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OIL SHALE
and
RELATED FUELS

Quarterly Report

December 1, 1964

Cameron And Jones
Incorporated
Denver, Colorado

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VOLUME I, NUMBER 4

(2nd Printing)

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Cameron and Jones
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Engineers . Consultants
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Volume 1, Number 4

TABLE OF CONTENTS (Continued)

	Page
FOREIGN OIL SHALE DEVELOPMENTS	43
Canada, Province of Manitoba	43
Canada, Province of Saskatchewan	43
OIL SHALE ASSAY LABORATORY AT RIFLE, COLORADO	46
Core Laboratories, Inc.	46
Other Laboratories Equipped for Fischer Assay Work	47
WATER DEVELOPMENTS	49
First Colorado River Storage Project Power Offered for Sale	49
Rifle Gap Dam	50
NAWAPA: Something of Future Interest	50
Status of USGS Water Study in Piceance Basin Area	51
Special Utah Water Study	52
MEETINGS AND CONFERENCES	53
Open House and Dedication Ceremonies at Anvil Points Oil Shale Research Center, September 14	53
1964 Mining Convention, Portland, Oregon, September 13-16	55
54th National Meeting, A.I.Ch.E., Las Vegas, Nevada, September 20-23.	55
13th Annual Field Trip, Intermountain Association of Petroleum Geologists, Vernal, Utah, September 16-19	56
Intermountain Symposium on Fossil Hydrocarbons, Salt Lake City, Utah, October 9-10.	57
Annual Meeting, Independent Petroleum Association, Houston, Texas, October 25-27.	59

TABLE OF CONTENTS (Continued)

	Page
COAL AND LIGNITE	60
Bituminous Coal Production	60
Current Research Projects for Office of Coal Research	60
Coal Acreage Bill, H.R. 8960	61
Coal's Efforts to Share in California's Future Energy Market	62
Status of 10 MM KW Coal-Fueled Utah Power Project	63
Effect on Coal of the Pacific NW-Pacific SW Electric Power Intertie	64
The Formation of WEST Associates	65
SODIUM PERMITS ON FEDERAL OIL SHALE LANDS	67
TAR SANDS AND RELATED MINERAL DEPOSITS	68
Utah Bituminous Sands	68
Utah State Bituminous Sand Lands Under Lease	68
State Selection of "In Lieu" Lands	68
In Situ Operations in Utah Tar Sands	68
Kentucky Oil Sands	70
Alberta Tar Sands	70
Amendments to Alberta Drilling Regulations	71
Alberta Bituminous Sands Regulations	71
Great Canadian Oil Sands, Ltd.	71
Leases and Permits in the Athabasca Area	72
Melville Island Tar Sands	72
Manitoba Tar Sands	77
Saskatchewan Tar Sands	77
Tar Sands Literature Survey	77
OIL SHALE MINING REVIEW	79
Publication of U. S. Bureau of Mines Bulletin 611	79
COMING EVENTS	84

TABLE OF CONTENTS (Continued)

	Page
BIBLIOGRAPHY	85
RECENT PUBLICATIONS OF INTEREST	86
APPENDIX INDEX	87

LIST OF FIGURES

Figure No.		Page
1	Site of the Colony Development Company Project, November 1964	6
2	The No. 1 Gas Combustion Retort at the Anvil Points Oil Shale Research Center	10
3	Site of the Socony-Equity *In Situ* Oil Shale Testing Project	14
4	Site of the Sinclair *In Situ* Oil Shale Testing Project, November 1964	14
5	Battery of 12 Fischer Assay Retorts Set Up at Laramie Petroleum Research Center	48

LIST OF TABLES

Table No.		
1	List of Civil Action Cases at the United States District Court for Colorado	23
2	Summary of Pro Forma Cost of Energy Delivered to Los Angeles Area	63
3	List of Leases and Prospecting Permits in the Athabasca Tar Sands Area of Alberta, Canada	73
4	Comparison of Melville Island and McMurray Tar Sands	76

LIST OF PLATES

Plate No.		Page
1	Location of Oil Shale Claims Recently Contested by the Bureau of Land Management	18
2	Location of Oil Shale Claims in Civil Action Cases at the United States District Court for Colorado	24
3	Location of State-Owned Oil Shale Lands Leased by the State of Utah	36
4	Access Roads to the Oil Shale Area of Colorado	41
5	Oil Shale Reservations on Crown Acreage in Manitoba, Canada	44
6	Sodium Prospecting Permits and Leases on Federal Oil Shale Land In Colorado	69
7	Oil Shale Prospecting Permits and Oil Sand Leases in the Athabasca Oil Sands Area of Alberta	75
8	Alternate Oil Shale Mining Method Proposed by U. S. Bureau of Mines Engineers	80

HIGHLIGHTS

Colony Development Company

The prototype plant for the Colony Development Company is now under construction. Concrete for foundations has been placed and steelwork is being erected. Work is also in progress on the access road to the plant site, site preparation, oil shale mine development and powerline installation.

The Bechtel Corporation of San Francisco was awarded the contract for engineering and constructing the prototype plant, and Bechtel will have about 170 men on the project until the plant is completed. Detailed engineering studies are being made by Colony personnel on means for expanding the entire operation to commercial scale. A TOSCO official has stated that the commercial plant will process 60,000 tons of 38-40 gallon-per-ton shale daily, yielding synthetic crude at an estimated production cost, exclusive of depreciation, of $1.00 to $1.30 per barrel.

Anvil Points Oil Shale Research Center

Open house and dedication ceremonies marked the September 14 reactivation of the former U. S. Bureau of Mines Oil Shale Demonstration Plant. The Colorado School of Mines Research Foundation, lessee of the facility, was joined by Socony Mobil Oil Company, project manager, and Humble Oil and Refining Company, participant. Before an October 29 deadline was reached, Continental Oil, Pan American Petroleum, Phillips Petroleum and Sinclair Research joined as participants. No commercial production of shale oil is planned. Rather, phase one of a publicly-announced research program will be followed utilizing retorts number 1 and 2 which were developed and used by the U. S. Bureau of Mines.

The cost of the first-phase research program is estimated at 2 million dollars, to be paid by the six participants. Phase one will concentrate on gas combustion retorting.

In Situ Retorting

There is some limited activity in the Piceance Basin, in areas where the rich shale sections are thickest, to investigate *in situ* retorting techniques. Available data on four projects are reported.

United States Government Actions

The Bureau of Land Management has challenged 12 selected oil shale mining claims, requesting that these claims be declared null and void. Due to similar facts and issues of law involved, the validity of several thousand unpatented oil shale mining claims may be determined by the final decision on these 12 contested claims.

A Public Land Law Review Commission has been established to comprehensively review the public land laws and to determine whether and to what extent revisions are necessary. It seems quite likely that the formation of a Federal policy for development of oil shale resources on public land will await the findings and recommendations of this commission. This commission's final report to the President must be submitted by December 31, 1968.

The Federal Oil Shale Advisory Board is meeting in Washington, D. C. at the time of this report, to hear from representatives of various groups invited to appear before the Board. An interim report of the Board will be submitted to Secretary Udall shortly after the first of the year, and it is anticipated by the Chairman of the Board that Secretary Udall will make the report available for public comment.

State Government Developments

The State of Utah has modified its State Oil Shale Lease Form in an attempt to facilitate oil shale development in Utah.

In Colorado, State officials are interested in and are studying access road problems affecting the oil shale areas

of Colorado. Colorado Governor Love's Oil Shale Advisory Committee is studying oil shale taxation problems and will spell out recommended statutory changes in the state tax laws.

Foreign Developments

The Canadian Province of Saskatchewan has finalized its Oil Shale Regulations. The Province of Manitoba has amended its Regulations under "The Mines Act". These changes are discussed in the text.

Interest in the oil occurrences in Saskatchewan and Manitoba continues. Aquitaine Oil has obtained a reservation in Manitoba covering 118,560 acres, joining Sun Oil as lessee in that province. In Saskatchewan, applications for 6,900,000 acres have been made in areas where oil shales are known to occur.

General Developments

Core Laboratories, Inc., has opened a Fischer Assay laboratory facility at Rifle, Colorado, and now offers this assay service.

The first hydro-power to be produced by the Colorado River Storage Project has been offered for sale on a commercial basis in the area. The small quantities of power available since 1963 have been disposed of on an interim basis. Construction is now in progress on the Rifle Gap Dam, located 7 miles northeast of Rifle, Colorado. This dam, in the oil shale area, was designed exclusively as an irrigation project facility and no benefits are foreseen for oil shale. The U. S. Geological Survey is continuing its water study in the Piceance Basin area, with results to be kept on open file as the study progresses.

No action has been taken on the applications for sodium prospecting permits on Federal oil shale lands. Spokesmen

for the Department of Interior state that sodium prospecting only complicates the process of resolving Federal oil shale land problems.

Ball Associates of Denver, Colorado has a contract to prepare a survey of the literature on tar sands and similar oil-impregnated deposits, under supervision by the U. S. Bureau of Mines. The tar sand leases and the tar sand prospecting permits currently issued for land in the Athabasca area of Alberta are tabulated in the text.

The U. S. Bureau of Mines has published Bulletin 611, "Oil Shale Mining, Rifle, Colorado, 1944-1956". This Bulletin makes available for the first time the research data obtained by the Bureau from its oil shale mining investigations at Rifle, Colorado. A review of this publication is presented.

An underground nuclear blast in dolomite was announced by the Atomic Energy Commission. This was the first underground nuclear detonation in carbonate rock. The formation of non-condensible gases, such as CO and CO_2, makes this experiment one of unique interest.

COLONY DEVELOPMENT COMPANY

Preface

Data concerning the formation and organization of the Colony Development Company, its oil shale land holdings, the company officers, and development plans announced by the company have been presented in detail in our earlier reports.

Prototype Plant Construction Progress

The prototype plant site is located about 14 miles north of Grand Valley, Colorado. Access is via an improved gravel-base secondary road from Grand Valley. For 10 miles, this road follows Parachute Creek and reaches the site of the Union Oil Company's shale oil plant which operated from 1955 to 1958. For the next two miles the road follows the Middle Fork of Parachute Creek. For the last two miles the road follows the East Middle Fork of Parachute Creek. The road is in good condition for the first 10 miles. From the Union Oil site to Colony, the road is still under construction. The Colony site is shown on Plate 4 and in Figure 1.

Power and telephone lines had been installed previously to the Union Oil site. The Public Service Company of Colorado is now building approximately four miles of 69,000 volt transmission line to Colony. Poles for the power and telephone lines are now in place. A framework to support a substation at Colony has been erected.

The Bechtel Corporation of San Francisco was awarded the contract for engineering and constructing the prototype plant. Bechtel will have about 170 men on the project until the completion date next March. Temporary offices have been set up. Levelling and grading work is underway, as is the placing of concrete. Steelwork will be underway in December. The road to the mine site is near completion.

