must be submitted prior to the award of a contract or subcontract exceeding \$10,000 which is not exempt from the provisions of the Equal Opportunity clause. The certification may be submitted either for each contract and subcontract or for all contracts and subcontracts during a period (i.e., quarterly, semi-annually, or annually).

SECTION 20. TAXES

The Lessee shall pay, when due, all taxes lawfully assessed and levied under the laws of the State or the United States upon improvements, output of mines, or other rights, property, or assets of the Lessee.

SECTION 21. MONOPOLY AND FAIR PRICES

The Lessor reserves full authority to promulgate and enforce orders and regulations under the provisions of Sections 30 and 32 of the Act (30 U.S.C. §§ 187 and 189) necessary to insure that any sale of the production from the Leased Deposits to the United States or to the public is at reasonable prices, to prevent monopoly, and to safeguard the public welfare, and such regulations shall, upon promulgation, be binding upon the Lessee.

SECTION 22. SUSPENSION OF OPERATIONS OR PRODUCTION

Any suspension of operations or production under section 39 of the Act (30 U.S.C. § 209) granted with respect to this lease shall take effect as of the first day of the calendar month following the calendar month during which the suspension is approved, except that, in a situation where in the opinion of the Mining Supervisor there is an immediate danger to life, or of irreparable major damage to property or the environment, the Mining Supervisor may grant a suspension effectively immediately. The term of any suspension granted pursuant to the Lessee's request with respect to operations or production under this lease shall be in full calendar months. A suspension shall terminate either at the time designated in the suspension order or, if there is no time of termination in the order, at such time as the Mining Supervisor shall designate in subsequent notice to the Lessee.

SECTION 23. READJUSTMENT OF TERMS AND CONDITIONS

The Lessor may propose the reasonable readjustment of the terms and conditions of this lease (including royalty provisions), the first readjustment to be effective at the twentieth Anniversary Date of this lease and subsequent readjustments to be effective at twenty Lease Year intervals thereafter. At least 120 days before the appropriate Anniversary Date the Lessor shall give notice to the Lessee of any proposed readjustment of the terms and conditions of the lease and the nature thereof, and, unless the Lessee, within 60 days after

receipt of such notice, files with the Lessor an objection to the proposed terms or relinquishes the lease as of the appropriate Anniversary Date, the Lessee shall be deemed conclusively to have agreed to such terms and conditions. If the Lessee files objections with the Lessor, and agreement cannot be reached between the Lessor and the Lessee within a period of 60 days after the filing of the objections, the lease may be terminated by either party upon giving 60 days' notice to the other party; however, the Lessor's right to terminate the lease shall be suspended by the Lessee's filing of a notice of appeal pursuant to Section 34 of this lease. If the Lessee files objections to the proposed readjusted terms and conditions, the existing terms and conditions (other than those concerning royalties) shall remain in effect until there has been an agreement between the Lessor and the Lessee on the new terms and conditions to be incorporated in the lease, or until the Lessee has exhausted his rights of appeal under Section 34 of this lease, or until the lease is terminated; however, the readjusted royalty provisions shall be effective until there is either agreement between the Lessor and the Lessee or until the lease is terminated. If the readjusted royalty provisions are subsequently rescinded or amended, the Lessee shall be permitted to credit any excess royalty payments against royalties subsequently due to the Lessor.

SECTION 24. ASSIGNMENT

With respect to the assignment or transfer of any interest under this lease, the Lessee shall comply with the provisions of 43 CFR Subpart 3506 to the same extent as if that Subpart were specifically applicable to oil shale leases. The Lessor shall have no discretion to refuse to approve an assignment except: (1) where the assignee is not qualified to hold a lease under section 1 of the Act (30 U.S.C. § 181); (2) where the assignee is unable to provide an adequate bond; or (3) where either the assigned or the retained portion of the lease would, in the opinion of the Lessor, be too small to be economically developed.

SECTION 25. OVERRIDING ROYALTIES

The Lessee shall not create, by assignment or otherwise, an overriding royalty interest in excess of 25 percent of the rate of royalty payable to the United States under this lease or an overriding royalty interest which when added to any other outstanding overriding royalty interest exceeds that percentage, except that, where an interest in the leasehold or in an operating agreement is assigned, the assignor may retain an overriding royalty interest in excess of the above limitation if he shows to the satisfaction of the Department that he has made substantial investments for improvements on the lands covered by the assignment.

SECTION 26. HEIRS AND SUCCESSORS IN INTEREST

Each obligation hereunder shall extend to and be binding upon, and every benefit shall inure to, the heirs, executors, administrators, successors, or assigns of the respective parties hereto.

SECTION 27. UNLAWFUL INTEREST

No member of, or Delegate to, Congress or Resident Commissioner, after his election or appointment, either before or after he has qualified and during his continuance in office, and no officer, agent, or employee of the Department of the Interior, except as provided in 43 CFR 7.4(a)(1), shall be admitted to any share or part in this lease or derive any benefit that may arise therefrom; and the provisions of Section 3741 of the Revised Statutes of the United States (41 U.S.C. § 22), as amended, and Sections 431, 432, and 433, Title 18 of the United States Code, relating to contracts, enter into and form a part of this lease so far as the same may be applicable.

SECTION 28. RELINQUISHMENT OF LEASE

(a) Upon showing to the satisfaction of the Lessor that he has complied with the terms and conditions of this lease, the Lessee may relinquish the entire lease or any legal subdivision of the Leased Lands.

(b) A relinquishment must be filed, in duplicate, in the proper Bureau State Office. Upon its acceptance it shall be effective as of the date it is filed, subject to the continued obligation of the lessee and his surety, in accordance with the terms and conditions of this lease, (1) to make payment of all accrued bonus payments, rentals, and royalties, except as provided in section 5; (2) to provide for the preservation of any mines, *in situ* production works, underground development works, other permanent improvements, and other property, whether fixtures or personalty, on the Leased Lands; (3) to provide for the reclamation of lands and water affected by exploration or mining operations under this lease; and (4) to comply with all other applicable requirements of this lease.

SECTION 29. REMEDIES IN CASE OF DEFAULT

If the Lessee shall fail to comply with any of the terms and conditions of this lease (including the terms and conditions of any development plan approved under section 10) and that default shall continue for a period of 30 days after service of notice thereof by the Lessor, the Lessor may (1) suspend operations until the required action is taken to correct noncompliance, or (2) institute appropriate proceedings in a court of competent jurisdiction for the forfeiture and cancellation of this lease as provided in Section 31 of the Act (30 U.S.C. §188) and for forfeiture of any applicable bond. If the Lessee fails to take prompt and necessary steps to prevent loss or damage to the mine, property, or premises, or to prevent danger to the employees, or to avoid, or, where avoidance is impracticable, to minimize and, where practicable, repair damage to the environment, or, if immediate action by the Lessor, without waiting for action by the Lessee, is required for any of those purposes, the Lessor may enter on the premises and take such measures as he may deem necessary to prevent such loss, damages, or danger, or to correct the damaging, dangerous, or unsafe condition of the mine or any other facilities upon the Leased Lands, and those measures shall be at the expense of the Lessee.

SECTION 30. EFFECT OF WAIVER

A waiver of any breach of the provisions of this lease shall extend only to that particular breach and shall not limit the rights of the parties with respect to any future breach. A waiver of a particular cause of forfeiture shall not prevent cancellation of this lease for any other cause, or for the same cause occurring at another time.

SECTION 31. DELIVERY OF PREMISES IN CASE OF FORFEITURE

In case of the termination of this lease in any manner the Lessee shall deliver to the Lessor, in the condition required by the reclamation requirements of approved exploration and development plans, and subject to the provisions of section 32 of this lease, the Leased Lands, including permanent improvements and other property on the Leased Lands, whether affixed to the ground or movable, and all underground shafts and timbering, well casing, and such other supports and structures as are necessary for the preservation of the Leased Lands, or any mines, other underground development works, or deposits in the Leased Lands.

SECTION 32. DISPOSITION OF PROPERTY UPON TERMINATION OF LEASE

(a) Upon termination of this lease in any manner all underground timbering and any other supports or structures which the Lessor shall inform the Lessee are necessary for the preservation of any mines or other underground development works shall become and remain thereafter a part of the realty without the payment of any compensation to the Lessee. All other structures, equipment, machinery, tools, appliances, and materials on the Leased Lands, whether affixed to the ground or movable, shall remain the property of the Lessee upon the termination of this lease, but the Lessee shall have no right, for a period of six months following the termination, to remove from the Leased Lands any of that property which in the opinion of the Lessor is useful for the protection of the Leased Lands (including any mines in those lands) unless the Lessor shall expressly authorize the removal. During the six-month period the Lessor shall have the right to purchase at the appraised value any or all items of that prop-

erty required or useful for the protection of the Leased Lands. The appraised value shall be fixed by three disinterested and competent persons (one to be designated by the Lessor, one by the Lessee, and the third by the two so designated), and the appraised value determined by the three or a majority of them shall be conclusive.

(b) At any time within a period of 90 days after either the Lessor has informed the Lessee that he will not purchase the property or the expiration of the 6-month period, the Lessee shall have the right to remove from the premises the property which was not purchased by the Lessor.

(c) Any structures, machinery, equipment, tools, appliances, and materials, subject to removal by the Lessee as provided above, which are allowed to remain on the Leased Lands shall become the property of the Lessor on expiration of the 90-day period or any extension of that period which may be granted by the Lessor because of adverse climatic conditions or other good and sufficient reason, unless the Lessor shall direct the Lessee to remove any or all of such property on expiration of the 90-day period. If the Lessor directs the Lessee to remove such property, the Lessee shall do so at his own expense or, if he fails to do so within a reasonable period, the Lessor may do so at the Lessee's expense.

SECTION 33. PROTECTION OF PROPRIETARY INFORMATION

(a) This lease, and any activities thereunder, shall not be construed to grant a license, permit or other right of use or ownership to the Lessor, or any other person, of the patented processes, trade secrets, or other confidential or privileged technical information (hereafter in this section called "technical processes") of the Lessee or any other party whose technical processes are embodied in improvements on the Leased Lands or used in connection with the lease. Notwithstanding any other provisions of this lease, the Lessor agrees that any technical processes obtained from the Lessee which are designated by the Lessee as confidential shall: (1) not be disclosed to persons other than employees of the Federal Government having a need for such disclosures; (2) not be copied or reproduced in any manner except as required specifically by the Mining Supervisor; and (3) not be used in any manner that will violate their proprietary nature unless the Mining Supervisor shall make a written determination that such technical processes do not contain trade secrets or are not confidential, or unless such disclosure is required by statute; provided however, that before any such publication or disclosure, except where the overriding national interest demands otherwise, the Mining Supervisor shall notify the Lessee of the proposed disclosure and those to whom the disclosure will be made, provide a copy of the written determination, and allow the Lessee 30 days to submit additional material supporting its claim of confidentiality or otherwise to initiate an appeal from the decision of the Mining Supervisor prior to any disclosure.

(b) In the event the lease is terminated and the Lessor elects pursuant to section 32 to purchase machinery or equipment the use of which would involve technical processes in the operations of the purchased machinery, the Lessor shall have the right to use those technical processes in the operations of the purchased machinery or equipment; provided that (1), with respect to third parties' technical processes which the Lessee has obtained the right to use by contract or agreement, the Lessor shall replace the Lessee as a party to the contract or agreement, and (2) with respect to technical processes owned, developed or controlled by the Lessee itself, the Lessor shall agree to pay the Lessee fair market value for use of the Lessee's technical processes in said operations. Any contract or agreement into which the Lessee shall enter with a third party for the right to use technical processes belonging to that third party shall provide that the Lessor may become a party to that contract or agreement to the extent that those processes may be used for the protection of the Leased Lands. If the Lessee and the Lessor shall not agree as to the fair market value of the Lessee's technical process, that value shall be determined as provided in section 32(a) for other property acquired by the Lessor upon termination of the lease.

SECTION 34. LESSEE'S LIABILITY TO THE LESSOR

(a) The Lessee shall be liable to the United States for any damage suffered by the United States in any way arising from or connected with Lessee's activi-

ties and operations conducted pursuant to this lease, except where damage is caused by employees of the United States acting within the scope of their authority.

(b) The Lessee shall indemnify and hold harmless the United States from any and all claims arising from or connected with Lessee's activities and operations under this lease.

(c) In any case where liability without fault is imposed on the Lessee pursuant to this section, and the damages involved were caused by the action of a third party, the rules of subrogation shall apply in accordance with the law of the jurisdiction where the damage occurred.

SECTION 35. APPEALS

The Lessee shall have the right of appeal (a) under 43 CFR 3000.4 from any action or decision of any official of the Bureau, (b) under 30 CFR 231.74 from any action, order, or decision of any official of the Geological Survey, or (c) under applicable regulation from any action or decision of any other official of the Department, arising connection with this lease, including any action or decision pursuant to section 23 of this lease with respect to the readjustment of terms and conditions.

SECTION 36. INTERPRETATION OF THIS LEASE

(a) The paragraph heading in this lease are for convenience only, and do not purport to, and shall not be deemed to, define, limit, or extend the scope or intent of the paragraph to which they pertain.

(b) As used in this lease, unless the context clearly indicates otherwise, a word in the masculine or neuter form shall be interpreted as equally applicable to the masculine, feminine, and neuter genders, and words in singular form shall be interpreted as equally applicable to singular and plural numbers.

THE UNITED STATES OF AMERICA,

By DALE R. ANDRUS,

State Director.

Witnesses to Signature of Lessees

Attest:

By PAUL W. DOWDELL,
Assistant Secretary.

Attest:

By G. FRED CHARLES,
Assistant Secretary.

Attest:

By NAME ILLEGIBLE,
Assistant Secretary.

Attest:

By H. MICHAEL SPENCE,
Assistant Secretary.

ATLANTIC RICHFIELD COMPANY,

By H. E. BOND,

Vice President.

ASHLAND OIL, INC.,

By WILLIAM H. GAMMON,

Assistant Vice President.

SHELL OIL COMPANY,

By KEITH DOIG,

Vice President.

THE OIL SHALE CORPORATION,

By JOHN B. TWEEDY,

Senior Vice President.

Oil Shale Lease Environmental Stipulations

SECTION 1. GENERAL

(A) Applicability of stipulations

The terms, conditions, requirements and prohibitions imposed upon Lessee by these Stipulations are also imposed upon Lessee's agents, employees, contractors,

and subcontractors, and their employees. Failure or refusal of Lessee's agents, employees, contractors, sub-contractors, or their employees to comply with these Stipulations shall be deemed to be the failure or refusal of the Lessee. Lessee shall require its agents, contractors, and sub-contractors to include these Stipulations in all contracts and sub-contracts which are entered into by any of them, together with a provision that the other contracting party, and its agents, employees, contractors and sub-contractors, and the employees of each of them, shall likewise be bound to comply with these stipulations.

(B) Changes in conditions

These Stipulations are based on existing knowledge and technology. They may be revised or amended by mutual consent of the Mining Supervisor, the Bureau District Manager, and the Lessee at any time to adjust to changed conditions or to correct an oversight. The Lessor may amend these stipulations at any time without the consent of the Lessee in order to make these stipulations consistent with any new Federal or State statutes for the protection of the environment upon their enactment and with regulations issued under those statutes. The Lessee, the Mining Supervisor, and the Bureau District Manager shall meet at least once a year to review advances in technology and, in a mutual endeavor, weight, and decide the feasibility and need of revising or amending existing Stipulations.

The Lessor and the Lessee agree that, in this mutual endeavor to decide upon the feasibility and need for amending the existing Stipulations, they will act in good faith and in a sincere effort to make the Lessee's activities under the lease as free from environmental damage as is practicable. Toward this end, systems which require pollution control devices shall possess sufficient flexibility to adopt improved technology at practicable intervals and shall be constructed with the understanding that continued compliance with changing pollution control laws is required.

(C) Collection of environmental data and monitoring program

(1) The Lessee shall compile data to determine the conditions existing prior to any development operations under the lease and shall, except as provided below, conduct a monitoring program before, during, and subsequent to development operations. The Lessee shall conduct the monitoring program to provide a record of changes from conditions existing prior to development operations, as established by the collection of baseline data, a continuing check on compliance with the provisions of the lease (including these attached Stipulations) and all applicable Federal, State, and local environmental protection and pollution control requirements, timely notice of detrimental effects and conditions requiring correction, and a factual basis for revision or amendment of these Stipulations pursuant to Section 1(B) hereof. Both the types of baseline and subsequent data required and the methods to be used for the collection of the baseline data and the conduct of the monitoring programs shall be those set forth in paragraph (2) of this subsection. The baseline data shall be collected for a period of at least two consecutive full years, one full year of which shall be prior to the submission of the detailed development plan under section 10(a) of this lease. If the detailed development plan is submitted prior to the collection of the second year's data, the plan already submitted shall, at the discretion, or with the approval, of the Mining Supervisor, be modified as necessary as a result of study of the additional baseline data. Exploratory operations, as approved by the Mining Supervisor, shall be permitted during the collection of the baseline data. All records of baseline data and subsequent monitoring required by this subsection shall be submitted to the Mining Supervisor at intervals to be prescribed by him.