Colony's original schedule called for the prototype plant to be ready for operation in March of 1965. A 30-day period

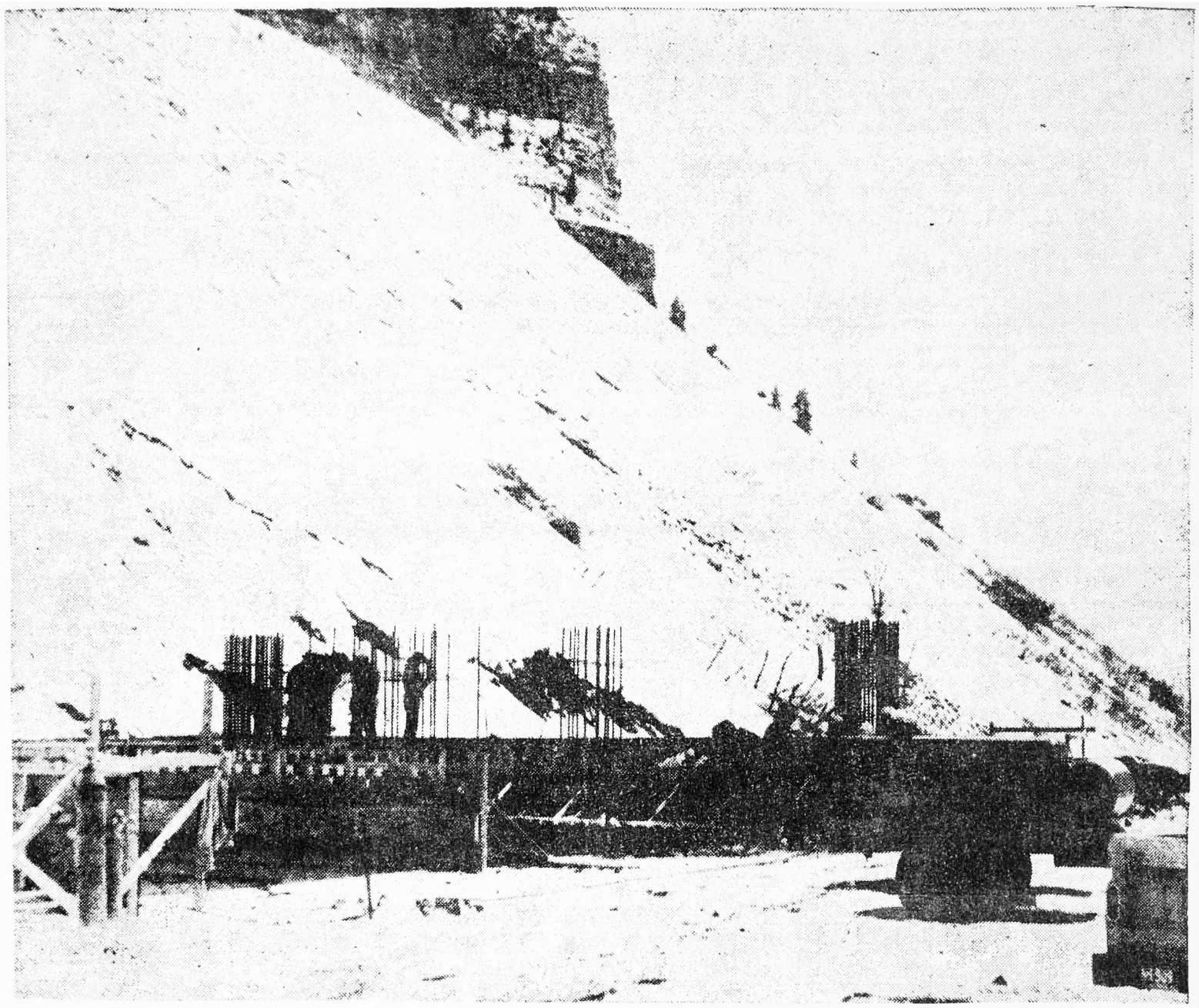


FIGURE 1

Prototype Plant Construction at the Site of
the Colony Development Company Project
(Photograph Courtesy of the Rifle Telegram)

of operation was then planned, during which time major decisions concerning the commercial phase will be made. There has been some slippage in the schedule, as completion of the prototype plant is now expected in May. We would anticipate that, owing to winter construction and other local conditions, it may be even later before the plant is in continuous operation.

General Developments

Some of the general plans of the Colony Development Company for access roads to the site of a future commercial plant were disclosed at a road conference held in Denver on October 7 and attended by company, state and national officials. This conference is reported in detail starting on page 38.

Colony hopes to dispose of the oil from its prototype plant at the gilsonite refinery owned by American Gilsonite Company and located near Fruita, Colorado, about 80 miles west of Colony. As yet, no firm price for the shale oil has been arrived at. The exact size of the prototype plant has not been announced, but the oil quantities discussed are in the 1000-barrel-per-day order of magnitude.

Simultaneously with the construction of the prototype retorting plant and the development of the commercial scale oil shale mine, detailed engineering studies are being made by Colony personnel on means for expanding the entire operation to commercial scale. One problem of considerable concern is the disposal of the finely-divided spent shale from the TOSCO retorts.

A TOSCO official stated that the commercial plant would process 60,000 tons per day of 38-40 gallons-per-ton shale by the TOSCO process. The properties of the retort oil and of the coked and hydrogenated synthetic crude are predicted to be:

	Retort Oil	Synthetic Crude
Gravity, °API	27	44
Pour Point, °F	0	--
Sulfur, wt.%	0.7	0.0
Nitrogen, wt. %	1.5	0.05

Production cost, exclusive of depreciation, is estimated at $1.00 to $1.30 per barrel of synthetic crude.

ANVIL POINTS OIL SHALE RESEARCH CENTER

In May of 1964 the Colorado School of Mines Research Foundation acquired a 5-year lease on the Government's experimental oil shale plant at Anvil Points. Socony Mobil Oil Company and Humble Oil and Refining Company entered into a cooperative research agreement and contracted with the Colorado School of Mines Research Foundation to perform research and development work at the Anvil Points facility. The publicly-announced two-stage program which is to be followed was presented in detail in our June 1, 1964 report.

Socony and Humble held open house and dedication ceremonies on September 14 marking the reactivation of the U.S.B.M. Oil Shale Demonstration Plant facility now named the Anvil Points Oil Shale Research Center. The open house program highlights are presented in detail in the Meetings and Conferences section of this report.

Four additional firms joined the project during the last two weeks of October. No additional companies can now join the venture as the closing date for new participants was October 29. The companies now constituting the research and development group at the Anvil Points Oil Shale Research Center are:

Lessee:	Colorado School of Mines Research Foundation, Inc.
Project Manager:	Socony Mobil Oil Company
Other Participants:	Humble Oil and Refining Co. Continental Oil Company Pan American Petroleum Corp. Phillips Petroleum Co. Sinclair Research, Inc.

Robert Cramer of Socony Mobil Oil Company was named Program Manager of the Oil Shale Research Center.

Socony Mobil and Humble are supplying the engineering and chemical research staff. The Colorado School of Mines Research Foundation is supplying the administrative and

operations staff. The companies that recently joined the group will not assign staff to participate directly in the research, but will be permitted to station observers at the plant and to share in what new discoveries are made. Progress reports will be made by Cramer to the entire body every two months.

Retorts Number 1 and 2, which were developed and used by the Bureau of Mines in its oil shale demonstration program from 1944 to 1956 will be used in the initial 18-month Stage I program now underway at Anvil Points. Retort Number 1 is shown in Figure 2 . This retort has been modified by the installation of improved feed and discharge control systems. The Number 2 retort also is being modified with improvements in its feed system.

Cramer, describing the program and activities at Anvil Points, said that:

> "Stage one will concentrate on gas combustion retorting. Studies will include investigation of such items as effect of shale particle size on yield, the criticality of uniform gas distribution, effect of cooling rate, and the amount of recovery of oil from a given amount of shale -- in short, areas of research directed at establishing the optimum balance of variables, the necessary retort design features, and at pinpointing potential operating problems. Mechanical models will be built to provide the basic design information needed to "scale up" existing, small retorts into much larger ones suitable for commercial production. The cost of the first-stage research is estimated at about $2,000,000 and costs will be paid by the six participants."

Cramer also said that:

> "The Socony Mobil Paulsboro Laboratory in Paulsboro, New Jersey, a group of chemical engineers, spent several years making fundamental studies of the chemical and physical phenomena encountered in the gas combustion process. After the fundamental data had been obtained, a mathematical model of the gas combustion retorting process was

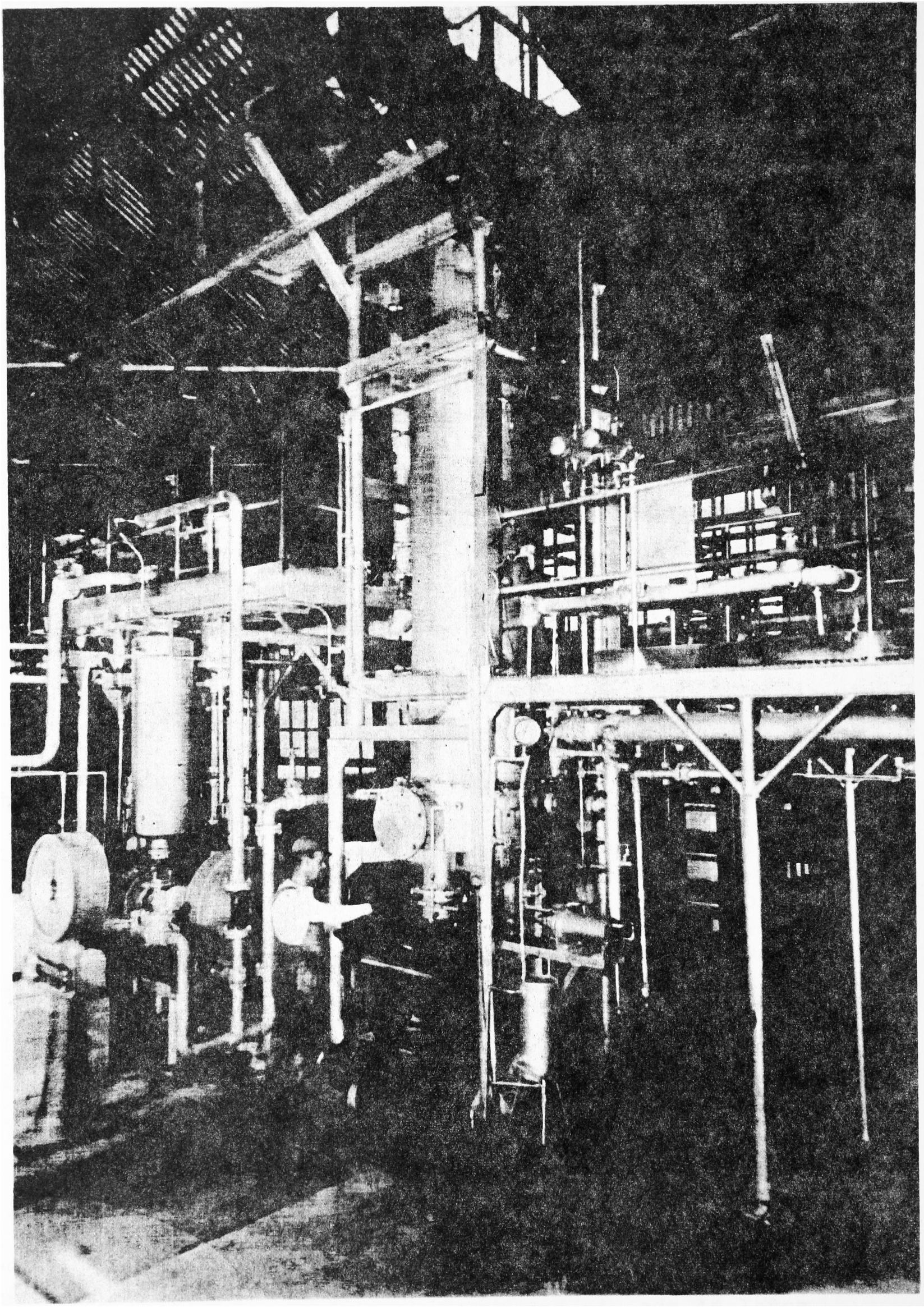


FIGURE 2

U. S. Bureau of Mines photograph of the No. 1 Gas-Combustion Retort at the Anvil Points Oil Shale Demonstration Plant

constructed and is now being used to simulate experimental runs on a 1410 computer and supplement the project's pilot plant work."

Concerning plans for commercial operations, Cramer said,

"We have no immediate plans for commercial production of shale oil. Until we complete our three-year program we probably won't know whether or not we will go into commercial production within the foreseeable future".

IN SITU RETORTING

Interest in in situ retorting now is centered on the deep lying oil shale beds. Although most activity is in the Piceance Basin in areas where the rich shale sections are thickest, some exploratory drilling has been done in the Uinta Basin where the shale is overlain by heavy cover. Sinclair's unsuccessful experiments at Haystack Mountain on thin shallow oil shale beds seem to have directed interest in in situ retorting away from outcrop areas. As yet there has been very little experimentation on actual in situ combustion of the deep shales.

The immediate research objectives seem to be two-fold; 1) to learn more about the nature of the oil shale formations by drilling, tests on cores and various well logging techniques, and 2) to learn how best to establish porosity, permeability and communication between holes.

Inquiry was made at each company that was known to have in situ projects in oil shale. Only meager information is available. For each in situ project, the available data are presented below.

Socony-Equity: Dayton Clewell, Vice President of Socony stated that, "Socony, with Equity, has been doing limited drilling and will do investigative testing of oil shale in situ methods". Our observations indicate that holes have been drilled in what appears to be a 5-spot pattern which measures about 300 feet on a side. Two small buildings which contain various instruments are at the site. The project is located in T3S, R98W on Black Sulphur Creek. Figure 3 presents a view of the Socony-Equity in situ operation.

Humble Oil: Don Geiger, Coordinator for the Shale Oil Project of Humble Oil, stated that the only public information available

Humble Oil (Cont.) is that "Humble has drilled three holes for in situ work on the Love Ranch oil shale property in the Piceance Basin"...Our observations are that some fracturing work has been tried. The Humble project is located in T2S, R97W.

Shell Oil

No data on Shell's in situ operation were available from the company. Shell drilled its Utah State leases in the Uinta Basin this past year. There was no known activity on Shell's fee land in Colorado although unpatented mining claims under option to Shell in the Cathedral Bluffs area were drilled extensively. (The Cathedral Bluffs probably is a mining prospect rather than in situ).