(2) In collecting baseline data and conducting a monitoring program the Lessee shall adopt the following methods and shall collect the information required below. Wherever the number and placing of testing installations are not given, they shall be as determined by the Lessee, but subject to being cancelled as required by the Mining Supervisor. After the collection of the required baseline data for at least two years, the Lessee shall not be required to conduct a monitoring program on the Leased Lands until a date six months prior to the commencement of development operations. The monitoring program shall, thereafter, be conducted until the Mining Supervisor has determined to his satisfaction that environmental conditions have been established after the termination of development operations which are consistent with the require-

ments of applicable Federal and State statutes and regulations; however, the Mining Supervisor may terminate this requirement at an earlier date where it is in the public interest.

(a) Surface water. The Lessee shall construct gauging stations on the major drainages of the Leased Lands and, as required by the Mining Supervisor, upstream and downstream from the Lease Lands. Data collected at the stations shall include continuous streamflow records, continuous water temperature records, periodic analyses for selected inorganic and organic chemical constituents, as directed by the Mining Supervisor, continuous precipitation records, and continuous sediment records. The Lessee shall maintain records of all information obtained under this paragraph (2) (a).

(b) Ground water. At each proposed or actual mine site the Lessee shall drill a test well and shall install an observation well in each water-bearing zone defined by the test well. The Lessee shall collect samples of drill cuttings and shall make borehole geophysical logs as directed by the Mining Supervisor. The Lessee shall isolate each water-bearing zone penetrated by the test wells and pump each of the zones for the period required by the Mining Supervisor. During pump tests the Lessee shall record the water-level fluctuations in each of the observation wells, maintain steady, continuous discharge from the test well, and record the discharge measurements. The Lessee shall maintain records of water level and temperature on each test well and on each observation well pursuant to a measurement schedule specified by the Mining Supervisor. At the initial pump test of each well the Lessee shall determine the water quality of that well by analyzing water samples for organic and inorganic chemical constituents, including, without limitation, trace constituents subject to drinking water standards and water pollution control regulations. The Mining Supervisor may require analysis of samples for such additional constituents as he may deem desirable. After the initial test, the Lessee shall collect water samples from each well at six-month intervals and analyze them for evidence of trends in water quality as determined by comparing the samples with previous analyses.

The Lessee shall complete one observation well upgradient from each spent shale disposal site and at least two observation wells downgradient from the site at depths and locations specified by the Mining Supervisor. The Mining Supervisor may require additional observation wells if there is evidence that they are needed to provide adequate monitoring of the water quality of an aquifer. The Lessee shall record water levels and temperatures in each observation well pursuant to a measurement schedule established by the Mining Supervisor. The Lessee shall determine the water quality of each observation well by analyzing samples for organic and inorganic chemical constituents, including, without limitation, trace constituents subject to drinking water standards and water pollution controls. The Mining Supervisor may require analysis of samples for such additional constituents as he may deem desirable. After the initial test of an observation well the Lessee shall collect water samples from the well at six-month intervals and analyze them for evidence of trends in water quality as determined by comparing the samples with previous analysis.

The Lessee shall maintain records of all information obtained under this paragraph (2) (b).

(c) Air Quality. In the collection of baseline data, the Lessee shall monitor air quality over at least 90 percent of each lease years, during which monitoring is required, using four strategically-located stations. One of the stations shall be at the expected point of maximum concentrations, or as close to that expected point of maximum concentration as feasible.

The Lessee shall monitor air quality for sulphur dioxide, hydrogen sulphide, and suspended particulates, using automatic instruments with continuous recorders, when applicable. The Lessee shall also monitor, under the same conditions, hydrocarbons, oxides of nitrogen, and other pollutants, where the Mining Supervisor has determined that such monitoring is necessary to determine baseline air quality or to conduct an effective monitoring program. In addition, the Lessee shall establish a meteorological station in reasonable proximity to each proposed plant site to monitor, at least 95 percent of the time over each lease year during which monitoring is required, wind direction and speed (vane and anemometer) and humidity at three levels, one at least

100 feet above the surface of the plant site, one at approximately 30 feet above the surface of the plant site, and one at ground level, and temperature at two levels, one at least 100 feet above the surface of the plant site, and one at approximately 30 feet above the surface of the plant site. The Lessee shall maintain records of all baseline data collection and monitoring programs.

(d) *Flora and Fauna.* The Lessee shall make studies of the flora and fauna of the leased lands, and of all lands to be used for disposal of residues from mining and processing oil shale and also of the aquatic habitat as far downstream as the Mining Supervisor shall require. These studies will determine the distribution and density of the flora in these areas and periodically determine the condition of such flora. These studies shall also determine the species of fauna, their distribution, and their abundance at bi-monthly intervals. The Lessee shall submit a report to the Mining Supervisor of the baseline data obtained and, during the monitoring program, shall submit semi-annual reports to the Mining Supervisor showing whether or not there has been any change. The Lessee shall also study, and report to the Mining Supervisor on ecological interrelationships including migratory patterns of birds, mammals, and fish, and plant animal relationships. The Lessee shall compile an inventory of natural surface water features, such as springs and seeps.

(e) *Soil Survey and Productivity Assessment.* The Lessee shall conduct a soil survey and productivity assessment of all portions of the Leased Lands proposed to be disturbed under the detailed development plan. This survey must include the preparation of maps, tables, and reports describing soil types, depth of the various layers of soil, but not more than a depth of 50 feet from the surface to be disturbed, strike and dip of the material, slopes, solar exposure, vegetative cover, and erodability.

(3) The environmental monitoring program shall be an integral part of the detailed development plan required in Section 10 of the lease, and at the time of the submission of the plan the Lessee shall provide the Mining Supervisor with a complete compilation of the baseline data collected above and the record of the monitoring program for any period subsequent to the conclusion of that compilation.

(4) Not more than one year after obtaining approval of the detailed mining plan and on each subsequent anniversary date the Lessee shall submit to the Mining Supervisor a report of the baseline data collected and a report of the monitoring programs as a part of the required annual progress reports on the development program. This portion of the annual report will be subject to public review and comment.

(D) *Emergency decisions*

Any decisions or approvals of the Mining Supervisor required by these Stipulations to be in writing may in emergencies be issued orally, with written confirmation as soon thereafter as possible.

(E) *Environmental briefing*

During the life of this Lease, Lessee shall provide that such Federal and State employees as may be designated by the Mining Supervisor shall brief personnel on environmental and other pertinent matters. The Lessee shall provide for such briefings upon the request of the Mining Supervisor, but the Mining Supervisor shall request only such briefings as may be reasonably necessary to effectuate the provisions of this Lease. Lessee shall make arrangements for the time, place, and attendance at such briefings. Lessee shall bear all costs of such briefings other than salary, per diem, subsistence and travel costs of Federal and State employees.

(F) *Construction standards*

The general design of all buildings and structures shall comply with the latest edition of the Uniform Building Code (U.B.C.). Structural steel shall be designed in accordance with the latest edition of the American Institute of Steel Construction "Specifications for Design, Fabrication and Erection of structural Steel for Buildings." Reinforced concrete shall comply with the latest edition of the American Concrete Institute's Building Code Requirements for Reinforced Concrete." Engineering works for impoundments shall conform to standard engineering practice sufficient to withstand the 100-year flood in the drainage in which installed.

(G) Housing and welfare of employees

In the exercise of his right under section 2 of the Lease to construct buildings and other facilities for the housing and welfare of his employees, the Lessee shall at all times make certain that these facilities are situated, constructed, operated, and maintained in an orderly manner, satisfactory to the Mining Supervisor. While no general restriction is imposed upon the construction of facilities necessary to the employees' health and well-being, such construction shall be subject to the Mining Supervisor's approval and shall not unreasonably damage the environment of the leased lands.

(H) Posting of stipulations and plans

The Lessee shall insure that copies of these Stipulations and any approved exploration and development plans are available at the operating sites and for inspection by all on-the-ground operating personnel.

SECTION 2. ACCESS AND SERVICE PLANS

(A) Transportation corridor plans

The Lessee shall provide corridor plans for roads, pipelines and utilities on the Leased Lands for approval by the Mining Supervisor. Each plan shall include probable major design features and plans for the protection of the environment, prevention of pollution, minimization of erosion, rehabilitation and revegetation of all disturbed areas not required in operation of the transportation system, both during and after construction. The Lessee shall, to the maximum extent practicable, make use of multi-use corridors for roads, pipelines and utilities.

(B) Regulation of public access

After road construction is completed, the Lessee shall, upon consultation with the Lessor, permit reasonable, free and unrestricted public access to and upon the road and rights-of-way for all lawful and proper purposes except in plant sites, mine sites, disposal areas, and other operational areas which may be closed to the general public. The Lessee shall regulate public access and public vehicular traffic as required to facilitate operations and to protect the public and, to the extent reasonable, livestock and wildlife from hazards associated with construction. For this purpose the Lessee shall provide warnings, flagmen, barricades, and other safety measures as necessary. Whenever the Mining Supervisor shall determine that the Lessee's regulation of access and traffic is unreasonable, or that the Lessee's provision of safety measures is inadequate, he shall so inform the Lessee who shall immediately take corrective measures.

(C) Existing and planned roads and trails

Where feasible, the Lessee shall use existing roads and trails. Unless the Mining Supervisor shall direct otherwise, roads and trails shall be located, constructed, maintained, and closed according to the specifications of the Bureau of Land Management and shall include drainage structures where needed.

(D) Waterbars and breaks

The Lessee shall divert runoff from roads and uphill slopes by means of waterbars, waterbreaks, or culverts constructed in accordance with Bureau specifications.

(E) Pipeline construction standards

In the design and construction of oil pipelines and the choice of materials for them, the Lessee shall follow the standards (wherever they may be made applicable) established by the Department of Transportation and, if these standards should ever be revised, supplemented, or superseded, shall follow the new standards in new construction. These standards include:

- (1) 49 CFR 192, Transportation of Natural and Other Gas by Pipeline; and
- (2) 49 CFR 195, Transmission of Liquids by Pipeline.

(F) Pipeline safety standards

The Lessee shall meet, where applicable, the safety standards and reporting requirements set forth in the following, as now in effect and as hereafter

amended, or, if these regulations should be superseded, the regulations or other rules superseding them:

(1) 49 CFR, Part 110, Carriers by Pipeline (Other than Natural Gas and Water);

(2) 49 CFR, Part 192, Transportation of Natural and Other Gas and Water;

(3) 49 CFR, Part 195, Transmission of Liquids by Pipeline;

(G) *Shut-off valves*

The Lessee shall insure that oil transportation pipeline designs provide for automatic shut-off valves at each pumping or compressor station and such additional valves as may be necessary in view of:

(1) Terrain and drainage systems traversed;

(2) Population centers;

(3) Wildlife and fishery habitat;

(4) Public water supplies and significant water bodies;

(5) Hazardous geologic areas; and

(6) Scenic Values.

The Lessee shall install any additional valves required by the Mining Supervisor.

(H) *Pipeline corrosion*

With regard to oil transportation pipelines, the Lessee shall submit detailed plans to the Mining Supervisor for corrosion-resistant design and methods for early detection of pipeline corrosion. These shall include: (1) pipe material and welding techniques to be used and information on their particular suitability for the environment involved; (2) details on the external pipe protection to be provided (coating, wrapping, etc.), including information on variation of the coating process to cope with variations in environmental factors; (3) plans for cathodic protection including details of impressed ground sources and controls to insure continuous maintenance of adequate protection over the entire surface of the pipe; (4) details of plans for monitoring cathodic protection current including space of current monitors; and (5) provision of periodic surveys of trouble spots, regular preventive maintenance surveys, regular surveys for external and internal deterioration which may result in failure, and special provisions for abnormal potential patterns resulting from crossings with other pipelines or cables.

(I) *Electric transmission facilities*

The Lessee shall design and construct telegraph, telephone, electric powerlines, distribution lines and other transmission facilities in accordance with the guidelines set forth in "Environmental Criteria for Electric Transmission System" (U.S.D.I., U.S.D.A., 1970), as now or in the future amended, or if these guidelines should be superseded, in the guidelines or other rules superseding them. Distribution lines shall be designed and constructed in accordance with REA Bulletin 61-10 (Powerline Contacts by Eagles and other Large Birds), as now or in the future amended, or, if these guidelines should be superseded, in the guidelines or other rules superseding them.

(J) *Natural barriers*

Where a road or exploratory site cuts a natural barrier used for livestock control, the Lessee shall, at his own expense, close the opening by the use of a fence or other suitable barrier meeting Bureau standards.

(K) *Specifications for fences, and cattleguards*

Fences and cattleguards constructed by the Lessee shall meet established Bureau specifications and standards.

(L) *Crossings*

The Lessee shall take all steps necessary to make certain that roads constructed under this lease do not prevent or unreasonably disrupt the use of existing roads, foot trails, pipelines, and other rights-of-way or major animal migration routes. This requirement shall include the construction of suitable overhead or underground crossings where they are determined to be necessary by the Mining Supervisor.

(M) Alternate routes

If during construction the Lessee's activities shall interfere with the free use of existing roads and trails used by persons, whether or not recorded, he shall provide such alternate roads and trails as the Mining Supervisor may determine to be needed.

(N) Off-road vehicle use

The Lessee shall use off-road vehicles in a manner consistent with applicable regulations.

SECTION 3. FIRE PREVENTION AND CONTROL

(A) Instructions of the mining supervisor

(1) The Lessee shall comply with the instructions and directions of the Mining Supervisor concerning the use, prevention and suppression of fires, and shall make every reasonable effort to prevent, control and suppress any fire on land subject to the lease. Uncontrolled fires must be immediately reported to the Mining Supervisor.

(2) (a) The Lessee shall construct fire lines or perform clearing when determined by the Mining Supervisor to be necessary for forest, brush and grass fire prevention.

(b) The Lessee shall comply with the National Fire Codes on handling, transportation, storage, use and disposal of flammable liquids, gases, and solids.

(c) The Lessee shall take all appropriate actions to prevent oil shale out-crop fires.

(B) Liability of lessee

The control and suppression of any fires on the Leased Lands (or on adjoining public lands which have spread from the Leased Lands) caused by the Lessee or his employees, contractors, subcontractors, or agents shall be at the expense of the Lessee. Upon the failure of the Lessee to control and suppress such fires in a manner satisfactory to him, the Mining Supervisor shall take such steps as are necessary to control and suppress the fire, either alone or in conjunction with other Federal, State, and local authorities, and the cost of such control and suppression shall be borne by the Lessee.

SECTION 4. FISH AND WILDLIFE

(A) Management plan

The Lessee shall submit for approval by the Mining Supervisor, as part of the exploration and mining plan, a detailed fish and wildlife management plan which shall include the steps which the Lessee shall take to: (1) avoid or, where avoidance is impracticable, minimize damage to fish and wildlife habitat, including water supplies; (2) restore such habitat in the event it is unavoidably destroyed or damaged; (3) provide alternate habitats; and (4) provide controlled access to the public for the enjoyment of the wildlife resources on such lands as may be mutually agreed upon. The plan shall include, but not be limited to, detailed information on activities, time schedule, performance standards, proposed accomplishments, and ways and means of avoiding or minimizing environmental impacts on fish and wildlife.

(B) Mitigation of damage

Wherever destruction or significant disturbance of fish and wildlife habitat is inevitable, the Lessee shall submit, for the Mining Supervisor's approval at least 60 days prior to the destruction or damage of the habitat, those measures which the Lessee proposes to take to comply with the requirement of 30 CFR 231.4(b), as now in effect or as hereafter amended, or, if that regulation should be superseded, the regulations or other rules superseding it, to avoid, or, where avoidance is impracticable, minimize and repair, injury or destruction of fish and wildlife and their habitat. As a general rule, the proposed measures should provide for habitat of similar type and equal in quantity and quality to that destroyed or damaged. The Mining Supervisor shall, within 60 days after the submission of the proposed measures to him, either approve or disapprove them. If he shall approve them, the Lessee shall execute the proposed measures for the mitigation of the destruction or damage of the habitat. If the Mining Supervisor shall disapprove the measures, he shall offer the Lessee an opportunity for consultation at which, whenever possible, he shall inform the Lessee of any changes which will make the measures acceptable.

(C) Big game

The Lessee shall construct big game drift fences when and where necessary to direct big game movements around or away from oil shale development areas.

(D) Posting of notices

The Lessee shall post in reasonable and conspicuous places notices informing its employees, agents, contractors, subcontractors, and their employees of all applicable laws and regulations governing hunting, fishing, and trapping.

SECTION 5. HEALTH AND SAFETY

(A) In general

The Lessee shall take all measures necessary to protect the health and safety of all persons affected by its activities and operations and shall immediately abate any activity or condition which threatens the life of any person or which threatens any person with bodily harm.

(B) Compliance with Federal health and safety laws and regulations

The Lessee shall comply with the Federal Metal and Non-metallic Mine Safety Act of 1966 (30 U.S.C. §§ 721-740), as now in effect or as hereafter amended, or, if it should be superseded, with the statute superseding it, and the Occupational Health and Safety Act of 1970 (29 U.S.C. §§ 651-678), as now in effect, or as hereafter amended, or, if it should be superseded, with the statute superseding it, and all health and safety standards promulgated pursuant thereto.