Sinclair Oil:

Bruce Grant, Director of Sinclair's Tulsa Laboratory, stated that he does not have "thing number 1" to report on his company's in situ project. Sinclair has drilled a 3-spot pattern for an in situ experiment on its fee-hold property located at T1S, R98W, Section 21. Figure 4 presents a view of the Sinclair in situ test site. One hole can be seen to the left of the man, one is to the right of the compressor, and the third is located behind the compressor and is marked by a tall, light-colored pipe which extends from the hole.

Sinclair and Pan American also are exchanging information from their drilling programs in the Piceance Creek area. Pan American has a seven-well core-drilling program in progress on oil and gas leases in the same general area as the Sinclair fee-holds.

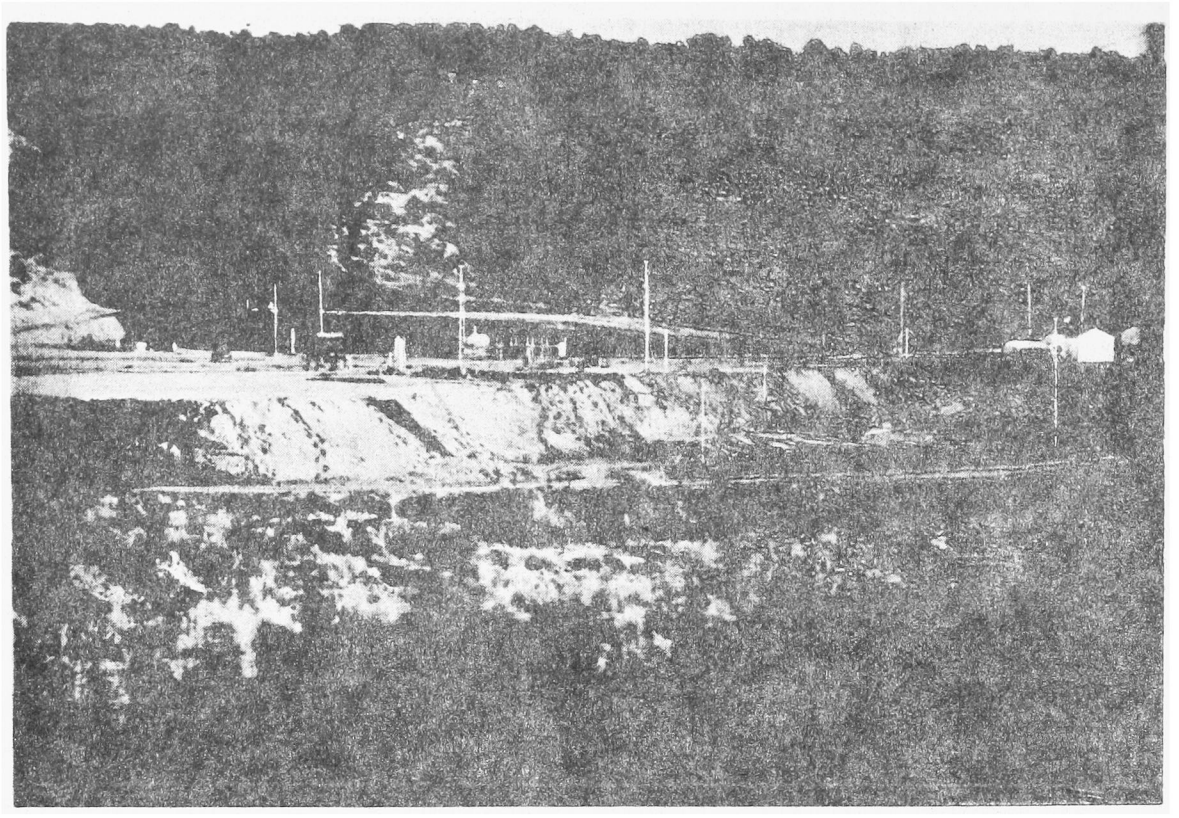


FIGURE 3

Site of Socony-Equity's Oil Shale *In Situ* Project

November 1964

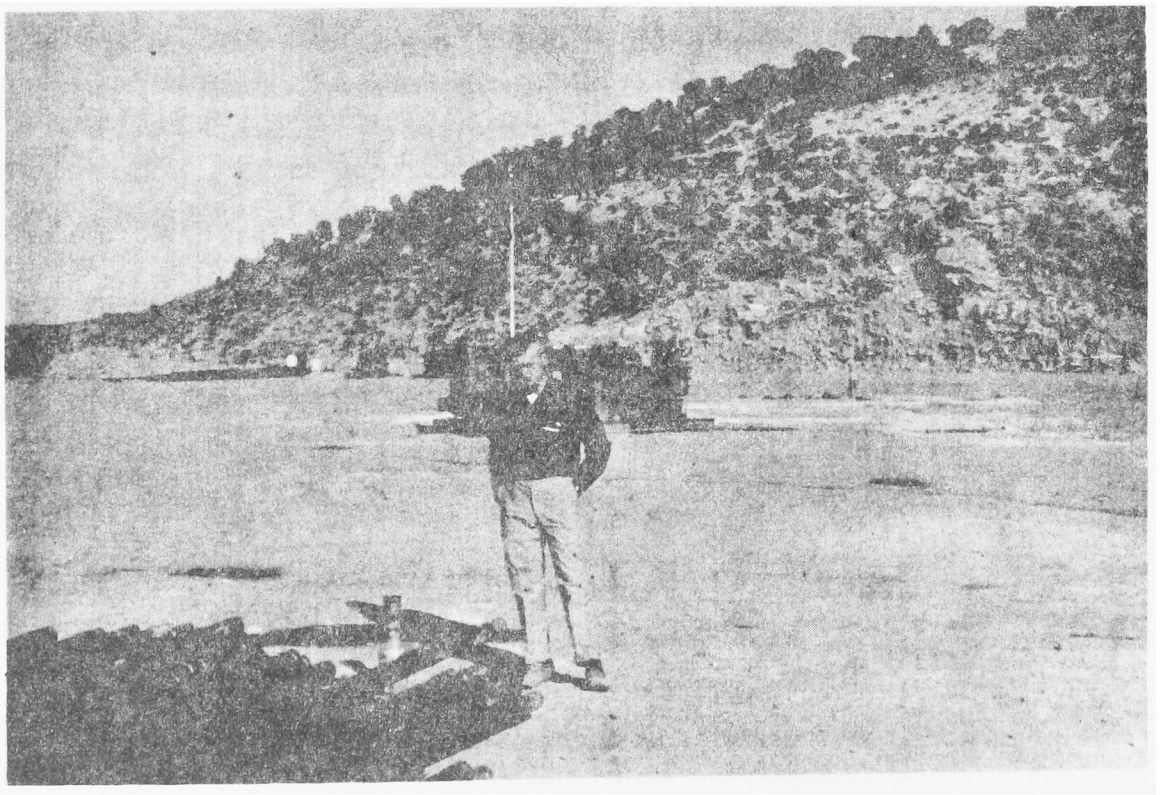


FIGURE 4

Site of Sinclair's Oil Shale *In Situ* Project

November 1964

U. S. Bureau of Mines: G. U. Dinneen, Director of the Laramie Petroleum Research Center, stated that the Bureau of Mines does not have an active field experiment. They are conducting laboratory tests for determining certain properties of oil shale in an effort to derive data that could be of use in a field experiment. Some electrolinking work is underway, on a modest scale. Laramie has studies underway visualizing the use of nuclear detonations in oil shale, and has men observing the nuclear detonations that are occasionally set off by other agencies.

UNITED STATES GOVERNMENT

BLM Challenge of Twelve Selected Oil Shale Mining Claims

On September 8, 1964, the Colorado office of the Bureau of Land Management mailed charges challenging the validity of twelve selected oil shale mining claims in Garfield County, Colorado. Legal notices, first published in the Rifle Telegram on September 17, 1964, stated that the contestant (BLM) has issued a complaint requesting that the claims be declared null and void. The last date of publication of legal notices was October 15, 1964. Contestees were allowed 20 days after the last date of publication to file answers to the complaint. At the request of the contestees, an additional 30 days have been allowed for filing of answers.

After answers are filed, an effort will be made to hold a pre-hearing conference of lawyers to reduce issues that will be presented at hearings to be conducted by BLM examiners. These hearings will be public, but probably will not be scheduled before January of 1965.

Due to similar facts and issues of law involved, the validity of several thousand unpatented oil shale mining claims may be determined by the final decision to be obtained on these twelve contested claims. The final administrative decision, if adverse to the claim holders, may be appealed to the courts.

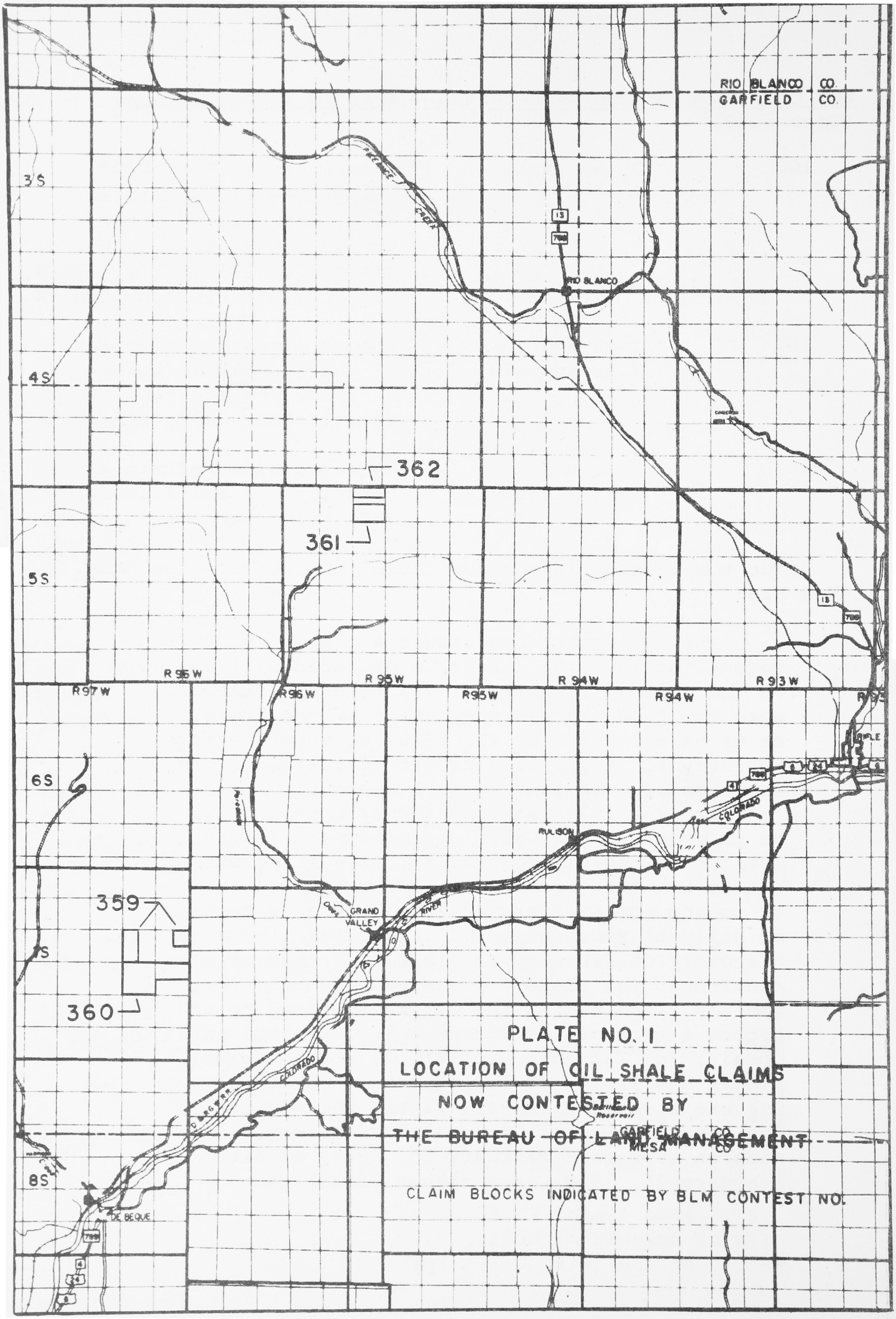
The twelve claims involved in the BLM contests are listed below and are shown on Plate No. 1.

BLM Contest Number	Contestee	Name and Location of Claims
359	Frank Winegar	Mineral Entry #C-023661 comprising placer claims Mountain Boy Nos. 1, 6 and 7, NE1/4 Section 13; N1/2 NW1/4, Lot 1, Tract 105A, E1/2 SW1/4, Lots 2, 3, Tract 105B in Section 14 all in T7S R97W, 6th PM.

360	D. A. Shale	Mineral Entry #C-050459 comprising placer claims K. C. Schuyler #2, 3 and Harold Shoup #1 to 4, NE1/4, NW1/4 S24; SE1/4NE1/4, NW1/4, S23 all in T7S, R97W, 6th PM.
361	Joan and John Savage	Placer claims Hoffman Nos. 42 and 43, S1/2S1/2 and N1/2S1/2 respectively of Sec. 4, T5S, R95W, 6th PM.
362	Joan and John Savage	Placer claims Hoffman #45, Lots 1, 2, 3 and 4 in S4, T5S, R95W, 6th PM.

The BLM charges in each of these contests are the same. They are:

> "The contestant has issued a complaint requesting that the claims be declared null and void on the following charges: (a) Valuable minerals were not found within the limits of the claims on or before February 25, 1920, or subsequent to February 25, 1920, as a result of diligent, prosecution of work leading to a discovery on February 25, 1920, and thereafter continued so as to constitute a valid discovery within the meaning of the mining law; (b) If a valid discovery was made on or before February 25, 1920, or subsequent to February 25, 1920, as a result of diligent prosecution of work leading to a discovery on February 25, 1920, and thereafter continued, the discovery was subsequently lost and the lands within the claims reverted to and became a part of the vacant unappropriated public domain; (c) Valuable minerals do not now exist within the limits of the claims so as to constitute a valid discovery within the meaning of the mining law; (d) If a valid discovery was made on or before February 25, 1920, or after February 25, 1920, as a result of diligent


RIO BLANCO CO.
GARFIELD CO.
3S
4S
5S
6S
8S
RIO BLANCO
362
361
359
360
R 97 W
R 96 W
R 95 W
R 94 W
R 93 W
RULISON
GRAND VALLEY
COLORADO
DE BEQUE
PLATE NO. 1
LOCATION OF OIL SHALE CLAIMS
NOW CONTESTED BY
THE BUREAU OF LAND MANAGEMENT
CLAIM BLOCKS INDICATED BY BLM CONTEST NO.

> prosecution of work leading to a discovery on February 25, 1920, and thereafter continued the claims were subsequently abandoned and the lands within the claims reverted to and became a part of public domain. The contest is pending in the Colorado Land Office, Bureau of Land Management, U. S. Department of the Interior, 700 Insurance Exchange Building, 910 - 15th Street, Denver, Colorado, 80202. Unless the contestees file an answer to the complaint in said office within 20 days after the last publication of this notice, the charges will be taken as admitted and the contest will be decided without a hearing."

As mentioned in our September 1 report, Congressman Wayne Aspinall, chairman of the House Interior and Insular Affairs Committee, obtained a letter statement from Secretary of the Interior Udall that the Department would, in future oil shale contest proceedings, assert all grounds for contest of the claims in one proceeding. This would permit a complete and final review by the Department and would permit the claimant to seek review of any adverse decision in one action in which all of the issues would be for the Court.

Presumably, the BLM contests against these twelve selected oil shale mining claims contain all grounds for contest of these claims by the Department of Interior. The grounds for contest appear to have been patterned after the April 17, 1964 Memorandum of Instructions to the BLM from the Secretary of Interior regarding validity of oil shale claims. This memorandum, reproduced from the Congressional Record, was presented in the Appendix of our September 1 report.

Establishment of a Public Land Law Review Commission

On September 19, 1964 the President signed H.R. 8070, (78 STAT. 982), an act for the establishment of a Public Land Law Review Commission to study existing laws and procedures relating to the administration of the public lands of the United States.

The declaration of purpose, Section 2 of this Act, states that because the public land laws of the United States have developed over a long period of years through a series of Acts of Congress which are not fully correlated with each other, it is necessary to have a comprehensive review of those laws and to determine whether and to what extent revisions are necessary.

This Act establishes a commission to be known as the Public Land Law Review Commission. The Commission is to be composed of 19 members, as follows:

(a) Three majority and three minority members of the Senate Committee on Interior and Insular Affairs to be appointed by the President of the Senate. These members have been appointed. They are:

Senator Jackson (D-Washington)
Senator Anderson (D-New Mexico)
Senator Bible (D-Nevada)
Senator Kuchel (R-California)
Senator Allott (R-Colorado)
Senator Jordan (R-Idaho)

(b) Three majority and three minority members of the House Committee on Interior and Insular Affairs, to be appointed by the Speaker of the House of Representatives. These members have been appointed. They are:

Representative Aspinall (D-Colorado)
Representative O'Brien (D-New York)
Representative White (D-Idaho)
Representative Saylor (R-Pennsylvania)
* Representative Kyle (R-Iowa)
Representative Burton (R-Utah)

*Defeated in recent election, replacement unknown.

(c) Six persons, to be appointed by the President of the United States, who are not officers or employees of the United States. These members have not yet been appointed.

(d) One person, elected by majority vote of the other eighteen, who shall be the Chairman of the Commission.

The duties of the Public Land Law Review Commission are set forth in the Act. In summary form, these duties are to:

(a) Study existing regulations governing retention, management and disposition of public lands.

(b) Review policies and practices of the Federal agencies having jurisdiction over such lands insofar as such policies relate to retention, management and disposition of these lands.

(c) Compile data necessary to understand and determine the various demands on the public lands.

(d) Recommend modifications in existing laws.

The Commission will submit its final report to the President and to Congress not later than December 31, 1968. The Commission will cease to exist six months after submission of its report.

A copy of this Act is presented in the Appendix.

Because of the complexity of the problems involved relating to Federal oil shale lands, it seems quite likely that the formation of a Federal policy for development of oil shale resources will await the findings and recommendations of the Public Land Law Review Commission. During the period of time that the Public Land Law Review Commission is in existence, it may be difficult for the Interior Department to formulate major administrative policies affecting Federal oil shale lands.

"Oil Shale" Civil Actions in the United States District Court for Utah

There are no Civil Actions concerning oil shale land in the Federal Court, District of Utah.

"Oil Shale" Civil Actions in the United States District Court for Colorado

Currently there are six civil actions, which concern oil shale, that are on file at the United States District Court for Colorado. General data on each of the civil actions are presented in Table Number 1. The locations of the lands involved are shown on Plate Number 2.

Five of the civil actions name the Secretary of Interior of the United States as Defendant. These are actions by Plaintiffs who have exhausted their administrative remedies within the Department of Interior and have turned to the court in order to obtain patent rights to oil shale land against opposition by the Department of Interior. The principles involved were discussed in our previous report.

Civil Action Number 8682 is of a different nature. The Plaintiff in this action (Socony Mobil Oil Company) is asking the court to interpret an Option Agreement that Socony entered into with Wasatch Development Company (Defendant) on November 19, 1958, as a controversy exists between Plaintiff and Defendant as to their rights and obligations under the Option Agreement.

Wasatch is owner of a 50 percent interest in 11,360 acres of unpatented oil shale claims known as the "Sunset-Gabbs Block" and is the owner of 6,400 acres of unpatented oil shale claims known as the "Ten-Section Block". These "blocks" are shown on Plate Number 2. Socony desired to obtain an option on the Wasatch interests in these lands, and Wasatch was willing to give such option on the following terms: (not verbatim)

1. Upon execution of the Option Agreement, Socony paid Wasatch $278,000.

2. Wasatch agreed to file patent application on any lands not then covered by applications.

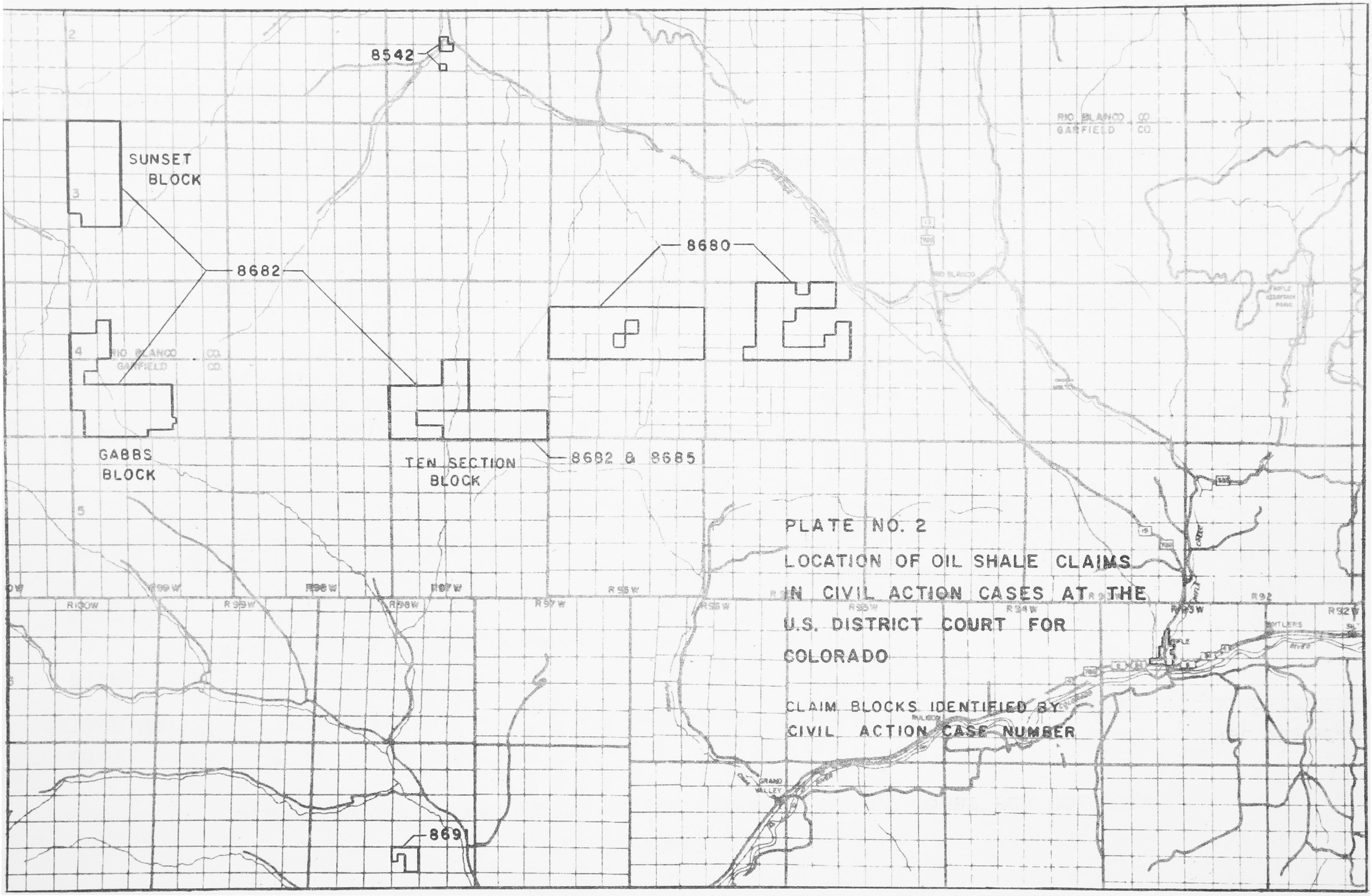
TABLE 1

OIL SHALE CIVIL ACTIONS IN UNITED STATES DISTRICT COURT FOR COLORADO

Civil Action No.	Plaintiff	Defendant	Land Status	Total Acres	Net Mineral Acres
8156	J. B. Umpleby Wasatch Development Company	United States	Unpatented Claims	640	640
8542	C. W. Brennan	United States	Patented Homestead (1)	160	160
8682	Socony Mobil Oil Company	Wasatch Development Company	Unpatented Claims Optioned to Socony in 1958	17,760	12,080
8680	The Oil Shale Corporation and Energy Resources Technology Land, Inc.	United States	Unpatented Claims, Patents Never Applied For	11,840	11,840
8685	J. B. Umpleby and Wasatch Development Company	United States	Unpatented Claims (2)	2,720	2,720
8691	J. W. Savage, et al	United States	Unpatented Claims (2)	440	440

(1) Patent from U. S. reserved nitrates and oil and gas minerals, but did not specifically reserve oil shale.

(2) Patent applications denied April 17, 1964.


8542
SUNSET BLOCK
8682
8680
GABBS BLOCK
TEN SECTION BLOCK
8682 & 8685
8691
RIO BLANCO CO.
GARFIELD CO.
PLATE NO. 2
LOCATION OF OIL SHALE CLAIMS IN CIVIL ACTION CASES AT THE U.S. DISTRICT COURT FOR COLORADO
CLAIM BLOCKS IDENTIFIED BY CIVIL ACTION CASE NUMBER

3. Lands of the Sunset-Gabbs Block, when patented, were agreed to have a value of $150 per net mineral acre. Lands of the Ten-Section Block, when patented, were agreed to have a value of $250 per net mineral acre.