(C) Use of explosives

The Lessee shall insure that all blasting operations, including the purchase, handling, transportation, storage, use, and destruction of blasting agents are performed in conformance with Public Law 91-452, October 15, 1970 (18 U.S.C. §§841-848), as now in effect or as hereafter amended, or if it should be superseded, with the statute superseding it, and the regulations promulgated thereunder which are now in 26 CFR 181.

SECTION 6. HISTORIC AND SCIENTIFIC VALUE'S

(A) Cultural investigations

The Lessee shall, prior to construction or mining, conduct a thorough and professional investigation of any portion of the Leased Lands to be used, including, but not limited to, those areas to be used for mining, processing, or disposal operations or roads, for objects of historic or scientific interest, including, but not limited to, Indian ruins, pictographs and other archeological remains. The Lessee shall report the results of these investigations of the Mining Supervisor before commencing construction and mining operations.

(B) Objects of historic or scientific interest

The Lessee shall not in any activities under this lease appropriate, remove, injure, deface, or alter any object of antiquity, or of historic, prehistoric, or scientific interest, including, but not limited to, Indian ruins, pictographs, and other archeological remains. Where a question exists as to whether or not an object is of historic, prehistoric, or scientific interest or is an object of antiquity, the Lessee shall report to the Mining Supervisor for a final determination of which he shall inform the Lessee without unnecessary delay.

SECTION 7. OIL AND HAZARDOUS MATERIALS

(A) Spill contingency plans

The Lessee agrees to submit spill contingency plans to the Mining Supervisor with the detailed development plan. This plan shall provide for the control of spills of oil or other hazardous substances which for purposes of this Section 7 shall be defined in section 311(a)(14) of the Federal Water Pollution Control Act, as amended (86 Stat. 816, 863), as now in effect or as hereafter amended, or if it should be superseded, the statute superseding it.

The plans shall conform to this Stipulation and the National Oil and Hazardous Substances Pollution Contingency Plan, 36 FR 16215, August 20, 1971, as now in force or as hereafter amended, or, if it shall be superseded, the document superseding it, and shall: (1) include a description of positive spill prevention efforts which the lessee shall make; (2) include provisions for spill

control; (3) provide for immediate corrective action including spill control and restoration of the affected resource; (4) provide that the Mining Supervisor shall approve any materials or devices used for spill control and shall approve any disposal sites or techniques selected to handle spilled matter; and (5) include separate and specific techniques and schedules for cleanup of spills on land, rivers and streams. As used in this Stipulation, spill control is defined as including detection, location, confinement, and cleanup of the spill.

(B) Responsibility

If, during operations, any oil or other hazardous substance should be discharged, the control, removal, disposal, and cleanup of that substance, wherever found, shall be the responsibility of Lessee. Upon the failure of the Lessee to control, remove, dispose of, or clean up the discharge, or to repair all damages resulting therefrom, the Mining Supervisor may take such measures as he deems necessary to control, remove, dispose of, or clean up the discharge and restore the area, including where appropriate, the aquatic environment and fish and wildlife habitats, at the full expense of the Lessee. Such action by the Mining Supervisor shall not relieve Lessee of any responsibility as provided in this lease.

(C) Reporting of spills and discharges

The Lessee shall give immediate notice of any spills or discharges of oil or other hazardous substances to: (1) the Mining Supervisor and (2) such other Federal and State officials as are required by law to be given such notice. Any oral notice shall be confirmed by the Lessee in writing as soon as possible.

(D) Storage and handling

The Lessee shall store oil, petroleum products, industrial chemicals and similar toxic or volatile materials in durable containers and locate such materials so that any accidental spillage will not drain into water courses, lakes, reservoirs, or ground water. Unless otherwise approved by the Mining Supervisor, the Lessee shall store substantial quantities (more than 500 gallons) of such materials in an area surrounded by impermeable containment structures. The volume of the containment structures shall be at least: (1) one-hundred fifty (150) percent of the total storage volume of storage tanks in the relevant area; plus (2) a volume sufficient for maximum trapped precipitation and run-off which might be impounded at the time of a spill.

(E) Pesticides and herbicides

The Lessee shall not use pesticides and herbicides without the approval of the Mining Supervisor. Pesticides and herbicides shall be considered treatments of last resort, to be used only when reasonable alternatives are not available and where their use is consistent with protection and enhancement of the environment. Where pesticides and herbicides are used, they shall be used only with the approval of the Mining Supervisor and the type, amount, method of application, storage, and disposal shall be in accordance with applicable Federal and State procedures.

SECTION 8. POLLUTION—AIR

(A) Air quality

The Lessee shall utilize and operate all facilities and devices in such a way as to avoid, or, where avoidance is impracticable, minimize air pollution. At all times during construction and operation, Lessee shall conduct its activities in accordance with all applicable air quality standards and related plans of implementation adopted pursuant to the Clean Air Act, as amended (40 U.S.C. §§ 1857-1857-1), as now in effect or as hereafter amended, or if it should be superseded, the statute superseding it, and applicable State standards.

(B) Dust

The Lessee shall make every reasonable effort to avoid, or, where avoidance is impracticable, minimize dust problems. Where necessary, sprinkling, oiling, or other means of dust control shall be required on roads and trails. The Lessee shall conduct processing operations so as not to create environmental or health problems associated with dust.

(C) Burning

The Lessee shall not burn waste, timber, or debris, except when disposal is essential and other methods of disposal would be more harmful to the environment and when authorized by the Mining Supervisor.

SECTION 9. POLLUTION—WATER

(A) Water quality

The Lessee shall not burn waste, timber, or debris, except when disposal is as to avoid or, where avoidance is impracticable, minimize water pollution. At all times during construction and operation, Lessee shall conduct its activities in accordance with all applicable Federal and State water quality standards and related plans of implementation, as then in force. Where applicable Federal and State standards do not exist, the Mining Supervisor may establish reasonable standards to prevent regradation of water, and the Lessee shall comply with those standards. The Lessee shall not discharge waste water into any aquifer deemed by the Mining Supervisor to be a potentially valuable water supply nor into any aquifer which will discharge the waste into a surface stream.

(B) Disturbance of existing waters

All construction activities, exclusive of actual mining activities, that may cause the creation of new lakes, drainage of existing ponds, diversion of natural drainages, alternation of stream hydraulics, disturbance of areas of steam beds or degradation of land and water quality or adversely affect the environmental integrity of the area are prohibited unless approved in writing by the Mining Supervisor.

(C) Control of waste waters

In areas where overburden, water, or waste from mines or processing plants might contain toxic or saline materials, the Lessee shall:

(1) Divert surface or ground water so as to avoid the formation of toxic and saline water and its drainage into streams, or, where avoidance is impracticable, to minimize the formation of such waters and drainage, by preventing the entry or reducing the flow of water into the workings, waste piles, or overburden-storage areas;

(2) Dispose of refuse and spent shale from mining and processing in a manner which will avoid the discharge of toxic drainage or saline water into surface or ground water;

(3) Employ, upon termination of operations or use of any mine, processing plant, or waste disposal site, all practicable closing measures consistent with ecological principles and safety requirements in order to avoid the formation and discharge of toxic or saline water;

(4) Dispose of toxic and saline water derived from mining, processing, or refining operations in a manner that does not pollute surface or ground waters;

(5) During mining operations, monitor spoil and refuse for the presence of materials likely to yield unacceptable alkaline, acidic, saline, or toxic solutes; and

(6) Reinject no water, except in compliance with Federal and State standards then in effect and where authorized to do so by the Mining Supervisor; if the Lessee does reinject water, he shall establish such monitoring as the Mining Supervisor shall require.

(D) Cuts and Fills

The Lessee shall not cut or fill near or in streams which will result in siltation or accumulation of debris unless approved in writing by the Mining Supervisor.

(E) Crossings

The location of crossings of perennial streams, lakes and rivers must be approved in writing by the Mining Supervisor. To control erosion, the Lessee shall maintain buffer strips at least 200 feet wide on each side of a stream in their natural and undisturbed state unless otherwise authorized in writing by the Mining Supervisor.

(F) Road surfacing material

All road surfacing material used by the Lessee must be approved by the Mining Supervisor.

SECTION 10. POLLUTION—NOISE

The Lessee shall comply with all applicable Federal and State standards on noise pollution, as now in effect or as hereafter amended, or, if they should be superseded, the standards superseding them. If the absence of specific noise pollution standards, the Lessee shall keep noise at or below levels safe and acceptable for humans, as determined by the Mining Supervisor.

SECTION 11. REHABILITATION

The Lessee shall, in accordance with approved plans, rehabilitate all affected lands to a usable and productive condition consistent with or equal to pre-existing land uses in the area and compatible with existing, adjacent undisturbed natural areas. Rehabilitation methods include, but are not limited to the following: leveling backfilling, covering the surface with topsoil, and revegetating the spoil banks and pit areas consistent with sound restoration methods. The Lessee shall leave reclaimed land in a usable, non-hazardous condition such that soil erosion and water pollution are avoided or minimized. The Lessee shall, to the extent practicable, conduct such backfilling, leveling and grading concurrently with the mining operations. Upon removal of property at termination of the Lease pursuant to Sections 31 and 32 of the Lease, the Lessee shall, in accordance with approved plans, complete the restoration of affected lands to a usable and productive condition at least equal to pre-existing land uses in the area and compatible with existing adjacent undisturbed natural areas.

(B) Management plan

The Lessee shall submit for approval by the Mining Supervisor an erosion control and surface rehabilitation plan as part of any exploration or development plan. The initial plan shall be submitted not less than 60 days prior to start of mining site preparation and updated each year thereafter before March 15. The plan shall include, but not be limited to, detailed information on activities, areas, time schedules, standards, accomplishments, and methods of eliminating or minimizing oil shale development impacts. The Lessee shall base erosion control plans and procedures on a maximum 100-year precipitation rate characteristic of the area. If a 100-year rate is not available the Lessee shall use data based on the longest period of reliable information. Procedures and plans shall consider flash flood effects, mud flows, mudslides, landslides, rock falls, and other similar types of material mass movements.

(C) Stabilization of disturbed areas

The Lessee shall leave all disturbed areas in a stabilized condition. Stabilization practices shall include, as determined by the needs of specific sites: seeding; planting; mulching; and the placement of mat binders, soil binders, rock or gravel blankets or other such structures. Seeding and planting shall be repeated, as often as the Mining Supervisor shall deem reasonable, if prior attempts to revegetate are unsuccessful. All trees, snags, stumps or other vegetative material, not having commercial, ecological, wildlife, or construction value, shall be considered for mechanical chipping and spreading in a manner that will aid seeding establishment and soil stabilization.

(D) Surface disturbance on-site

The Lessee shall correct surface disturbance which may induce soil movement or water pollution, or both, whether during or after construction or mining, in accordance with the surface rehabilitation plan.

(E) Areas of unstable soils

The Lessee shall, where possible, avoid areas having soils that are susceptible to slides and slips, excessive settlement, severe erosion and soil creep during construction or operation. When such areas cannot be avoided the Lessee shall design construction to insure maximum stability. The Lessee shall make soil foundation investigations in conjunction with construction activities. The Lessee shall make such data available to the Mining Supervisor upon request.

(F) Materials

The Lessee shall, when feasible, utilize waste rock from the mining operations for road beds, fills and other similar construction purposes. When not feasible, gravel and other construction materials shall be purchased in accordance with 43 CFR 3610, as now in effect or as hereafter amended, or, if it shall be superseded, the regulation or rule superseding it, except that the sale of such materials from stream beds and upland soil areas shall be avoided unless otherwise approved by the Bureau District Manager.

(G) Slopes of cut and fill areas

To the extent consistent with good mining practice, the Lessee shall maintain all cut and fill slopes in a stable condition for the duration of the Lease.

(H) Impoundments

The Lessee shall establish safe access to permanent water impoundments for persons, livestock, and wildlife, but, where consumption of such water would be harmful to humans or the use of such water would be detrimental to animals, he shall take necessary steps to prevent access by those to whom it would be harmful or detrimental.

(I) Flood plains

The Lessee shall not construct improvements or conduct operations in flood plains or stream drainages when it is reasonable to expect risk to human life, pollution damage, or destruction of the existing environment caused by flood damage, without the express permission of the Mining Supervisor and without providing for protection of any such improvements constructed.

(J) Land reclamation

The Lessee shall, unless otherwise directed by the Mining Supervisor, backfill, level, final grade, cover with topsoil and initiate revegetation of each segment of the operation area in accordance with the rehabilitation plan as soon as that segment is no longer needed, but not later than one year after completion of the particular operation unless an alternative schedule has been approved by the Mining Supervisor.

(K) Overburden

The Lessee shall, unless otherwise directed by the Mining Supervisor, separate overburden material and stockpile it separately as to topsoil, and rock material for later use as fill and as top dressing for rehabilitation of disturbed areas.

(L) Revegetation

(1) The Lessee shall revegetate all portions of the Leased Lands which have been disturbed by his operations as soon as possible after the disturbance has ended in order to prevent, or, if prevention is impracticable, to minimize erosion and related problems. The Lessee shall restore the vegetation of disturbed areas by reestablishing permanent vegetation of a quality which will support fauna of the same kinds and in the same numbers as those existing at the time the base line data was obtained under section 1(C) of these Stipulations. Plans for revegetation, including species, density, and timing, must be submitted to the Mining Supervisor for approval. The Mining Supervisor may require any reasonable methods of revegetation, and, if he deems it desirable, may require the Lessee to fence areas to assist revegetation. However, if the Lessor determines, at the time of submission of the detailed development plan under section 10(a) of this lease, that the Leased Lands will, upon the termination of the lease, be put to a different use from that to which they were devoted immediately prior to the issuance of this lease, the Mining Supervisor may require the Lessee to revegetate the land to meet that objective, except that the Lessee shall not be required to expend more money than that needed to meet the first revegetation standard.

(2) The Lessee shall initiate a revegetation program approved by the Mining Supervisor at the start of production to (1) delineate those parameters necessary to establish vegetation at a specific location and (2) show that successional changes in vegetation are compatible with the requirements under subparagraph (1) above.

(3) The Lessee shall demonstrate at the time of submission of the detailed development plan under section 10(a) of this lease that revegetation technology is available to enable him to provide the revegetation of the disturbed areas which is required under paragraph (1) of this subsection. If, in the opinion of the Mining Supervisor, the Lessee has failed to demonstrate the required technology, he shall be required to submit for approval a program designed to obtain the required technology. If the program to obtain the necessary technology is satisfactory, the Mining Supervisor may approve the Lessee's development plan submitted under section 10(a), but, if the Lessee has not demonstrated the necessary technology by the tenth Anniversary Date after the Lease Year in which the development plan under section 10(a) was approved, the Lessee shall cease all exploratory, development, and production operations under that plan until he has demonstrated that the necessary technology is available to him. The Lessee shall report annually to the Mining Supervisor on the progress of this approved program to obtain the required technology. If the progress

appears inadequate at any time, the Mining Supervisor may request the Lessee to amend the program. Whenever the Lessee has demonstrated the necessary technology, the required program shall terminate. Where the Mining Supervisor finds the Lessee has conducted his program to obtain technology, including any requested amendments, in a diligent manner and has expended funds in excess of \$500,000 on that program, the Secretary may determine the expenditures in excess of that figure to be extraordinary costs within the terms of section 7(d) of the lease and may credit those excess expenditures against any present or future royalties due the lessor, provided the results of the program are made public.

SECTION 12. SCENIC VALUES

(A) *Scenic considerations in general*

The Lessee shall, except where the Mining Supervisor has approved otherwise, use the following standards in all designing, clearing, earthmoving, and construction:

(1) Contours compatible with the natural environment shall be used to avoid straight lines.

(2) Natural colors consistent with the local environment such as pastels or muted shades of brown, green, reds, or greys shall be used in painting of facilities installed on the lease. Bright or unnatural colors shall be avoided except for use in warning signs or signals.

(3) Small natural openings or the edges of larger opening in the natural environment shall be utilized in construction of facilities, or disturbing the land surface.

(4) During the time when the land is disturbed, the portion of land which is not under revegetation programs shall only be those areas required under the mining plan for mining, storage, processing, or disposal operations.

(5) Contouring of the disturbed areas for reclamation shall simulate natural opening or areas consistent with the surrounding topography.

(B) *Consideration of aesthetic values*

The Lessee shall consider existing aesthetic values in all planning, construction, reclamation and mining operations. All operations, including, but not limited to, design and construction of roads, pipelines and transmission lines, shall, where practicable, be performed so as to minimize visual impact, make use of the natural topography, and to achieve harmony with the landscape.

(C) *Protection of landscape*

The Lessee shall design any structures and facilities built under this Lease so that they will, to the extent practicable, blend with the natural landscape.

(D) *Signs*

The Lessee shall design and construct signs that are rustic in appearance and conform to BLM sign standards.