4. When patents have issued on lands having a value of not less than $428,000 (determined in accordance with paragraph 3) Socony would have exclusive option to acquire all of the lands subject to the agreement upon payment of a total price of $2,452,000. The $278,000 referred to in paragraph 1 would be credited against the purchase price.

5. Socony would not be obligated to pay for lands which have not been patented.

6. In the event patents have not issued on lands aggregating in value $428,000 by October 1, 1964, or if Socony has not elected to exercise its option, then Wasatch shall return to Socony the sum of $278,000.

Prior to any court action, Socony notified Wasatch by letter, dated February 14, 1964, that Socony waived the requirement that patents aggregating a value of $428,000 shall have been issued prior to Socony exercising its option. This letter also notified Wasatch that Socony exercises its option to acquire all lands covered by the Option Agreement.

By letter dated May 13, 1964, Wasatch replied that Socony does not have any rights for immediately exercising the option to acquire the Wasatch interests. Wasatch advised that they will pay $278,000 to Socony to refund the initial Socony payment of the 1958 Option Agreement.

No trial date has yet been set for this civil action.

Activities of the Federal Oil Shale Advisory Board

During the period of this report, the Federal Oil Shale Advisory Board held two scheduled meetings. One meeting was held in conjunction with the Open House and Dedication Ceremonies at the Anvil Points oil shale facility owned by the government and located near Rifle, Colorado. The second meeting was held at Washington, D. C. during the period from November 30 through December 1. The meetings are discussed separately, below.

Meeting at Anvil Points
September 13, 1964

The Oil Shale Advisory Board met in public session during the open house and dedication ceremonies at the Anvil Points facility. At the conclusion of the ceremonies, the Board re-convened in executive session for discussions with Secretary Udall and with Assistant Secretary Kelly. A paper, by V. E. McKelvey, Assistant Chief Geologist for Economic Geology, Department of Interior entitled, "Economic Problems Attending Oil Shale Development", was presented to the Board. Some space will be taken here to present the salient thoughts presented by McKelvey in this Interior Department paper to its Oil Shale Advisory Board.

McKelvey stated that the critical questions facing the government in its consideration of the oil shale development problem are those of evaluating the economic advantages and disadvantages of developing a tremendously large source of energy. Also, since we have alternate sources of energy, the case for development of oil shale must rest on economic benefits expected from a lower cost for shale oil and from increased diversity in energy sources. The enormity of the oil shale reserves was said to be the source of several problems. These include the economic hazards stemming from an energy monopoly on the part of a single source and the equally-worrisome hazards associated with private control of such enormous volumes of oil. McKelvey mentioned the likelihood of indirect costs to the nation if a new source of energy gained prominence, arising from the dislocations of defeated industries and their labor forces. The case for oil shale development cannot be laid, according to McKelvey, on the physical need for another source of energy. McKelvey's conclusions were:

1. There is not now a need for new supplies of oil that has to be met by shale oil production.

2. If shale oil is to compete economically with domestic and foreign sources of petroleum, its production technology will have to advance beyond its present state.

3. Existing domestic sources of oil will be a major contributor to our energy-mix for the next two decades and perhaps longer.

4. We need not fear that oil shale would be monopolistic for many years.

5. The high concentration of oil equivalent per acre and the high investment required for production pose the danger that the number of producers (competitors) in an oil shale industry would be small.

6. Economic production of shale oil is not possible now but research and development will bring it into the competitive realm.

While in executive session, the Board was addressed by Dr. James H. Gary, of the Colorado School of Mines, who spoke on "Technology of In Situ Recovery of Oil From Shale". Since this is an unpublished paper and because of the limited data on in situ work, Gary's paper will be briefly reviewed here.

Gary first discussed the promise of in situ recovery of oil from shale on an operations scale equivalent to 50,000 barrels of oil/day. He then presented data on in situ tests at Haystack Mountain by the Sinclair Refining Company. At the Sinclair test site, hole spacing was said to be 50 feet between injection and recovery wells. The advantages and disadvantages of co-current and counter-current combustion in situ processes were discussed. Gary stated that in the Sinclair co-current process, the heavy, viscous crudes cooled rapidly in the ambient temperature formations in advance of the heat front, causing fluid blocking and loss of gas permeability. In one well, pressure was said to have built

up from 195 psi to 1000 psi in 3-1/2 hours. The shale oil produced by the Sinclair tests had a pour point in the neighborhood of 35°, somewhat lower than the 90 to 100°F pourpoints of oil produced from retorts. The possibility of using a steam-extraction process was discussed, with advantages of such a system said to be:

1. Higher recovery because no combustion occurs during pyrolysis.

2. Gases produced are concentrated.

3. Higher quality product produced because of more even temperatures during pyrolysis.

Sinclair was said to have used air fracturing techniques at Haystack Mountain. However, an extensive system of natural fractures existed. Sinclair's wells were said to be of shallow depth - approximately 300 feet.

Meeting at Washington, D. C.
November 29 - December 1, 1964

It was announced on November 13 by J. L. Fisher, Chairman of the Federal Oil Shale Advisory Board, that the full Board will meet in Washington, D. C. on November 29 - December 1 to hold a limited number of interviews with interested persons. The interviews, Fisher's announcement stated, were to be with representatives of firms that have made proposals to the Department of Interior for commercial shale oil development, and with representatives selected for their special competence by industry associations and professional societies.

The format of the meeting was to have representatives of the various groups appear before the complete board for periods of about 10 minutes each, with these hearings being closed yet informal, permitting free expression of opinions by the representatives. Each representative was then to be available to the Board for questions by the various members of the Board. A completely frank and uninhibited exchange of information is desired.

The general program of the Board meeting, and the groups invited to appear before the Board are presented below:

Sunday, November 29, 1964

Executive Session of the Oil Shale Advisory Board

Monday, November 30, 1964

Shell Oil Company
National Resource Council
Rocky Mountain Oil and Gas Association
The Oil Shale Corporation
Humble Oil and Refining Company
Colorado Governor's Oil Shale Advisory Committee
American Chemical Society

Tuesday, December 1, 1964

Socony Mobil Oil Company, Inc.
Valley Association
Sinclair Oil Company
Union Oil Company
National Coal Association
American Institute of Mining & Metallurgical Engineers
American Gas Association

The American Chemical Society is being asked to have available an expert who will be willing to discuss recovery of petrochemicals from oil shale. The American Gas Association is being asked to provide someone who can talk on and answer questions concerning gas from oil shale. From the Mining Branch, American Institute of Mining, Metallurgical and Petroleum Engineers it is hoped to get an expert from a leading mining organization, such as Utah Construction and Mining Company, to be able to talk about and answer questions on mining. From the National Coal Association it is hoped that someone from a major coal company, such as Consolidation Coal, will be provided. The Valley Association was asked so that a representative from a local group of landowners could be available.

Dr. Orlo Childs, President of the Colorado School of Mines, one of the Board members, stated that additional

meetings will be held with industry groups. These later meetings will be held in various areas of the country utilizing sub-committees formed of two or more members of the Board, with Childs and Mock serving the Mountain area, Galbraith and Gavin serving the New York area, etc. The dates of later meetings and the composition of the sub-committees have not been finalized. Childs stated that "full exposure" of the Oil Shale Advisory Board to all matters of interest is desired.

Fisher's announcement also stated that he anticipates than an interim report of the Oil Shale Advisory Board will be submitted to Secretary Udall shortly after the first of the year and that Secretary Udall will make it available for public comment.

Modification of the Utah State Oil Shale Lease Form

The Utah State Land Board held a public meeting on August 19, 1964 and received testimony and statements from interested parties concerning recommendations for modifying the Utah State Oil Shale Lease Form. Our September 1 report contains reproductions of written recommendations which were submitted at that time.

After the public hearing, the Utah State Land Board forumlated certain modifications to the State's oil shale lease form. By letter dated September 3, 1964, Max Gardner, Director of the State Land Board, transmitted these tentative modifications to A. P. Kesler, Attorney General for Utah. In his letter of transmittal, Gardner stated that any lease modifications will be predicated on the notion that the present oil shale lease form is too onerous to foster oil shale development.

A copy of Gardner's letter of September 3 is presented in the Appendix. In summary form, the proposed modifications to the Utah State oil shale lease form were:

1. A primary term of 20 years.

2. Royalty rate of 5 percent of the gross value of the products for first five years of commercial production. Rate to graduate at a rate of 1 percent per year maximum until a 12-1/2 percent royalty is reached.

3. A unitization clause authorizing unitization of State lands with other lands.

4. Rental of 50 cents per acre for first ten years, to graduate to $1.50 per acre for the second ten-year period. Rentals to be a credit on any royalty for each year.

5. The research and development provisions of Section 5 of the old form to be eliminated.

By letter dated October 13, 1964, the Utah Attorney General answered the provisions and questions set out by the State Land Board. A copy of this letter is presented in the Appendix. In summary form, the Attorney General's opinions were:

1. The State Land Board is presently empowered to issue mineral leases and is not prohibited from issuing a lease for a period of 20 years.

2. There appears to be no objection to the board issuing a lease with a unitization clause.

3. The royalty provisions would not be objectionable.

4. The rental provision of 50 cents per acre is in general accord with the Utah Code.

5. There is no objection to deleting Section 5 of the present lease form.

6. Modifications to existing leases would require considerations flowing to the State.

The Utah State Land Board met on October 14, 1964 and decided to go ahead with the proposed modifications to the oil shale lease form. It is planned that applications will be circulated to holders of oil shale leases, the applications to be executed by the lessee and submitted to the Land Board, making the modifications. The modifications would then be encompassed in the existing leases in the form of an addendum. In view of the Attorney General's opinion, a consideration will be charged for making the modifications.

It was the consensus of the Land Board that any further public hearings on these proposed modifications would be unnecessary. However, if there is any indication from the industry that another hearing is necessary, it is a certainty that the Board would hold one.

Developments Affecting State Selection of Mineral-Rich Lands

Utah State Land Board figures place at 358,000 acres the amount of Federal lands that can still be deeded by the

Federal government to the State of Utah to fulfill Utah land ownership rights conferred by Federal law when Utah became a state. With statehood, Utah was entitled to four sections of land in every township, but possession couldn't be completed until the sections were surveyed. Because of prior rights, the four sections in every township, usually sections 2, 16, 32 and 36, were not always available as surveys were completed Consequently, the State has been selecting sections in other parts of the public domain as indemnities.

In the 1950's, selection came almost to a halt becuase the Federal government would allow only non-mineral surface title. In 1958 and in 1960, Congress passed legislation clearing the way for mineral-base indemnity land selections by Utah. The substance of the Indenmity Selection Laws can be found in Secs. 851 and 852, Title 43, U.S.C. Annotated. Since 1961, land acquisitions by Utah, that are considered valuable, include 1238 acres in coal near Price, 1256 acres in gilsonite near Bonanza, about 9000 acres in oil shale in Uintah County and 2341 acres in potash in the Cane Creek area southwest of Moab.

Since the acquisition by Utah of the very valuable Cane Creek potash lands, the site of Texas Gulf Sulphur Company's potash facility, the Federal government has evidently changed its policies toward such acquisitions.

On February 11, 1963, Representative Wayne Aspinall, Chairman of the House Committee on Interior and Insular Affairs wrote to Secretary of Interior Udall suggesting that Interior should refrain from opening, for state selection, other mineral-rich lands until Congress has had an opportunity to consider the matter. Aspinall also suggested that Interior should make recommendations for legislation as it believes necessary or desirable concerning state selection of lands containing solid mineral materials. A copy of the letter of February 11, from Aspinall to Udall is presented in the Appendix.

By letter dated February 15, 1963, Secretary Udall replied to Representative Aspinall and stated that Interior would maintain a status quo with respect to state selection of lands until the

respective committees have had an opportunity to make a re-evaluation of the problems. A copy of Udall's letter is present in the Appendix.

On February 27, 1964, Karl Landstrom, who was then Director of the Bureau of Land Management, issued Instruction Memo No. AD-Land M-3 to all State Directors. This memo, reproduced in the Appendix, instructed State Directors to refrain from opening for selection any "mineral-rich" lands.

The directive of February 27, 1963, governed the actions of the Utah Director for the Bureau of Land Management from that date. Max Gardner, Director of Utah's State Land Board said that so long as this directive is in existence, it will block transfer of title to Utah of all "mineral rich" applications. Gardner stated that the Bureau of Land Management has suspended action on selection areas such as Asphalt Ridge, and he anticipates that it would also suspend any actions on selection of oil shale acreage. Gardner also stated his feeling that this Interior Department action is not legal.

The Department of Interior subsequently transmitted to the Congress an Executive Communication (1865) dated March 19, 1964, recommending the enactment of legislation. This Executive Communication was referred by the Speaker of the House to the Committee on Interior and Insular Affairs. At the Interior Department's request, Representative Aspinall introduced the legislation proposed by the Department as H.R. 10699. A copy of H.R. 10699 is presented in the Appendix. This is a bill to amend sections 2275 and 2276 of the Revised Statutes with respect to lands granted to the States. Specifically it proposes that no mineral lands believed to contain mineral deposits may be selected by a State, or that the mineral lands selected shall not exceed in value to the value of the lost lands for which they are to indemnify the State. Also, the respective values of the selected lands and the lost lands shall be determined by the Secretary of the Interior.

This bill, H.R. 10699, died with the adjournment of the 88th Congress. Max Gardner stated that he fully expects that this Interior Department-sponsored bill will be introduced again and that the State of Utah shall oppose it.

Utah State Oil Shale Lands Under Lease

A review of Utah State Land Office records concerning State-owned oil shale lands under lease was made in mid-October, 1964. The total acres of State oil shale lands under lease are 169,884. The location of the leased oil shale lands is shown on Plate 3. No State-selection oil shale land has been acquired by Utah from the Federal government during this reporting period of September-October-November, 1964.

The numbered areas, shown on Plate 3, are identified in the tabulation presented below.

Number	Lessee
1	National Farmers Union
2	A. N. Henderson
3	John Morgan
4	Shamrock Oil
5	Frank Allen
6	Dan W. Johnston
7	Dolores Marx
8	R. J. Hollberg
9	Justheim Petroleum
10	Wm. Stevenson
11	J. D. Archer
12	J. H. Morgan, Jr.
13	Nuclear Processing
14	Skyline Oil
15	Forest Oil Corporation
16	Esdras Hartley
17	John Osmond

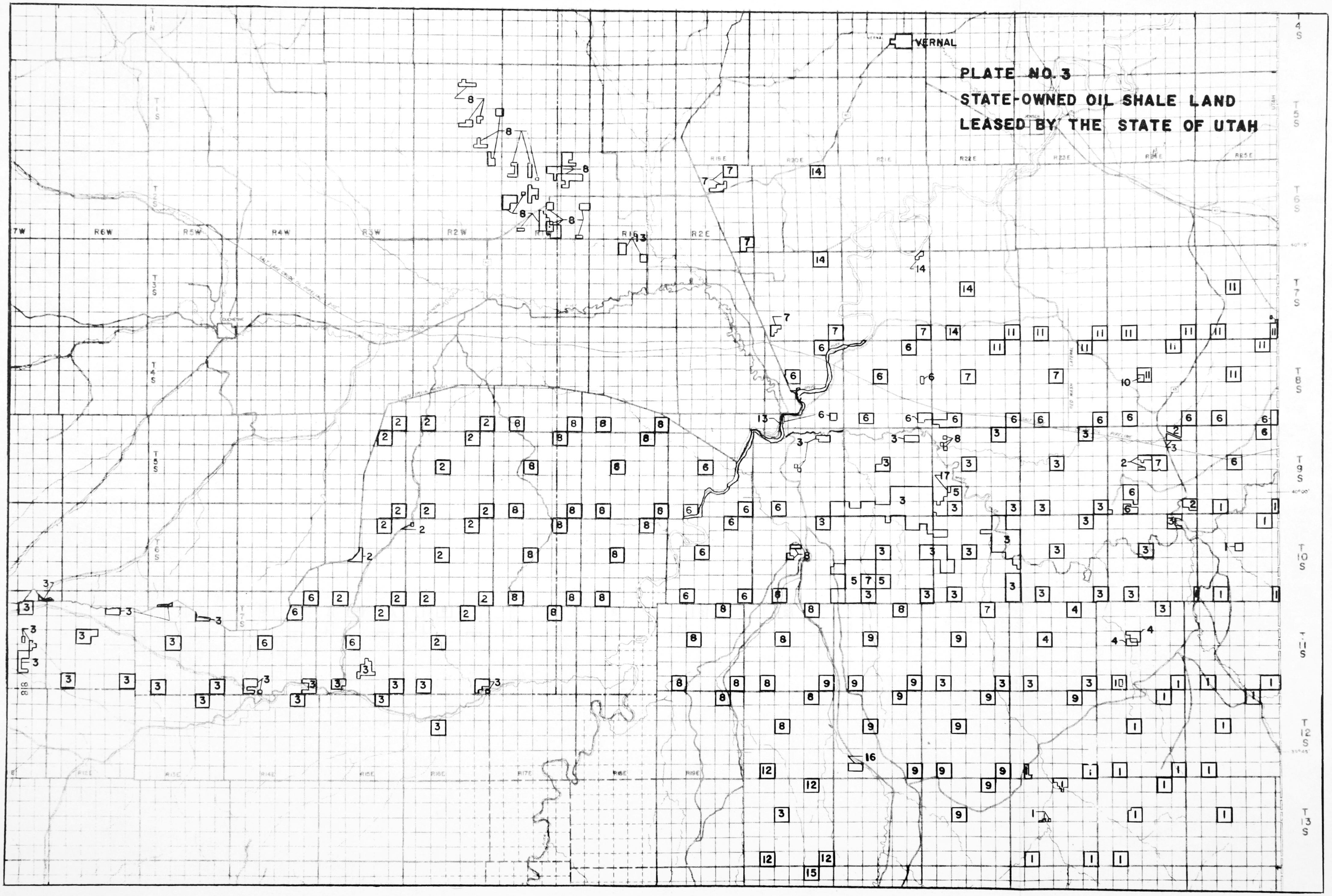


PLATE NO. 3
STATE-OWNED OIL SHALE LAND
LEASED BY THE STATE OF UTAH
VERNAL
COLCHESTER
R7W
R6W
R5W
R4W
R3W
R2W
R1W
R2E
R3E
R4E
R5E
T1S
T2S
T3S
T4S
T5S
T6S
T7S
T8S
T9S
T10S
T11S
T12S
T13S
4S
5S
6S
7S
8S
9S
10S
11S
12S
13S

Governor's Oil Shale Advisory Committee

The Taxation Subcommittee of the Governor's Oil Shale Advisory Committee met in Denver on October 27. This committee is actively studying the evaluation and taxation problems for oil shale lands. The immediate objectives of this study are to set forth the problems concerning taxation of producing and non-producing oil shale lands, spell out recommended statutory changes in the tax laws after conferring with the Rocky Mountain Oil and Gas Association and the Colorado Mining Association and to put interested companies on notice of the taxation problems that exist.

Study of Access Road Problems in the Oil Shale Area

At the request of Captain K. C. Lovell, Director, Naval Petroleum and Oil Shale Reserves, a preliminary meeting of Federal, State, County, Industry and Naval representatives was arranged to consider the problem of road access to the oil shale areas. This preliminary meeting was held on October 7, 1964 at the offices of Mr. Richard T. Eckles, Coordinator of Natural Resources for the State of Colorado. Those in attendance were:

R. T. Eckles, Coordinator of Natural Resources, State of Colorado
E. E. Young, Colony Development Company
Lowell A Noren, Garfield County Commissioner
Charles E. Shumate, State Highway Department
Ivo E. Shults, Rio Blanco County Commissioner
Frank G. Cooley, Meeker County Attorney
John B. Jones, Jr., Cameron and Jones, Inc.
Don Friedman, State Representative
Capt. K. C. Lovell, Director, Naval Petroleum Reserves
W. H. Teller, Bureau of Land Management
Hugh L. Caldwell, Rio Blanco County Commissioner

Capt. Lovell opened the meeting listing some of the problems that he sees in the development of oil shale. Major items mentioned were that now is the time for proper planning of

highways, city locations, etc., to permit orderly development of all public facilities. The Navy has had problems in the past in getting public access to the Naval oil shale reserves. The Navy has desired access along the top of the plateau coming in from the Piceance Creek side of the mountain. The Navy's only access has been jeep transportation over the Navy's trail and it is desirous of having better, more permanent roads.

Major access roads into the oil shale area now consist of the gravel road from Rio Blanco to White River, and the "dead end" roads going northerly from Grand Valley and from DeBeque. The problem of building additional roads of high standards is compounded by the topography of the area.

In general terms, the availability of funds from various sources for road construction in this area was discussed. Captain Lovell indicated that the Navy may be able to provide funds to assist in road construction from Rio Blanco up McCarty Gulch and to the Naval Oil Shale Reserve along the top of the plateau. He also suggested that the Bureau of Public Roads may be able to make funds available for roads in the area. Shumate, Chief Highway Engineer for the State of Colorado, indicated that there are $33 MM available for next year in the Bureau of Public Roads special project fund.

Colony Development Company revealed some of its road-building plans. Colony has an option on Standard Oil of California's property on Roan Creek and a temporary easement along Union Oil's property for access to the Colony prototype plant site. This temporary easement was given by Union on condition that Colony may be required to relocate the road when and if the road interferes with disposal of spent shale from commercial oil operations by Union.

Additional road plans disclosed by Colony are that its investigations show it would be desirable to have commercial plant access via a road across the top of the mesa. Colony is about to finalize right-of-way arrangements across private property for such a road. This access road would leave the Piceance Creek highway at McCarty Gulch. Colony is presently selecting and staking the right-of-way for this road. It will climb to the top of the mesa, will then keep essentially on level ground while passing through the Naval Oil Shale Reserve to end at a point about one-half mile above the site of the

Colony prototype plant. The road will end at the site where the Colony commercial plant will ultimately be located, on top of the mesa. Presently, however, Colony does not wish to have a public road all the way to its commercial plant site. Evidently, Colony would welcome assistance in providing the access road to the Naval Oil Shale Reserves. At such time as its commercial plant is working, Colony would consider converting its private access road to a public road. Colony indicated it was willing to go it alone on the road-building program. Actual road construction by Colony would start only after its decision is made to go to a commercial plant from the prototype plant program now underway.

Shumate estimated that the cost for construction of a 22-foot wide paved road on a 26-foot wide base from McCarty Gulch to the Naval Oil Shale Reserve would be $65,000 per mile, and that the maximum grade would be about 7 percent.

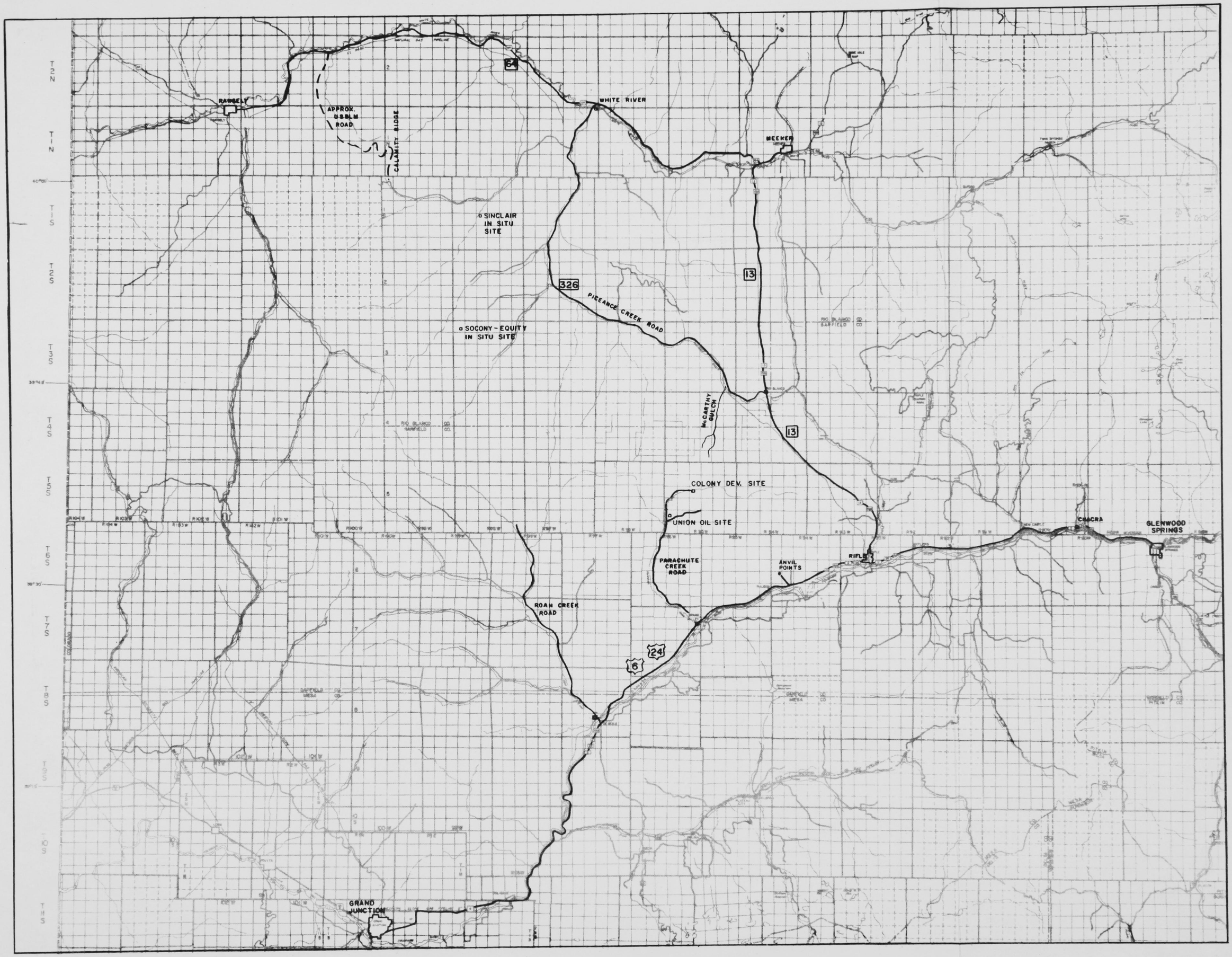
Teller, of the Bureau of Lang Management, indicated that the BLM is building a road from Rangely to Calamity Gulch, which approaches the northern oil shale area. This road will be 16 feet wide and will have a maximum grade of 10 percent. Teller indicated that the BLM has a policy of granting easements for road construction across unpatented claims.