SECTION 13. VEGETATION

(A) *In general*

(1) The Lessee shall reserve from cutting and removal all timber and other vegetative material outside the clearing boundaries and all blazed, painted or posted trees which are on or mark the clearing boundaries, with the exception of danger trees or snags designated as such by the Mining Supervisor.

(2) The Lessee shall insure that all trees, snags or other woody material cut in connection with clearing operations are felled into the right-of-way and away from live water courses.

(B) *Timber*

The Lessee shall deal with timber in accordance with the following: clearing and grubbing limits shall be approximately 5 ft. outside of the edge of any cut or fill; where practicable, trees, snags; stumps or other woody material not having wildlife value or value to the Lessee shall be mechanically chipped and spread in a manner that will aid seeding establishment and soil stabilization; clearing boundaries shall be identified on the ground prior to clearing operations.

(C) Clearing and stripping

The Lessee may clear and strip only such land as is necessary for mining, processing, disposal, and other operations under the lease. In connection with such operations the Lessee may clear and strip land necessary for roadbeds, but such roadbed widths shall be not more than 25 feet from the centerline unless otherwise specified by the Mining Supervisor.

SECTION 14. WASTE DISPOSAL

(A) Mine waste

The Lessee shall, in accordance with the detailed development plan under section 10(a) of this lease, backfill or reclaim excavated material and spent shale and shall compact it thoroughly by machinery to avoid or, where avoidance is impossible, minimize erosion. The Lessee shall design slope faces of waste piles to insure slope stability and shall revegetate slope faces in accordance with the rehabilitation plan.

(B) Other disposal areas

The term "waste" as used in this subsection (B) means all waste other than mine waste. In accordance with approved plans, the Lessee shall collect, recycle or dispose of waste in sanitary land fills or other disposal areas, and shall use the best practicable portable or permanent waste disposal systems, as approved by the Mining Supervisor. The Lessee shall remove or otherwise dispose of all waste in a manner acceptable to the Mining Supervisor, and in accordance with all applicable standards and guidelines of the State, the United States Public Health Service and the Environmental Protection Agency.

(C) Disposal of solid and liquid wastes

The Lessee shall design and construct disposal systems for solid and liquid wastes so as to avoid landslides, control erosion by wind and water, and establish conditions conducive to vegetative growth in the disposal area. The Lessee shall select and prepare disposal sites for wastes so as to avoid downward percolation of leached products and other pollutants into aquifers.

(D) Impoundment of water

No disposal of mine waste, other waste, or the residue from any activity under this Lease shall be disposed of in a manner which could cause an impoundment of water unless plans for spillways and means of diversion and the prevention of both surface and underground water contamination have been prepared by the Lessee and approved by the Mining Supervisor, and the Lessee has complied with those plans.

(E) Slurry waste disposal

Wherever slurry waste disposal is used the Lessee shall provide impoundments sufficient to contain landslides, mud flows, or waste pile blowouts.

Mr. HORTON. Yes, thank you.

Mr. STEELMAN. Madam Chairman, I have one final question.

We have gotten four bids so far. There has been a \$210 million bid on Colorado's c and \$117 million on the C-b, \$75 million on Utah tract U-a and tract U-b \$45 million.

Could you detail for the record and for our present purposes, is this money received by check immediately, is it paid out over a period of time, is it contingent upon the Department's final decision with respect to the mining plan, or just how does this go? And does it go into the general revenues? Just outline to us the procedure.

Mr. HORTON. Well, the bidders pay those amounts over a 5-year period, in equal installments. Mr. Edwards informs me that it does, in fact, go into the general fund of the Treasury.

Mrs. MINK. May I pursue that question? I am told that the lease also provides a refund, reimbursement mechanism back to the lessees

for unforeseen costs, whether they relate to the excesses of expenditures required because of environmental standards or because of new production technology and other matters.

How much money is it estimated, for instance, Colorado will receive from these two leases, and how much of it might be required to be reimbursed back to the companies involved?

Mr. HORTON. Madam Chairman, I gave a figure of approximately \$74 million in the first 3 years of tract C-a and tract C-b. That would be the share that the State of Colorado would receive from the bonus bids.

It is also my understanding that 1 to 2 million or 2 to 3 million additional a year could be expected from the royalties.

I have Mr. Fred Ferguson, who is our Assistant Solicitor for Energy, and I will ask him to elaborate upon the questions you have asked.

Mr. FERGUSON. Now, Madam Chairman, when you spoke about credit ore reimbursement or reduction of payments because of extraordinary costs which were not in the contemplation of the parties, that would not apply in any way to the bonus payments. That would only be applicable, as I understand it, to the royalties.

Mrs. MINK. Well, would you describe the differences between the bonus payment and the royalties that the States receive; the percentage of the royalties that the States have received? How are they different?

Mr. FERGUSON. The bonus payments are essentially due when a lease is issued. Now, we have a special provision on oil shale leases that says the bonus payments can be paid in installments over the time of the sale and one-fifth on the first, second, third, and fourth course of 4 years, in five equal installments, one-fifth due at the anniversary dates.

Mrs. MINK. You are speaking now with regard to that tract which went out for \$210 million? That is what you are speaking about? Where the bonus payments are divided into certain installment periods?

Mr. FERGUSON. We have received \$42 million at the time of sale and \$42 million will be due next year, and \$42 million the next year after and so on.

Mrs. MINK. So, with respect to the tract that went for \$210 million, with payments made in 3 years, Colorado State is to receive \$74 million? Is that right?

Mr. FERGUSON. Well, when Mr. Horton said \$74 million, he was referring to \$74 million over the course of the five installments. He was saying—

Mrs. MINK. In five installments?

Mr. FERGUSON. He was speaking of the 37½ percent of the \$210 million. But at this point the company has only paid \$42 million to us.

Now, then, in addition there is a requirement of royalty and rental.

Mrs. MINK. You say the company only paid you \$42 million. What is the reason for this?

Mr. FERGUSON. Well, this was because the statute does not require, does not provide, in fact, that there will even be competitive bidding. The Secretary is given very great discretion with respect to oil shale.

When the Congress acted in 1920, it obviously felt that there was more reason to give the Secretary wide discretion with oil shale than with the other minerals. I suppose this was because people did not know as much about oil shale.

The Congress, through the years, has spelled out rather specifically how we are to lease oil and gas, and how we are to lease coal, and sodium, and phosphate. When they came to oil shale, the Congress spoke in very general terms, and the Secretary has interpreted this as authority to go ahead and lease competitively. And I would expect that this committee would have been distressed if we had leased oil shale in any other way. So we did lease it competitively, but there was no absolute requirement that the bonus be paid all at one time.

Now, we have that kind of a requirement with the Outer Continental Shelf. There we are told by statute that it must be a cash bonus, and the Solicitor has taken the position that cash means immediate payment.

We do not have that requirement with oil shale and, therefore, the Secretary thought that it might be desirable to spread the bonus payments over the course of the 4 years.

Mrs. MINK. Now, with respect to that one tract again—it is easier to understand these formulas if we speak about a specific thing, where the bid price was \$210 million, are there any estimates in the Department as to exactly what the net receipts will be to the Government prior to distribution back to the States, taking into account all of the credit?

Mr. FERGUSON. Well, there may be a credit against the fourth and fifth installments, and this may reduce the amount that the Federal Government and the States and the reclamation fund receive.

Mrs. MINK. What kinds of things could occur that could reduce this amount?

Mr. FERGUSON. Well, I would say first that this was one of the many carrots offered. The lease form was worked out last year, and the year before, and the year before that. It was a long process, and there were a number of carrots and sticks put in the lease, and one of the inducements to acquire rapid action by our lessees, because we had been afraid that the lessees would want to just sit on the lease, one was that they can get a credit against the fourth and the fifth installments of the bonus.

Now, the only credit that they can get against the fourth bonus installment is for expenditures made prior to the third anniversary date directly attributable to operations under the lease on the leased land for the development of the leased deposits, but not for any expenditures attributable to the preparation of the development plan.

Now, at this time, so far as I know, most of the activity of the lessee must be preparation of the development plan by the third anniversary date, and this kind of credit against the bonus installments

was to induce the lessee to move as quickly as possible, and also to come up with a satisfactory development plan the first time, because he can credit against the fifth installment expenditures that he has made on the leased land prior to the payment of the fifth installment on the fourth anniversary date.

Now, it is possible that the development plan could be approved prior to the fourth anniversary date and operations on the lease pursuant to the development plan would be expenditures that could be credited against that fifth installment.

Mrs. MINK. So that since you are requiring operational capability by the fourth anniversary date—

Mr. FERGUSON. We are not requiring it. We are requiring that a development plan be submitted by the third anniversary date. Now, I can only say that my personal view is that probably it is going to take a fair length of time to approve that development plan.

Now, of course, the development plan could come in any time after the completion of 1 year's collection of baseline environmental data.

Mrs. MINK. There is no prejudice to the Department if the Department delays approval of the development plan?

Mr. FERGUSON. I think that there is a commitment that we will move with reasonable speed on it, that we cannot delay unreasonably. But, we certainly recognize, and it is also clear to the lessee, that this development plan is going to be subject to public hearings. It is going to be considered by the Environmental Advisory Panel, and there are going to be public hearings at which undoubtedly, knowing the situation in western Colorado, there are going to be extensive comments.

And I think it may well be there will be changes in a development plan.

Mrs. MINK. Would it be safe to estimate that within 1 year there would be approval of a development plan?

Mr. FERGUSON. I do not think anyone can make that statement. We do provide in the lease that if the development plan is not satisfactory, we shall inform the lessee and he has 1 year after he has been told that his development plan is unsatisfactory in which he can respond with a satisfactory plan.

And if his new plan is not satisfactory to us, we give him 1 year's notice again, and then if he does not respond satisfactorily, we can proceed to cancel the lease.

Mrs. MINK. The tracts which were set aside in Wyoming, as I understand your testimony, were not specifically designated for in situ technology, but that it was expected that this was the only way that oil shale could be extracted.

Is that correct?

Mr. HORTON. That is right, Madam Chairman.

Mrs. MINK. If this is the case, and these operations were in truth and seriously intended to be prototypes, and in situ technology is certainly a technology that should be incorporated in prototype development, why was it not decided that one of the better deposits in Colorado should be set aside and specifically designated for in situ development?

Mr. HORTON. Madam Chairman, we are looking at that question right now. We are reviewing in the Bureau of Mines and the Bureau of Land Management and the Geological Survey what further steps the Department should consider with respect to in situ refining.

We are looking at the tracts that were rejected, we are looking at the authorities that we have within the prototype program. As I indicated earlier in my prepared statement, or my introductory statement, it is my hope that within 6 weeks we will have a response to your question.

Mr. STEELMAN. Madam Chairwoman, would you yield?

Mrs. MINK. Yes, I will yield.

Mr. STEELMAN. Is there anyone of the leased tracts that you expect can only be surface mined?

Mr. HORTON. The four we have leased, it is our expectation that underground mining will be utilized.

Mr. STEELMAN. On all of them?

Mr. HORTON. Mr. Stone informs me that there is the possibility that parts of Colorado tract C-a could be surface mined. But, in our evaluation of it, it was indicated that we expect underground mining.

Mr. STEELMAN. Would you yield for one more question?

Will the Department in reviewing the mining plan seek to make any qualitative judgments about what techniques would be best if a company comes in and says they want to surface mine.

Is there any chance you will disapprove a plan if you felt that it should be underground rather than surface?

Mr. HORTON. Certainly, we have authority to disapprove the plan.

Mr. FERGUSON. You could have a disapproval, but I have to say this, Mr. Horton, that the lease does specifically state that the lessee is:

Granted, subject to the terms of this lease, the exclusive right and privilege to prospect for, mines by underground or surface means, and process by retorting or in situ methods or otherwise, as he may reasonably choose and in accordance with an approved plan.

So there is a choice as to the method given to the lessee. But he can only do it in accordance with an approved plan, and, therefore, while we do not indicate the method he will use, we can insist that any method he proposed be in accordance with and subject to our approval as environmentally safe and so forth.

Mr. STEELMAN. If you would yield for one final question, and I promise it will be the final one, this man on the oil shale task force—

Mr. HORTON. Yes.

Mr. STEELMAN. Who will be advising the Secretary when you start making these kinds of decisions?

Mr. HORTON. Well, we created and organized a very active Oil Shale Environmental Advisory Panel in the respective States with members from the State of Colorado, Wyoming, and Utah, that is members appointed by their respective State Governors.

Mr. STEELMAN. And the Secretary will call them in or confer with them? In some way?

Mr. HORTON. They have a man who reports to the Secretary through me, but I regard my responsibility as a conduit in that sense.

That is the recommendations of the Advisory Panel will not be altered by the Department, obviously.

Mr. STEELMAN. For the record, would you submit in writing the members of this advisory panel?

Mr. HORTON. I will be happy to do that.

Mrs. MINK. That information will be inserted at this point in the record.

[The information referred to follows:]

OIL SHALE ENVIRONMENTAL ADVISORY PANEL MEMBERSHIP

Interior bureau:

Office representative

U.S. Geological Survey-----	Mr. George L. Snyder, geologist, U.S. Geological Survey, room 1817-A, Denver Federal Center, Bldg. 25, Denver, Colo. 80225, Telephone: 234-3593.
Bureau of Mines-----	Mr. Robert L. Bolmer, Superintendent, Denver Mining Research Center, U.S. Bureau of Mines, Denver Federal Center, Bldg. 20, Denver, Colo. 80225, Telephone: 234-3755.
Bureau of Land Management---	Dr. Glen D. Fulcher, Chief, Division of Standards and Technology, Bureau of Land Management, Denver Federal Center, Bldg. 50, Denver, Colo. 80225, Telephone: 234-2239. (Alternate:) Mr. Albert K. Leonard, Colorado State Office, Telephone: 837-4712.
Bureau of Reclamation-----	Mr. Paul T. Sant, Chief, Economics and Land Resources Branch, Bureau of Reclamation, P.O. Box 11568, Salt Lake City, Utah 84111, Telephone: 801-524-5522.
Bureau of Indian Affairs-----	Mr. Martin E. Seneca, Jr., Director of Trust Responsibilities, Bureau of Indian Affairs, room 3447, 1951 Constitution Ave., NW., Washington, D.C. 20242, Telephone: 202-343-5831. (Alternates) Mrs. Adelyn H. Logan, realty officer, Utah and Quray Agency, Ft. Duchesne, Utah 84026, Telephone: (non-FTS 722-2406). Mr. Raymond W. Jackson, area realty officer, Phoenix Area Office, P.O. Box 7007, Phoenix, Ariz. 85011, Telephone: 602-261-4195.
Bureau of Sport Fisheries and Wildlife.	Mr. Richard E. Pillmore, Denver Wildlife Research Center, Denver Federal Center, Bldg. 16, Denver, Colo. 80225, Telephone: 234-3501.
National Park Service-----	Mr. Richard Strait, Associate Regional Director, Cooperative Activities (Rocky Mountain Regional Office), National Park Service, 655 Parfet, Lakewood, Colo. 80215, Telephone: 234-4942.
Bureau of Outdoor Recreation--	Mr. Derrell P. Thompson, Regional Director, Bureau of Outdoor Recreation, P.O. Box 25387, Denver Federal Center, Denver, Colo. 80225, Telephone: 234-2634.

Interior bureau—Continued

Office of the Solicitor-----

Office representative

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Federal departments:

U.S. Department of Agriculture.

Mr. Grant Davis, Associate Program
Manager for Research, SEAM Office,
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U.S. Department of Transportation.

Mr. Robert Lee Kessler, Regional Repre-
sentative of the Secretary, Department
of Transportation, 1050 17th St., suite
1822, Denver, Colo. 80202, Telephone:
837-3242.

U.S. Department of Commerce--

Dr. Sidney R. Galler, Deputy Assistant
Secretary for Environmental Affairs,
Department of Commerce, room 3425,
Washington, D.C. 20230, Telephone:
202-967-4335. (Alternate) Dr. H. S.
Boyne, Chief, Quantum Electronics Di-
vision, National Bureau of Standards,
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U.S. Department of Health, Edu-
cation, and Welfare.

Mr. Joseph W. Cover, Special Assistant
to Regional Director, Department of
Health, Education, and Welfare, Federal
Building, room 11037, Denver, Colo.
80202, Telephone: 837-2875.

Environmental Protection
Agency.

Mr. John A. Green, Regional Director, En-
vironmental Protection Agency, 1860
Lincoln, Denver, Colo. 80203, Telephone:
837-3895.

U.S. Department of Housing and
Urban Development.

Mr. Ray McKinney, Special Assistant to
the Regional Administrator, Department
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State representatives:

Colorado:

Colorado State geologist----

Mr. John Rold, State geologist, 1845 Sher-
man, Denver, Colo. 80203, Telephone:
303-892-2611.

Division of Wildlife-----

Mr. Jack Grieb, director, Division of Wild-
life, 6060 Broadway, Denver, Colo. 80216,
Telephone: 303-825-1192.

Colorado Open Space Coun-
cil, Audubon Society.

Mrs. Vim Crane Wright, Audubon So-
ciety—COSC, 631 Emerson, Denver,
Colo. 80218, Telephone: 303-573-5541.

Utah:

State Department of Nat-
ural Resources.

Mr. Gordon Harmston, executive director,
State Department of Natural Resources,
438 State Capitol, Salt Lake City, Utah
84114, Telephone: 801-328-5356.

Division of State Lands----

Mr. Charles Hansen, director, Division of
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801-328-5381.

National Wildlife, Audubon
society.

Mrs. Jeanne Stringham, 280 West 3d,
south, Vernal, Utah 84078, Telephone:
801-789-0240.

Wyoming:

Department of Economic
Planning and Develop-
ment.

Mr. John T. Goodier, chief, Mineral De-
velopment, Department of Economic
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18th St., Cheyenne, Wyo. 82002, Tele-
phone: 307-777-7284.

OIL SHALE ENVIRONMENTAL ADVISORY PANEL MEMBERSHIP—Continued

State representatives—Continued

Wyoming—Continued

Geological Survey of
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Audubon Society-----

Office representative

Dr. Daniel N. Miller, Jr., State geologist,
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Mr. Carl A. Gaensslen, Audubon Society,
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County representatives:

Rio Blanco County, Colo-----

Mr. Robert White, P.O. Box 25, Rangely,
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Uintah County, Utah-----

Mr. Charles Henderson, 255 West 1st,
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Sweetwater County, Wyo-----

Mr. L. W. Jones, 1024 Lincoln Ave., Rock
Springs, Wyo. 82901, Telephone: 307-
632-5029.

Appointees of Secretary of Interior:

Dr. Thadis Box, dean, College of Natural Resources, Utah State University,
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Rep. Michael L. Strang, Colorado House of Representatives, Route 1, Box 60,
Carbondale, Colo. 81623, Telephone: Aspen, Colo., 925-2115.

Mrs. MINK. Do you have a final question, or may I pursue mine?

Mr. SEIBERLING. I had one final question and now I have two, if
that is all right. The first one is simply this:

Why would a corporation invest \$200 million or some large sums
of money without really knowing what criteria the Secretary is
going to follow in approving the plans of operations under the
lease?

Mr. HORTON. The criteria are in the lease form.

Mr. SEIBERLING. Yes, but those criteria are awfully general, and
as I understand it, the Secretary has wide latitude in deciding
whether he is going to approve a plan.

Mr. HORTON. It would be my judgment, Congressman, after you
examine the lease, you will agree that they are much more specific
than general, and I was simply elaborating on some of the ones that
I mentioned.

But, there are pages of environmental stipulations here that are
certainly much more specific than perhaps we have gotten around
to discussing today.

Mr. SEIBERLING. Well, my other question was this: One of the
things that bothers me about the in situ situations is that we have one
corporation now, as I understand it, that is doing in situ develop-
ment work on its own land, and if, for internal reasons, the high
cost of capital or whatever, they decide that they do not want to
continue this, or that they are limited in the amount they can invest,
then our whole in situ program is based on something over which
we have no control, and yet this looks like the most environmentally
safe and possibly the most productive way of developing this re-
source.

And I just wonder why, as a matter of principle, you seem to
oppose the Government developing its own in situ program so as to
make sure that this possible technique is adequately explored? I
think your criticisms of Mr. Owens did not really go to the sub-
stance of the problem, and I would like to get your response.

Mr. HORTON. I would respond in two ways. First, there are more companies than simply one that are now engaged in research in in situ processing.

And the second is, and I will ask Dr. Morgan to amplify, the Federal Government is funding a large variety of R. & D. programs that would benefit in situ development.

Dr. MORGAN. Sir, in our Laramie Experiment Station we have a number of projects, many of which are ongoing from prior years, but the funding for the present year fiscal year 1975, is as follows: field fracturing and in situ recovery from oil shale, \$455,000 process development for in situ recovery from oil shale, \$230,000; and supporting research for in situ recovery from oil shale, \$290,000. And as a sort of a parallel, although not directly related to oil shale, in situ oil recovery from tar sands, \$525,000.

And there are a number of other related research projects. So, therefore, the Government does have ongoing in situ research.

Mr. SEIBERLING. Do you consider these adequate or should they be expanded?

Dr. MORGAN. Sir, we can always use increased funding, but for the magnitude of the ongoing effort, we believe these are reasonable at this time.

Mr. SEIBERLING. And you feel then, that if the companies that are in this program should get out of it, that your program is still adequate to develop this technique?

Dr. MORGAN. The way we try to operate, sir, is that if private industry were to surge ahead, we would probably drop our efforts back, only to those necessary to have a level of expertise in the Government for establishing regulations and so on.

In the contrary event that private industry should fall behind, then I believe we would be coming to the Congress for additional funds, because our mission is to take what is uneconomic and untried and bring it into the realm of economic and technological feasibility. So, we are constantly reviewing our work against that in the private sector.

Mr. SEIBERLING. Could I just ask how long these have been in effect, these research programs?

Dr. MORGAN. How long we have been in oil shale?

Mr. SEIBERLING. I mean the in situ program.

Dr. MORGAN. We started laboratory scale work in 1964.

Mr. SEIBERLING. Are these field projects or just laboratory?

Mr. PHILLIPS (Chief, Division of Shale Oil, Bureau of Mines). The early work was all in laboratories. I think our first field test was in 1969. We have conducted that one and one other since then, and we have another in preparation.

Mr. SEIBERLING. Madam Chairman, for the record could the gentleman supply a description of the nature of these projects and where they are located and what they are expected to prove and so forth?

Mr. HORTON. We will be happy to provide that for the record.

Mrs. MINK. Without objection, that will be inserted in the record at this point.

[The foregoing information follows:]

IN SITU RETORTING OF OIL SHALE BY THE BUREAU OF MINES

The Bureau's research directed toward development of in situ methods for processing oil shale was initiated on a laboratory scale at the Laramie (Wyoming) Energy Research Center in fiscal year 1964, with funding at \$0.1 million. As data were derived and fundamental understanding increased, the work was progressively extended to include larger scale experimentation as a prelude to actual field tests. This extended experimentation included tests with bench-scale equipment to study the effects of operating variables in closely controlled systems and operation of multi-ton-capacity, aboveground retorts in a manner to simulate anticipated underground conditions. The next step was to undertake field tests, this phase of the program being conducted in the general area of Rock Springs and Green River, Wyoming.

The overall effort as now constituted includes R and D on each of the scales mentioned above, ranging from supporting laboratory and bench-scale experimentation to field tests, and is funded in fiscal year 1975 at \$1.3 million. In addition, \$0.7 million is available this year for complementary studies of environmental problems that potentially may be associated with in situ retorting, such as adverse effects on subsurface waters.

Two principal steps are involved in the in situ retorting approach being investigated by the Bureau. First, the shale to be processed must be fractured (broken in its underground location) enough to provide flow paths for gases and liquids and to permit effective transfer of heat. Second, enough heat must be supplied to cause the retorting reactions to occur and thereby produce oil and gas products for recovery through wells extending from the surface. The first step involves application of hydraulic pressure via wells to create cracks through the section of formation to be processed followed, if necessary, by additional breakage of the shale with injected explosives. The second step, supplying enough heat to cause retorting, may be accomplished by underground combustion sustained by air injected into the fractured zone or by introduction of gases preheated in aboveground equipment. In either case, the hot gases introduced and/or formed are forced through the broken shale to recovery wells, moving the gas and oil products with them.

The Bureau's field work on fracturing techniques, first initiated in fiscal year 1966, has been successful in creating fracture systems in reasonably predictable patterns to depths approaching 1,000 feet. Starting in fiscal year 1969, two in situ retorting experiments have been completed at the Rock Springs site, one at a depth of about 80 feet in which very severe preparatory fracturing was employed, and the second at a depth of about 150 feet with relatively mild fracturing. The shallower test was successful in demonstrating at least a promising degree of technical feasibility, with production of 200 barrels of oil. The deeper test provided useful information but achieved only mediocre success in terms of oil production, apparently because the preparatory fracturing was insufficient to provide enough surface area for an adequate rate of heat transfer. A third test now is in an advanced stage of preparation, this one at a depth of about 160 feet and with preparatory fracturing to be of intermediate severity in comparison with the earlier tests. A fracturing treatment has been applied, and the results are now being evaluated before proceeding with actual retorting.

Although a considerable amount of experience has been gained, conclusions at present concerning process viability would be premature because of a variety of problems and uncertainties. Among these, depth limitations remain to be defined, improved control of heating and recovery techniques must be achieved, the practical limits of efficiency of resource recovery need to be determined, and potential environmental hazards must be investigated and necessary safeguards devised. Continued experimentation is proposed with the objective of resolving such uncertainties.

Mrs. MINK. I understand that the Department of Interior has been engaged in oil shale research and the development of pilot projects for at least 20 years. I am surprised to hear the response to the inquiry that it has only been since 1969.

Mr. HORRON. I think the differentiation is in 1964, 1964 was the first time the Department funded in situ R. & D. within the Department.

Mrs. MINK. On in situ in 1964; was that exclusive to the Laramie site?

Mr. HORTON. I think as far as the laboratory R. & D., that is correct.

Mrs. MINK. Well, what other operations do you have in addition to the Laramie pilot project?

Dr. MORGAN. A number of years ago, Madam Chairman, under the synthetic liquid fuels program, the Bureau of Mines spent \$22 million on oil shale under the Synthetic Liquid Fuels Act, in the period 1945 to 1955. \$16.8 million was spent at Rifle, Colo., where we developed underground mining of oil shale and retorting.

The balance went to Laramie, and it is that Rifle facility that is now being leased to private persons for further test work. So here again is an illustration of where the ongoing work has been taken up and is being carried further by private enterprise, which is what we want to accomplish.

Mrs. MINK. The Rifle, Colo. site is not an in situ site, is it?

Dr. MORGAN. No.

Mrs. MINK. That is the usual underground retort method, is that not correct?

Dr. MORGAN. Madam Chairman, the shale is mined underground but retorted aboveground.

Mrs. MINK. Now, in view of the executive branch's declaration of Project Independence and the need for extensive research in the whole matter of meeting the energy requirements of this country, why is the Department reluctant to undertake a specific prototype in situ operation for the commercial development of oil shale?

Dr. MORGAN. I cannot speak, Madam Chairman, for the administration or for the Department.

But, I believe that our present plan is intended to stimulate private enterprise to do this actively, in accordance, as Secretary Horton pointed out, with the Mining and Mineral Policy Act of 1970 and other legislation which points in this direction.

Now, the magnitude of the Government's effort to meet Project Independence, which involves far more than oil shale, including also coal gasification, coal liquification, secondary and tertiary recovery of petroleum, atomic energy, is being put together at the present time under the leadership of the Federal Energy Administration.

And in the event that some changes are required in the current, ongoing efforts, we believe that Project Independence studies will reveal the need for this. At the moment, we have what we think is a reasonably balanced program.

Mrs. MINK. With respect to your Laramie pilot project, would you be able to tell the committee whether the research that you have conducted now for 10 years has brought it to a point where you could say that the in situ process could be economically viable in terms of commercial development of oil shale by this process?

Dr. MORGAN. I do not think we know enough yet to say what is economically possible. We know enough to say what is technologically possible, but it is very different, Madam Chairman, to scale up these things from what is done in a little hole in the ground, or a little retort in the laboratory, to a production scale. I am sure we are

all well aware that the uncertainties in the world as to the oil prices and so forth make it very difficult to evaluate on a long-term basis what is economic.

So, we have uncertainties on the world oil price side, and we have uncertainties on the scaling up and it is only through larger testing that we will get these answers.

Mrs. MINK. Could you tell us what other private companies are involved in situ development besides the Occidental Oil?

Mr. HORTON. I think, with your permission, we will provide that for the record. Superior Oil Co. is another, and it is my understanding that there are as many as six companies involved in funding in situ R. & D.

Mr. SEIBERLING. Could we also get a description as to the extent and the nature of their involvement?

Mr. HORTON. That would be included.

[The foregoing information follows:]

Other companies have done some research and development work in situ recovery of oil shale in the past but the only company now known to be actively working on in situ research is Occidental Petroleum/Garrett Research and Development Corporation in Western Colorado.

They are working on modified in situ retorting, involving underground mining of a cavern, collapse of formation above to produce a "chimney" filled with broken shale, and batch retorting of the broken mass. Two tests were made in rooms about 30' x 30' x 70' high (including "chimney" plus original cavern). Results were reported as promising on the first test and the results of the second test have not been announced.

Mrs. MINK. I have a question for Dr. Morgan with regard to the TOSCO efforts to reclaim spent shale. Do you have any statement or analysis as to the effectiveness of their program?

Dr. MORGAN. I am sure our people in the field who are doing their own research are in contact with all of the people engaged. I do not have it here, Madam Chairman, but we will gladly supply a summary of what we have from the field.

[The foregoing information follows:]

INVESTIGATIONS BY COLONY DEVELOPMENT OPERATION ON MANAGEMENT OF SPENT SHALE

The Colony Development Operation, of which The Oil Shale Corporation (TOSCO) is a member, initiated a systematic investigation of means of stabilizing spent shale, primarily by vegetation procedures, in 1967. This work is still in progress and is producing an increasing body of knowledge on practical methods of accelerating the vegetation process. The investigations have ranged from laboratory studies to determine the chemical and physical properties of spent shale that affect plant growth to actual field demonstrations involving test plots and a variety of grasses, shrubs, and trees.

As a result of Colony's work it is known with a reasonable degree of confidence that vegetation can be established and sustained if reasonable precautions are taken in site preparation, early care, and choice of plant species. Summarizing the more important preparatory and care factors, the inherent salinity of the upper layer (root zone) of the spent shale deposit should be reduced by leaching or other treatment as a part of the final spreading and compaction process; addition to the same layer of some native soil is desirable but not required; fertilizer at a rate of about 150 pounds per acre should be added twice a year for the first two or three years; and, moisture at a rate of about one inch per week during the summer season (about 10 weeks) should also be applied for the first two or three years. Present indications are that heavy vegetative cover cannot only be established following the general procedures outlined above but that it will be self-

sustaining after about three years. Among the grasses that have been successfully grown are hardy varieties such as Western Wheat and Crested Wheat, although Kentucky blue grass also has been used with good results. Shrubs include native varieties such as sage, bitterbrush, and salt bush. Both deciduous and conifer seedlings have also been planted with promising but as yet indeterminate long-term results.

Mrs. MINK. Does the Bureau of Mines have a study with regard to the matter of spent shale reclamation and the attendant problems and difficulties regarding spent shale disposal?

Dr. MORGAN. We have information in all stages of preparation in our research work, but let me ask Mr. Phillips again, who is the head of our oil shale research.

Mr. PHILLIPS. I think Dr. Morgan mentioned earlier in his remarks that there is a budget of \$600,000 in this current fiscal year, which is set aside specifically for environmental research.

This is largely, in fact I think entirely, dedicated this year to spent shale handling and adequate disposal. This also addresses itself to some extent to the possibilities of using the material for mine fill, which was another question that came up some time back.

In addition to that, there is money provided under the in situ retorting program this year in the amount of \$700,000, which is also dedicated directly to environmental problems that may exist in connection with in situ retorting. Yes, we have a reasonable sized program going along in line.

If I may, I might also clarify a little bit on what has been received from Colony. We have seen their results on site. We know that the spent shale material can be revegetated, and stabilized in the conditions that they have shown so far.

They also provided a fair amount of information that appears in the final environmental impact statement that was issued in connection with the Department's prototype leasing program. So they have cooperated rather well with the Government in making known the results of their environmental research.

Mrs. MINK. I am pleased to be advised that the Department is considering the possibility of designating a specific tract for in situ development. Is there sufficient data accumulated after 10 years of research by the Department to make positive selection of a tract suitable for this particular kind of technology?

Mr. HORTON. I think we are more secure, Madam Chairman, on the data on the tracts, more secure on that than we are on the state of the art as to in situ processing. No one can predict when technology will be refined to the point where, in fact, it will be commercial. The information on the tracts is a matter of drilling, it is a matter of hydrological investigation and a matter of examining the vegetation.

And I think in order of magnitude, it is far easier to have a comfortable feeling on the tracts than it is on the technology.

Mrs. MINK. Suppose there is a careful, very studious scientific selection of a specific high quality deposit, and this is set aside for in situ development, and again there are no bidders.

Would the Department at that point reconsider the necessity of instituting its own prototype development of such a site with that process?

Mr. HORTON. Well, we were certainly evaluating the program. Of course, we have not met what I would call the second step projection yet, in fact, I think as we look now at the reports from very favorable to unfavorable in the prototype program, and we look at what we do next, we obviously will attempt to arrange a successor or new part of the old program in such a manner that we would not fail.

If we did fail, obviously we would reconsider that effort.

Mrs. MINK. When Secretary Morton was before the subcommittee in the early part of the year, he indicated that the Department was going to inaugurate a program of close liaison and cooperation with State and local officials whose jurisdictions would be affected by the issuance of leases in these four tracts.

What kind of liaison committees or councils or coordinating bodies have thus far been established or are under contemplation?