The State program for major roads near the oil shale area includes plans for completion of the Interstate highway between Grand Junction and Glenwood Springs in 1969. The State is about ready now to let construction contracts for this highway between Glenwood Springs and Chacra, which is seven miles west of Glenwood Springs. A contract probably will be let in 1967 for the portion of this highway between Chacra and Rifle. The State has no plans for relocating any portion of State Highway 13, the black-topped highway between Rifle and Meeker.

Rio Blanco County has requested State assistance for improvement of the road along Piceance Creek between Rio Blanco and White River, but indications are that funds for this improvement will not be available.

Charles E. Shumate was selected to coordinate roadbuilding plans of the various groups interested in roads in the area.

The main access roads to the oil shale areas of Colorado are shown on Plate Number 4.


RANGELY
APPROX. U.S.B.L.M. ROAD
CALAMITY RIDGE
WHITE RIVER
MEEKER
SINCLAIR IN SITU SITE
326
PICEANCE CREEK ROAD
13
SOCONY - EQUITY IN SITU SITE
McCARTHY GULCH
COLONY DEV. SITE
UNION OIL SITE
PARACHUTE CREEK ROAD
ANVIL POINTS
RIFLE
CAMERA
GLENWOOD SPRINGS
ROAN CREEK ROAD
24
6
GRAND JUNCTION

Bureau of Mines Report of Investigations 6531, "Specific-Gravity to Oil-Yield Relationships for Black Shales of Kentucky's New Albany Formation", gives the results of assays on three cores of New Albany oil shale from widely separated points in south central Kentucky. The New Albany shale also is known as the Chattanooga shale and underlies hundreds of thousands of square miles from New York to Oklahoma and from Canada to Alabama.

The oil shale assayed averaged about 10 gallons per ton for sections from 39 to 99.5 feet in thickness. Individual one-foot samples varied from zero to almost 24 gallons per ton. The authors developed a correlation relating specific-gravity to oil yield to which most of the data conform. The relationship may have value in exploration on the New Albany (Chattanooga) shales but data from other areas would be highly desirable.

Specific Gravity to Oil Yield Relationship; Basis of a Field Method for Evaluation of Oil Shales

Because the specific gravity of the organic matter (kerogen) in oil shales is very near 1.0 and because the specific gravity of the inorganic minerals present in oil shales varies upward from 2.6, the organic content of an oil shale has a significant effect on the specific gravity of that oil shale. This useful relationship was recently pointed out in Report of Investigations 6431 entitled, "Specific Gravity to Oil-Yield Relationships for Black Shales of Kentucky's New Albany Formation". The report presents a curve, for this particular shale, showing the definite relationship between the specific gravity of the shale and the oil yield from the shale.

Similar curves for other oil shales can be derived using methods described in Report of Investigations 6531. Such curves offer a field method for estimating oil yields or organic contents of oil shales. Separate curves for each particular shale are necessary because the suite of inorganic minerals present in oil shales can vary widely. The presence of the mineral pyrite, which has a specific gravity of 5, can have a large effect on the curve for any particular oil shale. Data on the specific gravity to oil yield relationship for other oil shales are presented in references.

OIL SHALE

FOREIGN DEVELOPMENTS

Canada, Province of Manitoba

In the Province of Manitoba, the Sun Oil Company has been granted eight oil shale reservations covering 1,476,531 acres. One additional application from Sun Oil is still pending. One reservation, covering 118,560 acres, has been issued to Aquitaine Oil Corporation of Canada, Limited. Plate number 5 presents the locations of these oil shale lands.

> Note: Aquitaine is part owner of TOSCO, which, in turn, is one of the organizing partners of the Colony Development Company now active in Colorado.

In order to handle the oil shale applications, the Province of Manitoba amended its Regulations under "The Mines Act". The amendments were discussed briefly in our previous report. A copy of the amendment, which is Manitoba Regulation 42/64, is presented in the Appendix of this report.

Canada, Province of Saskatchewan

The Oil Shale Regulations for Saskatchewan, made under the Mineral Resources Act of 1959 have been finalized and passed since our last report. A complete copy of the Oil Shale Regulations is presented in the Appendix of this report. The salient features of the proposed regulations were included without change in the finalized regulations.

At the present time, applications for 6,900,000 acres have been made in areas in which oil shales are known to occur. Montreal Trust Company, Sun Oil Company and Bison Petroleum and Minerals, Ltd. have applications under the Petroleum and Natural Gas Regulations, and these applications will be

converted to permits under the Oil Shale Regulations. Neither the acreages that have been applied for nor the names of companies that have applied for permits under the Oil Shale Regulations will be disclosed by the Deputy Minister of Mineral Resources, Mr. James T. Cawley, until the procedures under the new regulations have been completed. At the time of our last report, acreages applied for were approximately as shown below:

Bison Petroleum	670,000
Montreal Trust	1,000,000
Sun Oil Company	3,500,000
Total	5,170,000

The present play on 6,900,000 acres indicates that interest in thes lands has continued, with an additional 1,730,000 acres being affected by applications within the last three months. It is believed that Montreal Trust Company is acting for other companies.

OIL SHALE ASSAY LABORATORY AT RIFLE, COLORADO

Core Laboratories, Inc., Opens Fischer Assay Facility at Rifle, Colorado

Core Laboratories, Inc. opened a new laboratory in September at 825 Railroad Avenue, Rifle, Colorado. Facilities are available at this laboratory for slabbing of drill cores and for performing Fischer assays. The engineer in charge of the new facility is Neal Davis.

The cost schedule for services to be performed by this laboratory is presented below.

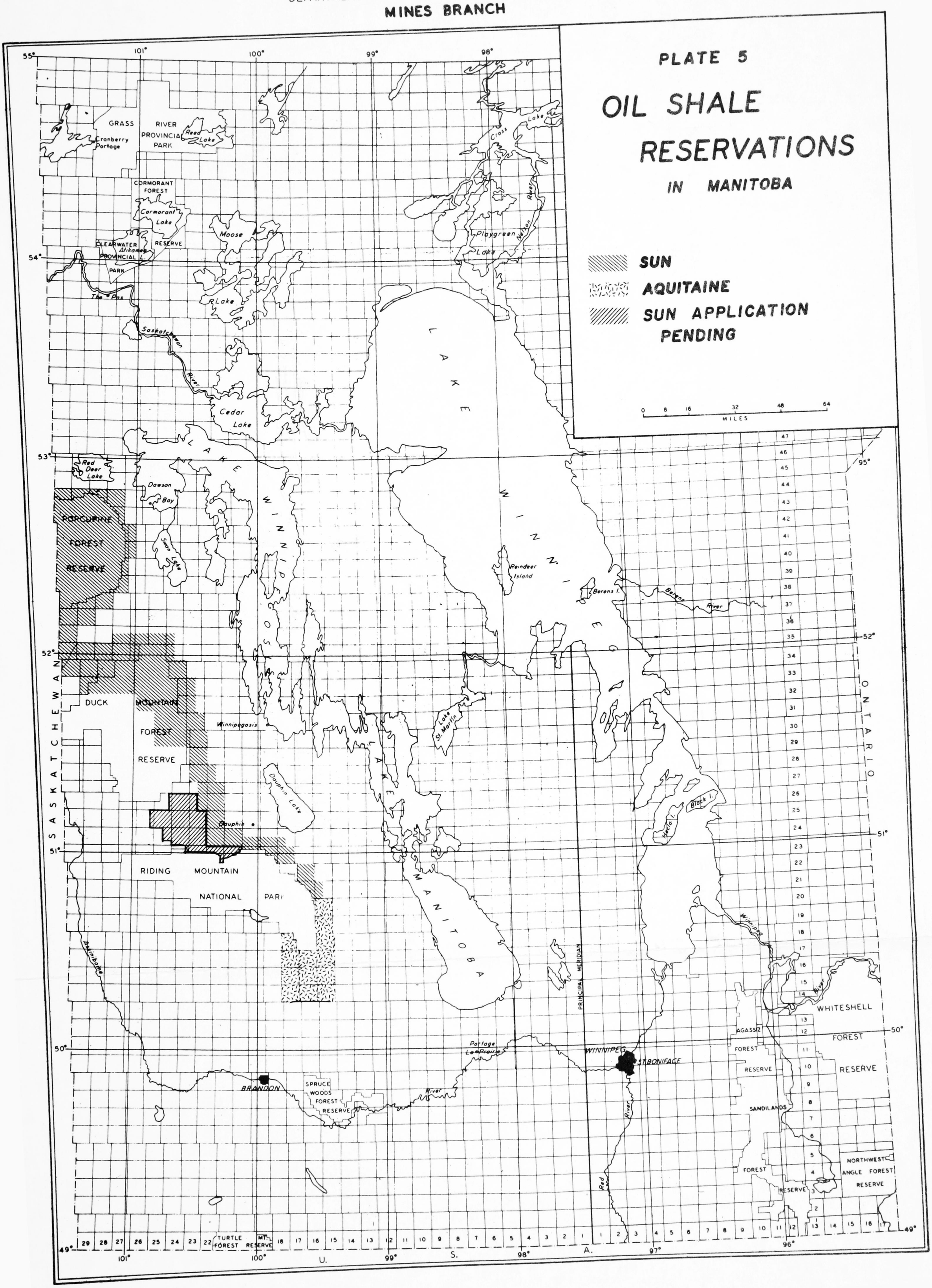
Oil Shale (Fischer) Assay	$4.00 per sample
Slabbing of Core	0.75 per foot
Sampling Time (if preferred)	3.00 per hour
Mileage Charge	0.12 per mile

Core Laboratories, Inc. is using an equivalent Modified Fischer Retort method for assaying oil shale, as performed by the Bureau of Mines at Laramie, Wyoming. An improved method for electrically heating and for temperature control of the retorts is utilized. In conjunction with a refrigerated condensing system, the setup and procedure is claimed to provide reliable and consistent results.

Results reported from a typical Fischer assay are:

Constituent	Units
Oil	gallons/ton
Oil	weight percent
Oil	specific gravity
Water	gallons/ton
Water	weight percent
Gas plus loss	weight percent
Spent shale	weight percent
Tendency to coke	estimate

MANITOBA
DEPARTMENT OF MINES AND NATURAL RESOURCES
MINES BRANCH



Other Laboratories Equipped for Fischer Assay Work

The Colorado School of Mines Research Foundation in Golden, Colorado is also equipped to perform Fischer assays of oil shale samples. Their charges are $4.00 for the Fischer assay and $1.00 for the sample preparation. Under certain conditions, Fischer assays of oil shale samples may be made by the Laramie Petroleum Research Center of the U. S. Bureau of Mines.

The battery of 12 Fischer retorts in use at the Laramie Petroleum Research Center is shown on the following page. Refrigeration equipment for the condensing system is located under the bank of retorts. The equipment for electrically heating and for controlling retort temperature is shown in the left central portion of the picture. Photograph was furnished by the United States Bureau of Mines.