Mr. HORTON. We have two main efforts. The first we have discussed previously. This is the Oil Shale Environmental Advisory Panel, where the Governors of the three States have three members of their cabinet, generally either the water commissioner or the State geologists or people involved with fish and wildlife who sit on this advisory panel, who receive the plans of the industry, the most recent information, not through the Department, but directly from the industry. They comprise an independent, advisory body to the Department.

The second liaison effort is through the State's BLM director in Colorado, who has established a close working relationship with members of the cabinet of both the Governor of Utah and the Governor of Colorado. And I would amplify that by saying that we have a joint research program now underway with respect to reclamation of the land with the State of Colorado.

Mrs. MINK. What about the local and county officials? There was a great deal of concern expressed in earlier testimony by several Members of the Congress that it was not simply the State that needed to be consulted, but that the impact would have to be borne by the local communities and local units of government.

Mr. HORTON. The counties and local planning units are represented on the advisory panel.

Mrs. MINK. Very good.

Mr. HORTON. And I might mention here, you asked for the figures earlier and they have just arrived. There is a good deal of overall coordination between the Federal efforts and the State efforts through the Federal regional councils that the administration has underway.

And in addition to the Department of Interior, OEO, EPA, HUD, HEW, are represented. And we are now funding it, and we did fund in fiscal year 1974 \$225,000 of Federal funds to the States to assist in the examination of the local, county socioeconomic impacts. And it is our planned effort, in any event, to provide \$400,000 through the Federal regional councils to the States in a similar manner.

Mrs. MINK. Now, you testified in very vigorous opposition to two bills, one introduced by Mr. Vanik of Ohio and another by Mr. Dingell of Michigan, which would, if enacted, prevent offsite dumping of spent shale.

Assuming that it would be the Department's view that the spent shale should be kept onsite, are there any statutory provisions which currently exist which require this or which permit you to go offsite or would any offsite dumping require the reissuance of a new lease because of the acreage limitation?

Mr. HORTON. Well, let me start with a statement of our general principle, and that is we believe the decision on the best disposal, the optimum disposal of spent shale should be reached only after a careful on-the-ground land use planning minerals analysis.

We, of course, are testifying to a support flexibility until we get on the ground for professional, technical recommendations. Our position is we should remain flexible.

It could well be that in terms of environmental impact, it would be more desirable to put it off-tract. Now, it is my understanding that the environmental impact statement would be required if a proposal is made and a decision reached to dispose of it, for let us say for environmental reasons, for technical reasons, to dispose of it offsite, and then we would have to go through the NEPA process.

Mrs. MINK. What statutory authority do you have for permitting it to be dumped offsite on another tract of land which is not covered by the lease?

Mr. FERGUSON. That is something that we are not certain about at this time. It would depend upon the kind of requests that we receive. The Department has withdrawn some land nearby, as you probably remember, in case something might be needed.

But, there is a question as to whether under the Mineral Leasing Act we could do this at all.

Mrs. MINK. That is the question I am raising. Who is providing you with the answer to this matter, which seems to me to be the key question at hand? For you to summarily say you are in opposition to the Vanik-Dingell proposals requires this subcommittee to ask if the basis of your opposition is that you are seeking this permission by statutory authority?

Mr. FERGUSON. We would like more specific authority; yes.

Mr. HORTON. This is, in fact, contained in our proposal to the Congress to reform the Mineral Leasing Act of 1920, our proposal for new legislation.

Mrs. MINK. So, therefore, that means you do not now have the authority?

Mr. FERGUSON. Let me say that the Mineral Leasing Act does not give us this authority. The question at an earlier stage in development of the program, say back in 1969, I believe that certain people thought that a special land use permit could be used. That is, I think, questionable.

Mrs. MINK. I would assume that question has been resolved in the negative and consequently the administration has tendered a bill dealing with this subject?

Mr. HORTON. I think that it is too strong a comparison. I think it is the uncertainty that we want to bring to the committee's attention of whether we have authority, and we really do not know, and with the committee we thought it should be clarified one way or another.

Mr. FERGUSON. I think all we say is that the Mineral Leasing Act does not specifically provide for that.

Mrs. MINK. Do you have any legal opinions from the counsel of your Department or others, such as briefs which have been prepared on this subject, which can be submitted to the committee?

Mr. FERGUSON. I do not believe so.

Mrs. MINK. For its information?

Mr. FERGUSON. I do not believe that we have any formal opinion of the Solicitor's Office on this. There has been a good deal of discussion, but I do not remember any written opinion, and probably it would have been written by me, if it was written in the last few years.

Mr. HORTON. We brought our opinionmaker with us.

Mrs. MINK. Well, I certainly thank you, Secretary Horton, for your patience and your testimony and for providing this committee with valuable information. This is an extremely urgent matter, and the subcommittee, as you know, has been conducting extensive hearings and investigative discussions on the subject, in its broad context as well as in the narrow perspective of the pending legislation.

I do want to tender my own view with respect to the objections that have been raised with regard to my legislation which proposes to establish a public corporation, that I personally do not offer it lightly. It is a very serious proposal and should be considered in that light.

And it seems to me that we cannot afford to differ to the economic judgment of industry whether this kind of development activity should or should not occur. We can differ on whether Government should get into full-scale development, but it seems to me at this juncture in history, when we do not know down the road whether we shall have enough energy to meet the needs of this country unless we can curb our appetites as consumers, that every effort ought to be explored in terms of energy resources and energy development.

And I would hope that the Department and this committee can develop an understanding with respect to that question and move on the bills as they come up, and not close our minds on the question of looking seriously at the need for a public corporation not only specifically for oil shale, but for the whole field of energy development.

And with that I will adjourn the meeting of the subcommittee.

[Whereupon, at 12:20 p.m., the subcommittee was adjourned, subject to the call of the Chair.]

[Additional material for the record follows:]

CONGRESS OF THE UNITED STATES,
HOUSE OF REPRESENTATIVES,
Washington, D.C., August 19, 1974.

Hon. PATSY MINK,
Rayburn Office Building,
Washington, D.C.

DEAR CONGRESSWOMAN MINK: Although I could not testify at your August 8th Mines and Mining Subcommittee hearing, I am anxious to testify at some future date on your bill, H.R. 12014, and my bill, H.R. 12127.

I am glad to learn that the hearing touched somewhat on my spent shale disposal bill, H.R. 12127, and the similar bills by Congressman Dingell and Congresswoman Schroeder. It is in that connection that I write.

I know that you are aware of the huge amounts of waste shale that will be generated by shale oil recovery—a single 50,000 b/d plant will result in over

70,000 tons of sterile, unusable debris that must be discarded at some location that will not block access to still unmined shale ore, and sufficiently convenient to the retort to keep transportation costs low. The Federal Prototype Oil Shale Leasing Program will have at least *four* plants producing this amount of waste *each day*.

Despite clear indications in the Department of the Interior's Lease Form that non-leased public lands would be available for disposal of the huge amounts of spent shale, the Department continues to insist that there are no plans to allow oil shale lease holders to dump shale on non-leased lands, but they have nevertheless made absolutely no plans that would indicate they intend to do otherwise. In the "C-a" tract "Preliminary Development Plan" filed by Gulf Standard, for instance, both text and accompanying maps indicate that all "major facilities" for oil shale development will be located *off* tract. Indeed, the off-tract area assigned to waste shale disposal appears to be approximately equal in size to *the leased tract itself*.

I am quite sure that the Department of the Interior, if questioned on this particular aspect of the preliminary plans, would hasten to assure us that these plans had not yet been "accepted," as if to imply that plans to dump spent shale on non-leased public lands were completely unthought of. But the facts are that the Department has already implied, in Section 10 of the Lease Form and in their "Proposed Withdrawal of Lands for Oil Shale Purposes" in the January 3, 1974, Federal Register (pg. 832-34), that large amounts of public land (6,560 acres in Colorado alone) will be used "particularly in connection with the disposal of spent shale."

It is incredible to think that the Department of the Interior intends to allow the oil shale industry free and apparently relatively unfettered use of lands never leased or accounted for in the oil shale lease. But in fact, the *only* operation of the complex and lengthy oil shale retorting process that will actually take place on the leased tract itself is the *mining of the oil shale ore*. All other operations will take place on other, non-leased public land.

At your August 8th hearing, Secretary Horton and his aides said that although the Department of the Interior feels it now has the authority to allow industry use of non-leased lands, they were nevertheless attempting to "clarify" such authorization in legislation currently before the Congress. In correspondence to Senator Jackson and in response to GAO questions motivated by my inquiries, the Department of the Interior cited Section 112 of H.R. 5442, and Section 101(a) of H.R. 5441 as provisions that would specifically allow them the discretion they think they need.

H.R. 5442, which appears to be the more dangerous in terms of the additional authority it grants, is before your Mines and Mining Subcommittee. Section 112(a) says:

"The lessee shall have, under his lease, the right to use, free of charge, so much of the surface of the leased area as may be reasonably required for the actual extraction and removal of the mineral subject to the lease. The lessee shall also, upon payment of fair market rental and upon such terms and conditions as the Secretary may prescribe, have the right to a lease for the amount of the surface reasonably necessary for other operations under the lease and access to (1) the leased area, and (2) where the leased area is inadequate, nearby leasable lands. Where the surface of the area to be covered under the surface lease is under the jurisdiction of any Federal agency other than the Department of the Interior such lease may be issued only upon such terms and conditions as that other Federal agency may prescribe with respect to the use and protection of the non-mineral interests in such area."

Such additional authority is extremely objectionable because, intentionally or otherwise, it completely violates the spirit and letter of the 5120 acre limitation that the Mineral Leasing Act requires of oil shale leases. The GAO investigation of spent shale agrees that such a provision is indeed questionable.

Additionally, the provision for payment of "fair market value" is not specific enough—who makes the determination of fairness? Is there any means of appeal? Provisions for public participation? How much land constitutes "reasonably necessary?" This whole section must be strengthened and clarified.

I hope that when you take up H.R. 5442 you will give particular considera-

tion to this section and the future repercussions of wholesale waste shale dumpings at the expense of the public's interest.

If I could make one suggestion, I think that you and the Subcommittee could provide a valuable service by holding *separate* hearings on the Prototype Oil Shale Program. Your hearings on H.R. 12014, while getting excellent testimony in support of the Oil Shale Mining and Energy Corporation, too often turn into a justifiable critique of the Prototype Program—with the resulting negativism unfortunately rubbing off on your bill. Separate hearings could better allow witnesses to address more specifically one area or the other.

In particular, an oversight hearing on the Prototype Program could help expose what appear to be some genuinely irresponsible and unreasonable plans and practices. They also would be of extreme value in giving perspective to the Department of the Interior's in-house studies for radically expanded oil shale projects as part of Project Independence. It would also be extremely interesting to learn just what role the Environmental Advisory Board has been allowed to play in policy making, and the make-up of that board. Do lease holders appear to be making progress toward the rough timetable that the Department of Interior has envisioned? Where does the industry think they are going to dump their shale wastes? Naturally, I am most anxious to testify at both if you decide to take such a course.

The question of disposal of spent shale in this prototype program, and for future oil shale programs, is so important that I urge you to consider holding separate hearings on the subject and on the several pieces of legislation that address it. Questions of gross environmental abuse, violation of the Mineral Leasing Laws, and an apparent catering to industry and neglect of the public's interests by the Department of the Interior must be answered.

In any event, I am anxious to participate in any other hearings you schedule on H.R. 12014 or related bills. The subject of oil shale is an extremely important one given the enthusiasm that FEA and DOI officials apparently assign it. I do not think the Congress can be too careful in its approach to the future of this new industry.

Sincerely yours,

CHARLES A. VANIK,
Member of Congress.

Enclosures.

CONGRESS OF THE UNITED STATES,
HOUSE OF REPRESENTATIVES,
Washington, D.C., January 7, 1974.

HON. ELMER STAATS,
*Comptroller General,
General Accounting Office,
Washington, D.C.*

DEAR MR. STAATS: The Federal Prototype Oil Shale Leasing Program recently announced by Secretary of the Interior Morton will soon begin with bidding on the first of six tracts of land in Colorado, Utah, and Wyoming. Each state contains two lease tracts of about 5100 acres apiece that Secretary Morton hopes will provide "enough industrial experience" to allow informed decisions to be made on the continuation and expansion of the oil shale program.

Each tract will support one of several mining techniques, among them a "strip mining" technique that will mine the oil shale rock before it is crushed and retorted to yield its kerogen contents. This surface mining technique appears to be the cheapest and most efficient oil recovery method, but also the most destructive to the Rocky Mountain Western Slope lands where all of the prospective tracts are located.

After the oil is recovered, the remaining crushed shale, the consistency of flour and effectively sterilized by the heat of the retorting process, is *discarded*. It has *no* practical use, at least not in the huge quantities that a commercial oil shale operation will produce. Most of the operations foresee mining of shale of an average quality of about 30 gallons of oil per ton of shale. A 50,000 barrel-a-day commercial plant like Secretary Morton hopes will be developed by the Prototype Program will have over 69,000 tons of waste shale each day.

Compounding the disposal problem is the fact that the crushed and processed rock will have a *greater* volume than its parent rock since it has been broken up—with a consequent increase in the inter-particle spaces. Authorities estimate that the processed shale will have a volume *at least* 12% more than the original, and perhaps up to 40% more. This spent shale cannot be immediately returned to its original site since access to other oil shales might then be blocked.

The Department of the Interior's "Environmental Impact Statement" attempted to anticipate the tremendous problems that the massive amounts of waste would bring. The Final Lease Form, published in the *Federal Register* of November 30, 1973, further anticipated disposal of spent shale in section 10 of its initial remarks:

"10. Withdrawal of additional lands: The Department recognizes that in some situations lands outside the leased tracts may be required under other statutes than the Mineral Leasing Act for roads or other purposes in connection with the prototype oil shale leasing program. Moreover, since this is a prototype rather than a general leasing program, the Department may in the future find it desirable to conduct investigations, studies, and experiments under section 101 of the Public Land Administration Act (43USC1362), particularly in connection with the disposal of spent shale. In order to facilitate these possible future investigations, studies, and experiments, the Department is withdrawing from all forms of appropriation under public land laws, including the mining laws, certain lands in the vicinity of the tracts offered for lease."

An examination of the Public Land Administration Act cited, shows this:

"43 USC 1362: The Secretary of the Interior may conduct investigations, studies, and experiments, on his own initiative or in cooperation with others, involving the improvement, management, use, and protection of the public lands and their resources under his jurisdiction."

Using this authority as precedent, the Secretary of the Interior will allow millions of tons of shale waste to be dumped on adjacent Federal lands that are *not* leased by the oil companies under the Prototype Leasing Program. This seems to me a very severe stretching of the apparent intent of 43 USC 1362. It allows private, profit-making industry to use the public's lands as garbage pits for their spent shale wastes—and at no cost to the industry.

In view of the profit making potential of oil shale, a potential which increases almost daily as the price of available liquid oil skyrockets, it makes no sense to allow this government-sanctioned abuse of our public lands without compensation.

I would appreciate it if your office could review and examine all aspects of this waste shale dumping on non-leased public lands and report your findings to me. I would hope a preliminary assessment could be available several days before February 1, 1974, so that it can be submitted before that deadline for comments solicited in the January 3, 1974 *Federal Register* announcement of Colorado and Utah public land withdrawals (pages 832-34).

There are several areas that are worthy of attention in your considerations:

Did the enacting legislation for 43 USC 1362 foresee this use of its authority? Did it intend to authorize disposal of mining wastes? Did it foresee the dumping of wastes of this extent?

Is this utilization of the Code within the law? Can the Secretary indeed interpret the Code as he has?

Is it reasonable and proper to allow this proposed use, and probable abuse, of public lands without a single penny of compensation? Why shouldn't the oil companies be required to pay for the use of and damage to non-leased public lands? Why should the Federal government subsidize these private companies for their financial gain?

If non-leased land dumping is allowable, what are the environmental repercussions? Shouldn't a NEPA statement be required in *each* instance of waste shale disposal in addition to the already published very general EIS that covered the Prototype Leasing Program?

If there is any way that my office might aid you in your examination, please do not hesitate to contact us.

Sincerely yours,

CHARLES A. VANIK,
Member of Congress.

COMPTROLLER GENERAL OF THE UNITED STATES,
Washington, DC., January 30, 1974.

HON. CHARLES A. VANIK,
House of Representatives.

DEAR MR. VANIK: Your letter of January 7, 1974, raises several questions concerning a proposal by the Department of the Interior (hereafter "the Department") to withdraw from all forms of appropriation and to reserve certain public lands in the vicinity of other public lands which are to be leased under the Department's "prototype oil shale leasing program."

Proposals to withdraw approximately 6,560.04 acres in Colorado and 840 acres in Utah appear at 39 F.R. 832 and 833 (January 3, 1974). Each notice of proposed withdrawal states that the subject lands are

"* * * to be used in investigations, studies and experiments by the Department of the Interior, or with others in the improvement, management, use and protection of the lands and their natural resources under section 101 of the Public Land Administration Act (43 U.S.C., section 1362), and pursuant to paragraph 10 of the notice of sale of shale leases published in the November 30, 1973 issue of the FEDERAL REGISTER, 38 FR 33187-33199."

Section 101 of the Public Land Administration Act is paraphrased in the portion of the proposed withdrawal notice quoted above. Section 10 of the Department's notice of sale of shale leases, 38 F.R. 33188, reads as follows:

"Withdrawal of additional lands: The Department recognizes that in some situations lands outside the leased tracts may be required under other statutes than the Mineral Leasing Act for roads or other purposes in connection with the prototype oil shale leasing program. Moreover, since this is a prototype rather than a general leasing program, the Department may in the future find it desirable to conduct investigations, studies, and experiments under section 101 of the Public Land Administration Act (43 USC 1362), particularly in connection with the disposal of spent shale. In order to facilitate these possible future investigations, studies, and experiments, the Department is withdrawing from all forms of appropriation under public land laws, including the mining laws, certain lands in the vicinity of the tracts offered for lease."

As you point out, the Department's prototype oil shale leasing program involves the leasing of certain public lands in Colorado, Utah and Wyoming. While a specific mining technique is not mandated for a majority of the tracts under the Department's program, several probable techniques require a "retorting" process whereby oil is recovered from the oil shale rock, leaving huge residues of "retorted" or "spent" shale. Your figures indicate that over a ton of shale is required to produce one barrel of oil by retorting, and that the shale residue is greater in volume than the original shale by virtue of the retorting process.

Your specific questions concerning the use of withdrawn lands outside the leased tract for disposal of spent shale are as follows:

Did the enacting legislation for 43 U.S.C. 1362 foresee this use of its authority? Did it intend to authorize disposal of mining wastes? Did it foresee the dumping of wastes of this extent?

Is this utilization of the Code within the law? Can the Secretary indeed interpret the Code as he has?

It is reasonable and proper to allow this proposed use, and probable abuse, of public lands without a single penny of compensation? Why shouldn't the oil companies be required to pay for the use of and damage to nonleased public lands? Why should the Federal Government subsidize these private companies for their financial gain?

If nonleased land dumping is allowable, what are the environmental repercussions? Shouldn't a NEPA statement be required in *each instance* of waste shale disposal in addition to the already published very general EIS that covered the Prototype Leasing Program?

We would offer several general observations before proceeding to these questions. First, section 10 of the notice of sale of shale leases as well as the Department's 1973 environmental impact statement clearly envision that some outside lands with be required for disposal of spent shale in some cases. However, the extent of this cannot be determined at the present time since it is dependent upon such factors as the mining techniques which lessees employ, and the extent to which disposal can be accomplished on the leased tracts. For

example, the Department's environmental impact statement indicates that *in situ* recovery is the only option to be afforded for the two Wyoming tracts (vol. III, pg. IV-6). Consequently, no outside lands would be required for disposal. On the other hand, use of some outside lands for disposal seems probable with respect to the Colorado and Utah tracts (vol. III, pgs. IV-10-30). The need for outside lands will generally be greatest in the early stages of mining and production, since initial disposal on the leased tracts would impede mining operations. Secondly, actual arrangements for the use of outside lands for spent shale disposal have yet to be made. The Department's proposed lease for the mining tracts does not of itself confer any access to outside lands. The Department's environmental impact statement (vol. III, pg. V-86) states:

"An oil shale lessee or any other party will have to make separate applications for rights-of-way for roads, power transmission lines, telephone and telegraph lines, and pipelines and for special land use permits and other rights to use land outside the tract subjects to the oil shale lease for purposes connected directly or indirectly with oil shale development. * * *

Thus, provision of outside lands for disposal purposes will be accomplished separate and apart from the lease or any other arrangements now existing. Thirdly, the Department has informally advised us that it has not at present determined what specific authorities and procedures would be employed in actual arrangements for the use of outside lands.

As a result of the foregoing, the questions which you raise cannot be fully answered at the present time. However, we hope that our responses will be of assistance in formulating comments on the proposed withdrawals.

With reference to your first question, section 101 of the Public Land Administration Act, 43 U.S.C. 1362, provides:

"The Secretary of the Interior may conduct investigations, studies, and experiments, on his own initiative or in cooperation with others, involving the improvement, management, use, and protection of the public lands and their resources under his jurisdiction."

Closely related is section 102 of the same act, 43 U.S.C. 1363, which provides:

"The Secretary of the Interior may enter into cooperative agreement involving the improvements, management, use, and protection of the public lands and their resources under his jurisdiction. The provisions of this section shall apply only in those cases where the making of cooperative agreements for such purposes is neither expressly authorized nor expressly prohibited by other provisions of laws."

The relatively brief legislative history of the act does not disclose any consideration of whether section 101 or 102 might apply to disposal of mining wastes; nor, for that matter, does the legislative history indicate any efforts to specifically detail projects or uses contemplated by these sections.

The Public Land Administration Act was based upon draft legislation proposed by the Department, and sections 101 and 102 were enacted in the same form as proposed. Compare H.R. 7004, 86th Cong., 1st sess. (May 7, 1959). The general purpose of these sections was to extend to all public lands under the jurisdiction of the Department the same authority for investigations, studies, and cooperative agreements which theretofore applied only under certain specific statutes. See H. Rept. 1249, 86th Cong., 2d sess., 1; S. Rept. No. 1755, 86th Cong., 2d sess., 1. The Department's letter transmitting the proposed legislation noted that then existing statutes not only limited authority for such activities to particular categories of public lands, but also to particular purposes. H. Rept. No. 1249, *supra*, 3, 4. Accordingly, it appears that both sections 101 and 102 were designed to provide general authority to undertake or support activities not specifically prohibited or authorized by other statutes.

Your second question is whether this authority may be applied to the use of outside lands for disposal of spent shale under the circumstances discussed herein. As noted previously, it is not clear at present exactly what authority and procedures the Department will employ in actually making outside lands available for shale disposal. Thus it is possible that other statutory authority might ultimately be invoked apart from, or in conjunction with, the Public Land Administration Act. However, considering the Public Land Administration Act alone, we would offer the following comments.

We doubt that the mere general provision of outside lands for use is disposal of shale could of itself be considered an investigation, study, or experiment

within the purview of section 101. On the other hand, we understand that there are a number of factors and alternatives to be considered in terms of disposal techniques. For example, level filling a canyon or gorge from bottom to top might adversely affect wildlife which feed at the base of such locations. Therefore, a graded filling operation might be preferable if feasible from an engineering viewpoint. Questions also exist concerning the types of vegetation which can grow in a deposit of spent shale. In sum, it appears that legitimate investigative or experimental activities could possibly be undertaken in connection with shale disposal. Accordingly, we believe the broad authority conferred by the act could be utilized for shale disposal provided that such disposal is undertaken in conjunction with specific and meaningful investigative, study or experimental activities.

Your third question is whether compensation should be obtained for use of outside lands for shale disposal. For consideration here is the so-called "user charges" statute, section 501 of the Independent Offices Appropriation Act, 1952, 65 Stat. 290, 31 U.S.C. 483a, which provides:

"It is the sense of the Congress that any work, service publication, report, document, benefit, privilege, authority, use, franchise, license, permit, certificate, registration or similar thing of value or utility performed, furnished, provided, granted, prepared, or issued by any Federal agency (including wholly owned Government corporations as defined in the Government Corporation Control Act of 1945) to or for any person (including groups, associations, organizations, partnerships, corporations, or businesses), except those engaged in the transaction of official business of the Government, shall be self-sustaining to the fullest extent possible, and the head of each Federal agency is authorized by regulation (which, in the case of agencies in the executive branch, shall be as uniform as practicable and subject to such policies as the President may prescribe) to prescribe therefor such fee, charge, or price, if any, as he shall determine, in case none exists, or redetermine, in case of any existing one, to be fair and equitable taking into consideration direct and indirect cost to the Government, value to the recipient, public policy or interest served, and other pertinent facts, and any amount so determined or redetermined shall be collected and paid into the Treasury as miscellaneous receipts: *Provided*, That nothing contained in this section shall repeal or modify existing statutes prohibiting the collection, fixing the amount, or directing the disposition of any fee, charge or price: *Provided further*, That nothing contained in this section shall repeal or modify existing statutes prescribing bases for calculation of any fee, charge or price, but this proviso shall not restrict the redetermination or recalculation in accordance with the prescribed bases of the amount of any such fee, charge or price."

We have observed that the very broad language of this section contemplates that persons who receive special benefits from the Government should provide compensation therefor. 48 Comp. Gen. 24, 27-28 (1968). The matter of compensation for Federal benefits is also the subject of BOB Bulletin No. 58-3 (November 13, 1957) and BOB Circular No. A-25 (September 23, 1959). Circular No. A-25 states in part, pages 1-2:

"3. *General policy.* A reasonable charge, as described below, should be made to each identifiable recipient for a measurable unit or amount of Government service or property from which he derives a special benefit.

* * * * *

"b. *Lease or sale.* Where federally owned resources or property are leased or sold, a fair market value should be obtained. Charges are to be determined by the application of sound business management principles, and so far as practicable and feasible in accordance with comparable commercial practices. Charges need not be limited to the recovery of costs; they may produce net revenues to the Government."

In our opinion, 31 U.S.C. 483a would apply to any arrangement for disposal of spent shale on outside lands absent specific statutory authority to the contrary. Again, the matter of compensation will depend upon the precise statutory authority and procedures utilized by the Department. If the Department invokes a statute or existing statutory regulations which contain provisions relating to compensation, such provisions would presumably be governing.

Your fourth question relates to the environmental repercussions of shale disposal on outside lands and whether environmental impact statements would be required in each instance of such disposal in addition to the Department's

existing environmental impact statement. We believe that making outside lands available for shale disposal of the magnitude contemplated could be a major Federal action significantly affecting environmental quality, and thus subject to the environmental impact statement requirement under section 102(2)(C) of the National Environmental Policy Act, 42 U.S.C. 4332(2)(C). Accordingly, the real issue here is whether the Department's 1973 general environmental impact statement for the prototype oil shale leasing program is sufficient to cover the actual and ultimate provision of outside lands.

The 1973 statement does address potential impacts of shale disposal both on and under the lease tracts and on outside lands, and discusses environmental impacts on specified outside lands which the Department considers likely areas for disposal. At the same time, the statement recognizes that such discussion is necessarily hypothetical and tentative at present since it is unknown precisely what outside lands will be involved, what disposal techniques will be employed, and what new technologies and alternatives may become relevant by the time disposal is actually required (presumably when detailed development plans are submitted several years from now). Department officials have informally advised us that while they have no current plans to file additional environmental impact statements, such action will be taken if warranted by circumstances existing at the time detailed development plans are submitted.

In addition to the specific questions which you have raised, our review indicates another legal issue concerning the use of outside lands for shale disposal. The basic statutory foundation for the prototype oil shale leasing program is section 21 of the Mineral Lands Leasing Act, as amended, 30 U.S.C. 241. This section authorizes the Secretary of the Interior to lease shale oil deposits on public lands containing such deposits, *or land adjacent thereto*, as may be required for the extraction and reduction of the leased minerals * * * (italics supplied). Section 21 further provides that no lease under that section may exceed 5,120 acres. Each of the six tracts to be leased under the prototype oil shale leasing program approaches 5,120 acres without consideration of any outside lands which may be required for shale disposal. As noted previously, the Department's proposals to withdraw outside lands in connection with the leasing operations include over 6,500 acres in Colorado and over 800 acres in Utah.

It could be argued that section 21 contemplates a 5,120-acre limitation upon all surface lands required for the extraction and reduction of minerals in a mining operation under any single lease, particularly since this action specifically authorizes inclusion of adjacent lands in the basic lease. In any case where mining of oil shale could not as a practical matter be accomplished without the existence of offsite disposal facilities, outside lands used for this purpose could be regarded as "required for the extraction and reduction of" shale oil within the meaning of section 21. Somewhat analogous considerations involving maximum amounts of land provided for pipeline rights-of-way under section 28 of the Mineral Lands Leasing Act, 30 U.S.C. 185 proved fatal to the Department's original trans-Alaska pipeline program in *Wilderness Society v. Morton*, 479 F. 2d 842 (D.C. Cir. 1973). See particularly part I of the court's opinion, 479 F. 2d at 851-875.

While in our opinion legal issues regarding the effect of the 5,120-acre limitation upon provision of outside lands for shale disposal are potentially quite serious, they appear to be premature at the present time. Presumably, actual applications for outside lands will not be made for some time, and then will require consideration of the specific authorities relied upon. It should also be noted that use of outside lands for purposes specifically authorized by law—such as rights-of-way for tramroads (43 U.S.C. 956) and power and communications lines (43 U.S.C. 959)—would clearly not conflict with the 5,120-acre limitation. See *Wilderness Society*, *supra*, 479 F. 2d at 879-881.

Finally, it is noted that the Department has proposed legislation which, if enacted, would apparently overcome the problem of acreage limitations in relation to outside lands. See S. 1040 and H.R. 5442, 93d Congress. Section 112(a) of these identical bills provides in part as to mineral leases:

"The lessee shall have, under his lease, the right to use, free of charge, so much of the surface of the leased area as may be reasonably required for the actual extraction and removal of the mineral subject to his lease. The lessee shall also, upon payment of fair market rental and upon such terms and conditions as the Secretary may prescribe, have the right to lease for the amount

of the surface reasonably necessary for other operations under the lease and access thereto of (1) the leased area, and (2) where the leased area is inadequate, nearby leasable lands. * * *

Sincerely yours,

ELMER B. STAATS,
Comptroller General.
of the United States.

[From the Federal Register, Vol. 59, No. 2, Thursday, January 3, 1974]

COLORADO

LANDS FOR OIL SHALE PURPOSES PROPOSED WITHDRAWAL AND RESERVATION

DECEMBER 21, 1973.

The Bureau of Land Management, U.S. Department of the Interior has filed an application Colorado 19889 for the withdrawal from all forms of appropriation under the public land laws including the mining laws (30 U.S.C. ch. 2 (1970) and, mineral leasing laws (30 U.S.C. 181-301 (1970) the following described national resource lands to be used in investigations, studies and experiments by the Department of the Interior, or with others in the improvement, management, use and protection of the land and their natural resources under section 101 of the Public Land Administration Act (43 U.S.C. Sec. 1362) and pursuant to paragraph 10 of the notice of sale of oil shale lease published in the November 30, 1973 issue of the FEDERAL REGISTER (38 FR 33187-33199):

SIXTH PRINCIPAL MERIDIAN, COLORADO

T. 1 S., R. 101 W.

- Sec. 10, SE $\frac{1}{4}$ SW $\frac{1}{4}$;
- Sec. 15, NW $\frac{1}{4}$, N $\frac{1}{2}$ SW $\frac{1}{4}$, SW $\frac{1}{4}$ SW $\frac{1}{4}$, SE $\frac{1}{4}$ SE $\frac{1}{4}$ SW $\frac{1}{4}$, and SW $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$;
- Sec. 16, SE $\frac{1}{4}$ NE $\frac{1}{4}$, S $\frac{1}{2}$ SW $\frac{1}{4}$ and SE $\frac{1}{4}$;
- Sec. 17, SE $\frac{1}{4}$ SE $\frac{1}{4}$;
- Sec. 20, E $\frac{1}{2}$ NE $\frac{1}{4}$, and E $\frac{1}{4}$ NE $\frac{1}{4}$ SE $\frac{1}{4}$;
- Sec. 21, lots 1, 2, 3, 4, 5, NE $\frac{1}{4}$, E $\frac{1}{2}$ NW $\frac{1}{4}$, NE $\frac{1}{4}$ SW $\frac{1}{4}$ and N $\frac{1}{2}$ SE $\frac{1}{4}$;
- Sec. 22, W $\frac{1}{2}$ NE $\frac{1}{4}$, NW $\frac{1}{4}$, N $\frac{1}{2}$ SW $\frac{1}{4}$ and W $\frac{1}{2}$ SE $\frac{1}{4}$;
- Sec. 26, S $\frac{1}{2}$ NW $\frac{1}{4}$, SW $\frac{1}{4}$, S $\frac{1}{2}$ SE $\frac{1}{4}$;
- Sec. 27, lots 2, 3, 4, 5, 6, 7, NE $\frac{1}{4}$, SE $\frac{1}{4}$ NW $\frac{1}{4}$, NE $\frac{1}{4}$ SW $\frac{1}{4}$ and N $\frac{1}{2}$ SE $\frac{1}{4}$;
- Sec. 28, S $\frac{1}{2}$ SE $\frac{1}{4}$ NE $\frac{1}{4}$, SE $\frac{1}{4}$ NE $\frac{1}{4}$, SE $\frac{1}{4}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$, SE $\frac{1}{4}$ SW $\frac{1}{4}$ and SE $\frac{1}{2}$;
- Sec. 33, N $\frac{1}{2}$ NE $\frac{1}{4}$, NE $\frac{1}{4}$ NW $\frac{1}{4}$, S $\frac{1}{2}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$ and SE $\frac{1}{4}$ SE $\frac{1}{4}$;
- Sec. 34, NE $\frac{1}{4}$, E $\frac{1}{2}$ NW $\frac{1}{4}$, N $\frac{1}{2}$ NW $\frac{1}{4}$ NW $\frac{1}{4}$, SW $\frac{1}{4}$ and N $\frac{1}{2}$ SE $\frac{1}{4}$;
- Sec. 35, lots 1, 2, 3, NE $\frac{1}{4}$, E $\frac{1}{2}$ NW $\frac{1}{4}$, NE $\frac{1}{4}$ SW $\frac{1}{4}$, N $\frac{1}{2}$ SE $\frac{1}{4}$, SW $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$ and N $\frac{1}{2}$ S $\frac{1}{2}$ SE $\frac{1}{4}$;
- Sec. 36, SE $\frac{1}{4}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$, SE $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$, SE $\frac{1}{4}$ SW $\frac{1}{4}$ and W $\frac{1}{2}$ SE $\frac{1}{4}$;