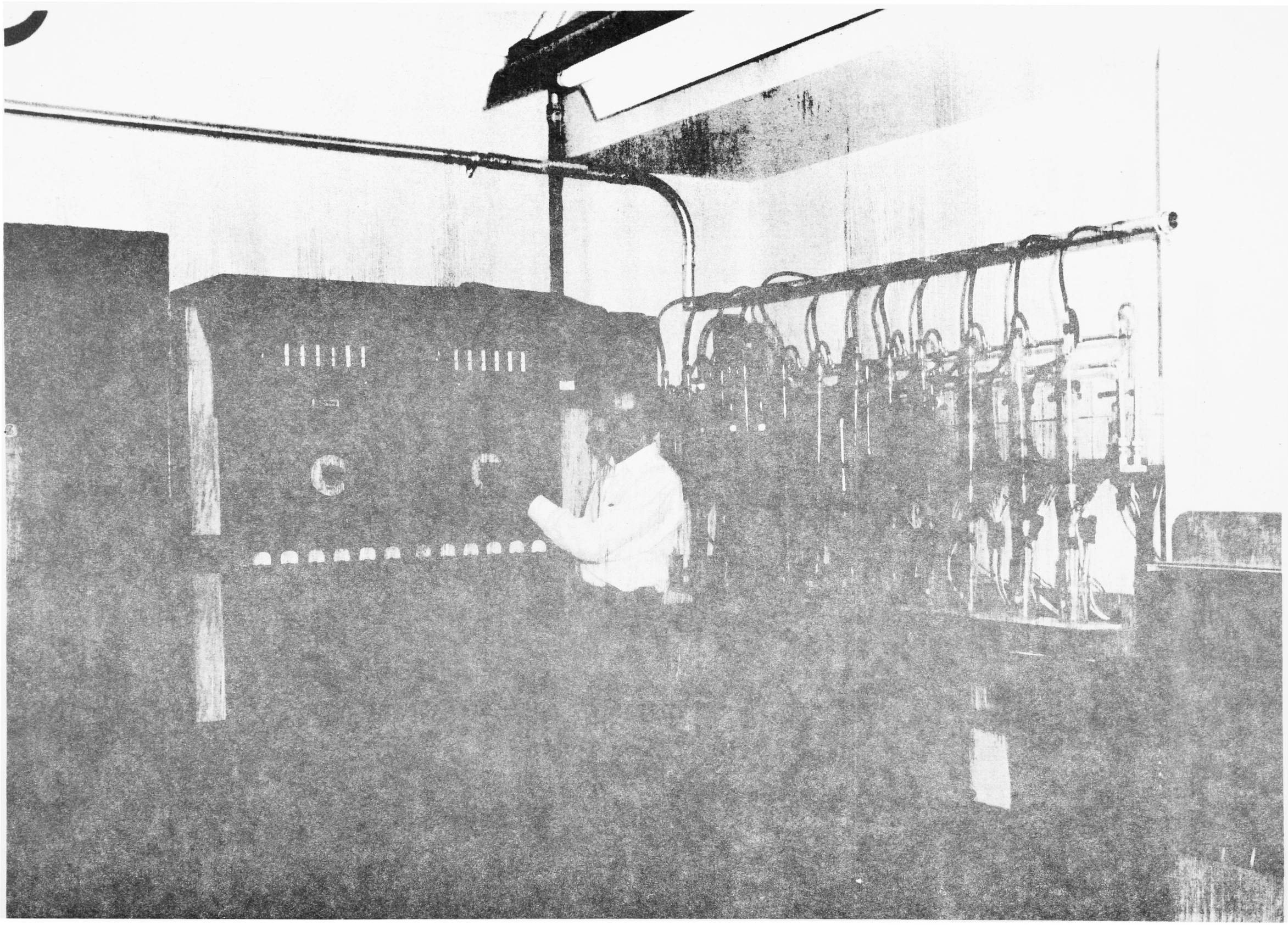


FIGURE 5

U. S. Bureau of Mines' photograph showing battery of 12 Fischer Assay Retorts set up at the Laramie Petroleum Research Center, Laramie, Wyoming.

First Colorado River Storage Project Power Offered for Sale, An Event of Interest to the Future Oil Shale Industry

The Colorado River Storage Project (70 Stat. 105) provides for basin-wide development and control of the Colorado River system within the confines of the upper Colorado River basin. The sale of power generated at three major stations (Glen Canyon, Curecanti, Flaming Gorge) will furnish funds which will aid in the financing of many small "participating projects". These are the facilities which will be able to furnish dependable year-around supplies of water for municipal, industrial and agricultural purposes in the oil shale areas.

The first Colorado River Storage Project (CRSP) power was produced at Flaming Gorge in 1963. Power was next produced at Glen Canyon in September of 1964. This power has been disposed of on an interim basis. The Curecanti project is still in the initial stages of construction.

The Bureau of Reclamation has just announced that it now has a second generator in operation at Glen Canyon and is prepared to offer 75,000 KW of power for sale on a commercial basis. In offering this power, however, the Bureau acknowledges that a critical period in the Glen Canyon reservoir-filling operations will be encountered next spring just before the 1965 snowmelt and runoff period starts.

By the time the 1965 spring runoff is complete, four generators will be operative at Glen Canyon, and 150,000 KW of power will be available for sale on a commercial basis.

Although the heart of the Colorado River Storage Project Act is those provisions which authorize the use of power revenues to assist in financing the "participating" projects, no specific criteria are contained in the legislation for the determination of the market price of CRSP power. Nothing has been firmed up yet in this respect and no long-term contracts have been negotiated. The power which was sold on an interim basis went at a rate which would produce six mills per kilowatt hour.

At the time the fourth generator becomes operative at Glen Canyon, the Bureau of Reclamation has stated that it will then reappraise the marketing situation with the objective of making some rate adjustments.

In order to permit the planned development of the water resource, the Colorado Water Conservation Board contends that power sale revenues must accrue in the greatest amounts possible and at the proper time. Last July, however, preference customers for CRSP power informed the Bureau of Reclamation that it was their opinion that the six mill figure per KW hour should be reduced, as power can now be purchased in the area from a private source at 5.8 mills per KW hour. This power source is the coal-fueled power plant of Arizona Public Service Company in the Four-Corners area. Arizona Public Service and Salt River Project (Phoenix) plan greatly enlarged power facilities in the Four Corners area for the near future. Should power revenues from the major facilities be less than predicted, participating projects which could store water for oil shale development would be affected.

Rifle Gap Dam

The contract for the construction of the Rifle Gap Dam has been awarded by the U. S. Bureau of Reclamation to Northwestern Engineering Company of Denver. This dam, located on Rifle Creek some seven miles northeast of Rifle, Colorado will be an earth and rock structure 120 feet high and 1500 feet long. It will impound 12,650 acre feet of water. This dam is part of the Silt project, which is exclusively an irrigation project and no benefits are foreseen for oil shale.

NAWAPA: Something of Future Interest

The Ralph M. Parsons Company has a general design for a gigantic water system involving the United States, Canada and Mexico. The North American Water and Power Alliance (NAWAPA) plan would utilize all major drainage basins in Western Canada and in the Western United States and would involve numerous facilities as far away as Hudson Bay or Lake Superior or Northern Mexico.

NAWAPA: Something of Future Interest (Continued)

Should this massive project materialize, previously unforeseen new quantities of water would be available to the oil shale areas and to California, Mexico, Nevada, Texas, Kansas and all western states.

Several of the major features of the project are listed below:

1. Dams on the upper reaches of the Columbia, Frazer and Kootenay Rivers would form a reservoir 500 miles long, within the Rocky Mountain Trench, as far south as Flathead Lake, Montana.

2. Dams on the Yukon and Tanana Rivers would form a reservoir extending from Dawson, Yukon Territory, southeastward into British Columbia.

3. Water to meet the needs of the southwestern United States would be drawn from the outflow of the Rocky Mountain Trench, involving many proposed facilities in the drainage basins of the Columbia, Clearwater, Colorado, Salmon and Snake Rivers.

4. A transcontinental canal in Canada

This NAWAPA concept makes all other water plans appear to be temporary, piecemeal schemes for utilizing small quantities of presently-surplus water. NAWAPA is a continent-wide development involving all major western rivers, the Great Lakes, Hudson Bay, and the countries of Canada, United States and Mexico.

Status of USGS Water Study in Piceance Basin Area

This study of the ground water and surface water resources of the Piceance basin was begun July 1 of this year. It will continue through October of 1965, and may possibly be extended for an additional year. Four gaging stations have been set up, two on Piceance Creek, one on Yellow Creek and one on Roan Creek. All known wells in the area will be surveyed.

Pumping tests will be made on some of them. Known aquifers will be tested. The precipitation in the area will be measured. Results will first be published as an Hydrologic Atlas, with the objective being the definition of existing water supplies of the area. During the study, results will be kept on open file, available for inspection at the New Custom House in Denver and at the Rio Blanco County courthouse.

Special Utah Water Study of Interest

A reconnaissance study[1/] of the water resources of about 850 square miles of western Kane County in southern Utah was undertaken by the Engineering Experiment Station of the University of Utah to promote development of the coal deposits of southern Utah, which could be used to produce electricity if adequate water supplies are available. Recommendations were made for the development of the existing water supplies.

Open House and Dedication Ceremonies at the Anvil Points Oil Shale Demonstration Plant, Rifle, Colorado, September 14, 1964

Socony Mobil Oil, Humble Oil, and the Colorado School of Mines Research Foundation sponsored open house and dedication ceremonies at the re-activated Anvil Points Oil Shale Demonstration Plant.

The National Oil Shale Advisory Board attended the ceremonies. Speakers included Governor Love of Colorado, Secretary of Interior Stewart Udall, Representative Wayne Aspinall of Colorado, Chairman of the House Interior and Insular Affairs Committee, and Senators Gordon Allott and Peter Dominick of Colorado.

Governor John Love of Colorado said that two major obstacles impede expanded development of the oil shale industry. One is the unavailability of publicly-owned deposits and another is the extreme delay by Interior in processing oil shale patent applications. He also said that recommendations already made to Interior afford an adequate basis upon which Interior can proceed on at least a limited program for leasing lands in Federal ownership. The recent actions by Interior to contest claims on a novel theory of discovery, which would defeat the traditional operation of the mining laws, was said to be not conducive to a speedy solution of the problems facing the unpatented mining claimant.

Secretary Udall talked "off the cuff" rather than from a prepared speech, stating in general that this is a fine beginning. Udall cautioned against a boom and bust development of the oil shale industry, saying that we must move forward on a sound basis toward large-scale commercial shale oil production.

Senator Gordon Allott stressed the urgency of the early development of a viable oil shale industry, citing rapid

depletion of world reserves and needs in case of national emergencies. Allott called for the development of a fair and equitable national leasing policy and an early determination of what lands will be subject to the Department of Interior's leasing policy. He presented a summary of the Allott Bill (S.2809), introduced May 5, 1964. The summary is presented below.

(S. 2809), The Allott Bill

A. Authorizes Secretary of Interior to issue patents on oil shale claims upon applications filed on or before July 1, 1966, and Secretary may not deny such patent applications for any of the following reasons: ---

1. Failure of a claimant to perform assessment work;
2. Abandonment or presumed abandonment;
3. Lack of economically or commercially feasible method of extracting shale oil from oil shale.

B. After July 1, 1966 the Secretary may cancel any claim, for which a patent application has not been made, on the basis of abandonment, by appropriate proceedings, and the burden of disproving abandonment shall be upon the claimant.

(The effect of this is to clear up within a two-year period the title to most all claims based upon a valid discovery but because of confusion of the law have not gone to patent nor had annual assessment work done.)

Representative Wayne Aspinall described the reactivation of Anvil Points as a team effort in which partisanship was laid aside.

R. H. Cramer of Socony Mobil Oil Co., the research project manager, said the plant is experimental and no commercial oil shale extraction is contemplated.

1964 Mining Convention, American Mining Congress, Portland, Oregon, September 13-16, 1964

One paper concerning oil shale was presented at the 1964 AMC Mining Convention. E. H. Crabtree, Director of the Colorado School of Mines Research Foundation, Golden, Colorado was the speaker at an "Oil Shale Luncheon", on September 14. An abstract of this paper is presented below.

"Oil Shale and Shale Oil", E. H. Crabtree

The time is near, Crabtree said, when shale oil will be competitive in cost with conventional crudes, and an eventual production of 1.25 million barrels of shale oil per day in 1974 was estimated to be from 8 to 10 percent of the requirements of that time. Crabtree's estimate of the reserves of these shales was:

Colorado	Over 1 trillion barrels in 1500 square miles
Utah	430 billion barrels in 5400 square miles
Wyoming	at least 43 billion barrels in 9500 square miles

American Institute of Chemical Engineers, 54th National Meeting, Las Vegas, Nevada, September 20-23, 1964

Two of the papers presented at this meeting concerned oil shale. Available papers are reviewed below.

"Oil and Gas, With Emphasis on Oil Shale", Robert E. Johnson, Plains