T. 2 S., R. 101 W.

- Sec. 1, lots 6, 7, 8 and S $\frac{1}{2}$ NW $\frac{1}{4}$;
- Sec. 2, lots 5, 6, 7, 8, S $\frac{1}{2}$ N $\frac{1}{2}$, SW $\frac{1}{4}$ and W $\frac{1}{2}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$;
- Sec. 3, lots 5, 7, 8, S $\frac{1}{2}$ NE $\frac{1}{4}$, S $\frac{1}{2}$ NW $\frac{1}{4}$, SW $\frac{1}{4}$, N $\frac{1}{2}$ SE $\frac{1}{4}$, SW $\frac{1}{4}$ SE $\frac{1}{4}$ and NW $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$;
- Sec. 4, lots 5, 6, S $\frac{1}{2}$ NE $\frac{1}{4}$, N $\frac{1}{2}$ N $\frac{1}{2}$ SE $\frac{1}{4}$ and SE $\frac{1}{4}$ SE $\frac{1}{4}$;
- Sec. 9, NE $\frac{1}{4}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$;
- Sec. 10, NE $\frac{1}{4}$, E $\frac{1}{2}$ NW $\frac{1}{4}$, N $\frac{1}{2}$ NW $\frac{1}{4}$ NW $\frac{1}{4}$, NE $\frac{1}{4}$ SW $\frac{1}{4}$, NE $\frac{1}{4}$ SE $\frac{1}{4}$ SW $\frac{1}{4}$, N $\frac{1}{2}$ SE $\frac{1}{4}$ and N $\frac{1}{2}$ S $\frac{1}{2}$ SE $\frac{1}{4}$;
- Sec. 11, W $\frac{1}{2}$ NE $\frac{1}{4}$, NW $\frac{1}{4}$, N $\frac{1}{2}$ SW $\frac{1}{4}$, N $\frac{1}{2}$ S $\frac{1}{2}$ SW $\frac{1}{4}$ and NW $\frac{1}{4}$ SE $\frac{1}{4}$.

The area described aggregates approximately 6,560.04 acres of national resource lands.

All persons who wish to submit comments, suggestions, or objections in connection with the proposed withdrawal should present their views in writing to the undersigned officer of the Bureau of Land Management, Department of the Interior, 700 Colorado State Bank Building, 1600 Broadway, Denver, Colorado 80202 prior to February 1, 1974.

The Department's regulations (43 CFR 2351.4(c)) provides that the authorized officer of the Bureau of Land Management will undertake such investiga-

tions as are necessary to determine the existing or potential demand for the lands and their resources.

The authorized officer will also prepare a report for consideration by the Secretary of the Interior who will determine whether or not the lands will be withdrawn as requested by the applicant agency.

The determination of the Secretary on the application will be published in the FEDERAL REGISTER. A separate notice will be sent to each interested party of record.

If circumstances warrant, a public hearing will be held at a convenient time and place, which will be announced.

DALE R. ANDRUS,
State Director.

[FR Doc. 74-24 Filed 1-2-74; 8:45 am]

GRAND JUNCTION DISTRICT; REDELEGATION OF AUTHORITY TO AREA MANAGERS

Under authority of Bureau Order 701, dated July 23, 1964., and as amended April 26, 1966, the Area Managers administering the Grand Junction and Glenwood Springs Resource Areas of the Grand Junction District, Colo., are authorized to act on the following matters: Within their respective areas of responsibility in accordance with existing policies and regulations of the Department, and under direct supervision of the Grand Junction District Manager, they may exercise the functions of the Bureau Director on the matters specified below subject to the limitations of Bureau Order 701, Part III.

AUTHORITY IN SPECIFIC MATTERS

Sec. 3.3 *Fiscal affairs.* The Area Manager may take action on:

(d) Trespass: Determine liability and issue notice of grazing trespass; recommend as to acceptance of settlement offer made.

Sec. 3.7 *Range management.* The Area Manager may take action on:

(a) Within grazing districts, the issuance of licenses and permits to graze or trail livestock.

(b) Outside grazing districts, the issuance of grazing leases.

(d) Soil and moisture conservation; control of halogeton glomeratus.

Sec. 3.8 *Forest management.* The Area Manager may take all action on:

(a) Disposition of forest products including sales of timber not exceeding \$100 in value.

Sec. 3.9 *Land use.* The Area Manager may take all action on:

(g) Disposition of material other than forest products, not exceeding \$100 in value.

The District Manager may at any time temporarily reserve, restrict, or withhold any portion of the above delegated authority through the use of Form 1213-1—District Office Authority and Responsibility Guide.

This order will become effective January 3, 1974.

Dated: December 7, 1973.

THOMAS J. OWEN,
District Manager.

Approved:

DALE R. ANDRUS,
State Director.

[FR Doc. 74-71 Filed 1-2-74; 8:45 am]

GRAND JUNCTION DISTRICT ADVISORY BOARD

NOTICE OF MEETING

Notice is hereby given that the Grand Junction District Advisory Board will meet January 8, 1974, beginning at 9:00 a.m., in Room 114, Wayne Aspinall Federal Building, Grand Junction, Colorado.

The purpose of the meeting is to hear protests on adverse recommendations made during their regular meeting on December 13, 1973.

The meeting will be open to the public. Those members of the public wishing to make an oral statement should advise the Co-Chairman prior to the meeting to aid in scheduling the time available. Any interested person may file a written statement for consideration by the Board by sending it to the Co-Chairman, Grand Junction District Manager, P.O. Box 1509, Grand Junction, Colorado 81501.

DALE R. ANDRUS,
State Director.

[FR Doc.74-72 Filed 1-2-74;8:45 am]

SALMON DISTRICT ADVISORY BOARD

NOTICE OF MEETING

Pursuant to the requirements of the Federal Advisory Committee Act, Pub. L. 92-463, notice is hereby given that the Salmon District Advisory Board will hold a meeting beginning at 10:00 a.m., January 17, 1974, at the Salmon District Office, Salmon, Idaho. The agenda for the meeting will include presentation of the Challis Unit Plan, proposed range improvements projects, late grazing applications, and the hearing of protests by the Board of previous actions.

The meeting will be open to the public. Those wishing to appear before the Board in person should inform the Advisory Board Chairman prior to the meeting. Any interested person may file a written statement with the Board for its consideration. The Advisory Board Chairman is Floyd J. Whittaker, Leadore, Idaho 83464.

REX D. COLTON,
Acting State Director.

[FR Doc.74-161 Filed 1-2-74;8:45 am]

UTAH

NOTICE OF PROPOSED WITHDRAWAL AND RESERVATION OF LANDS

DECEMBER 21, 1973.

The Bureau of Land Management, U.S. Department of the Interior, has filed an application, serial No. Utah 24667 for the withdrawal from all forms of appropriation under the public land laws including the mining laws (30 U.S.C. ch. 2(1970)) and mineral leasing laws (30 U.S.C. 181-301(1970)) the following described national resource lands to be used in investigations, studies and experiments by the Department of the Interior, or with others in the improvements, management, use and protection of the lands and their natural resources under section 101 of the Public Land Administration Act (43 U.S.C. section 1362), and pursuant to paragraph 10 of the notice of sale of oil shale leases published in the November 30, 1973 issue of the FEDERAL REGISTER, 38 FR 33187-33199.

On or before February 1, 1974, all persons who wish to submit comments, suggestions or objections in connection with the proposed withdrawal, may present their views in writing to the undersigned officer of the Bureau of Land Management, Department of the Interior, Room 3103, Federal Building, Salt Lake City, Utah 84138.

If circumstances warrant, a public hearing will be held at a convenient time and place, which will be announced.

The determination of the Secretary on the application will be published in the FEDERAL REGISTER. A separate notice will be sent to each interested party of record.

The lands involved in the application are:

SALT LAKE MERIDIAN, UTAH

UINTAH COUNTY

T. 10 S., R. 24 E.,
Sec. 35.

T. 11 S., R. 25 E.

Sec. 5, SW $\frac{1}{4}$ NW $\frac{1}{4}$, W $\frac{1}{2}$ SW $\frac{1}{4}$;

Sec. 6, SE $\frac{1}{4}$ NE $\frac{1}{4}$, NE $\frac{1}{4}$ SE $\frac{1}{4}$.

The areas described aggregate 840 acres.

WILLIAM G. LEAVELL,
Acting State Director.

[FR Doc.74-121 Filed 1-2-74;8:45 am]

STATEMENT OF ALEX RADIN, GENERAL MANAGER, AMERICAN PUBLIC POWER
ASSOCIATION

My name is Alex Radin. I am General Manager of the American Public Power Association, the national organization of more than 1,400 municipal and other local publicly owned electric utilities in 48 states, Guam, the Virgin Islands, and Puerto Rico, supports the creation of an Oil Shale Mining and Energy Corporation. APPA believes that the establishment of such a corporation would, among other things, increase the supply of oil derived from shale resources, act as a competitive lever on price, and bring about more competition in the oil and gas industry. At the APPA Annual Conference held in Phoenix, Arizona, the members of the Association approved the following resolution on April 23, 1974 of a Federal Oil and Gas Corporation:

Whereas, the American Public Power Association has supported the formation of a Federal corporation to develop oil, oil shale, coal, and natural gas resources; and

Whereas, an independent Federal fuels corporation could (1) provide competition within the present highly-concentrated domestic and foreign fuels markets, (2) lead in the development of fuel resources with proper safeguards for the environment, (3) end the present practice of private oil companies being the sole negotiators with foreign governments in setting the price and supply levels of imported oil, (4) help insure that the United States has adequate reserves of fuel in order to avoid harmful disruptions of supply, and (5) end monopolization of Federal fuel resources, through present leasing practices, by large oil companies; and

Whereas, legislation has been introduced in the United States Senate and House of Representatives to establish a Federal Oil and Gas Corporation;

Now, Therefore, Be It Resolved: That the American Public Power Association reaffirms its support of a Federal corporation to engage in the production and sales of fuel resources, and endorses legislation to establish a Federal Oil and Gas Corporation, but urges the Congress to empower such a corporation to engage in the development and sale of all fuel resources, including nuclear, coal, and geothermal in a manner which will promote competition in the fuels industry; and

Be It Further Resolved: That American Public Power Association believes such a Federal corporation should supply the nation's consumers with data on the real cost of producing oil, oil shale, gas, coal, nuclear, and geothermal resources.

It should be noted that APPA supports the general establishment of a single federal corporation which would include oil, gas, uranium, geothermal resources, as well as oil shale. However, the establishment of a separate federal corporate entity for oil shale development is certainly a step in the right direction, particularly considering the fact that such development is in its incipency. In the case of oil, gas, and coal, a federal entity is essential to create competition in the production and sale of resources already in the marketplace. By the creation of an Oil Shale Mining and Energy Corporation at this early stage in oil shale development, there is a far better chance of assuring competition for oil derived from shale, and injecting this new product into the existing market for alternative fuels.

The composition of the electric industry offers a useful vantage point to view the establishment of an Oil Shale Mining and Energy Corporation, because the institutional framework of the electric industry provides some models that might well be emulated in the oil and gas industry.

The electric industry is characterized by pluralistic ownership. In the production of electric energy, privately owned companies account for 77.3% of total generation: the Federal government, 12%, local public power systems, 8.9%, and rural electric cooperatives, 1.7%. As early as 1905, the Federal government entered into the production of electricity as part of its responsibility for comprehensive, multi-purpose development of water resources owned by the people of the Nation. Through the Tennessee Valley Authority, the Federal government also produces electric energy from fossil-fired generation, and is building nuclear power projects.

The 2,005 municipal and other local public power systems began operation in 1882 at the inception of central station electric service, providing this essential public service, in most cases, because it was not available from other sources or because communities felt that they could obtain better service at lower rates by providing electricity for themselves. Rural electric cooperatives likewise came into existence in order to fill a need that was not then being filled by other suppliers.

Generally speaking pluralistic ownership in the electric industry has worked well. Although improvements can be made, the institutional competition has resulted in a utility system which is generally regarded as one of the best of any country in the world.

It is true that private electric utilities are generally protected from competition at the retail level through franchises. But it is also true that there is active competition between consumer owned utilities and private companies for the right to serve at the retail level, and private companies are fully subject to the antitrust laws at the wholesale market levels of generation and transmission.

Competitive pressures frequently arise within the electric industry as a result of its pluralistic ownership. When anticompetitive arrangements between large private power companies appear, it has been the policy of the Nation to head them off through Federal development of the Nation's waters with a preference in the sale of power for publicly and cooperatively owned utilities, or by offering several forums where the smaller, publicly and cooperatively owned utilities may pursue an antitrust remedy, including the courts, the Federal Power Commission, the Atomic Energy Commission, and the Securities and Exchange Commission.

One of the tests of the effectiveness of the U.S. electric industry is that electric rates compare favorably with those in other countries. Until the recent sharp rise in fuel and construction costs, the consumer had the benefit of steadily lower average costs per kilowatt hours of electric service.

I believe that a considerable amount of credit for declining rates can be attributed to the active institutional competition within the electric industry, in which the publicly owned systems have been pace setters. For example, in 1971, the most recent year for which FPC figures are available, average residential revenue for the privately owned companies was 2.32 cents per kwh, 48.7% higher than the public systems' average of 1.56 cents per kwh. Average commercial or industrial revenue of the privately owned companies, 1.5 cents per kwh, was 19% higher than the 1.25 cents per kwh for the publicly owned systems. Generally, private company rates are lowest in those areas contiguous to public power systems.

The annual publication by the FPC of detailed statistics about electric utilities, publicly and privately owned, has subjected electric utilities to careful scrutiny of the public, and has stimulated active competition between utilities as to their performance.

APPA believes the federal Oil Shale Mining and Energy Corporation would serve the following purposes:

1. *Increase production.* The corporation would develop publicly-owned oil shale resources under H.R. 12014 "to assure that the Nation's energy requirements are met without degradation to the environment . . ." Having been vested with the right to develop the oil shale resources on federal lands, the corporation, acting on behalf of the people, could determine the development

of resources they own, rather than leaving decisions on the rate of production to private companies whose interests do not necessarily coincide with the need of the nation to receive adequate supplies of oil at fair prices.

2. *Stimulate competition.* The corporation, in the sale of oil derived from oil shale, would set up competition of a "yardstick" variety between it and the private oil and gas companies which would enable consumers to evaluate the performance of the private fuels industry which is presently dominated by a relatively few companies. Hopefully, such competition should act as an important lever in holding down prices of both the federal and private corporations. H.R. 12014 contains a clause which gives "priority" in sales of oil "to corporations engaged in the business of distributing and selling oil or oil derivatives or gas to the public which have no facilities for the primary production of oil or gas." Such a mandate should place the non-integrated oil and gas supplier in a better position to compete with the large oil companies and offer consumers, including electric utilities, the benefits of competitive oil shale development.

3. *Disclosure of information.* The corporation would be required to keep open books and records. Consequently, the nation would know what it really costs to produce oil from oil shale deposits. If the Federal Energy Office, or other governmental entity, is empowered to set the price of oil in the future the cost figures developed by the corporation should provide reliable data in one area of production, oil shale, which should make such regulation fairer and more accurate. In addition, the cost of producing oil from shale deposits would, in the future, be open to public scrutiny and comparison. This is vastly preferable to leaving such vital data within the files of large oil companies, whose manipulation of such data could affect the course of oil shale exploitation.

4. *Return to the Treasury.* Substantial amounts of money should be returned to the Federal Treasury from the activities of the corporation. The federal government has proven that it can operate successfully in the energy business, as witness the experience of TVA, Bonneville Power Administration and other federal power agencies which have been paying for themselves, returning money to the Treasury, and building up an equity for the federal government—while producing power at the lowest possible price for the consumer.

5. *Environmental protection.* Because of public control over the corporation, and because of the environmental protection features of H.R. 12014, the corporation should be more responsive to environmental concerns than a privately owned oil and gas company. In addition, responsiveness should be increased because the corporation's principal purpose is not to maximize profit, but to perform a public service.

While APPA supports the establishment of a federal corporation to act as a competitive force in all fuel areas, including oil, natural gas, coal, geothermal, uranium, and oil shale, we endorse the creation of the Oil Shale Mining and Energy Corporation. There are disturbing signs of monopolization of the nation's fuel resources by large oil and gas companies. The enactment of H.R. 12014 would be a major step in thwarting the growth of monopoly in the development of oil shale, a vast resource which is owned by the people, and should be developed on their behalf.

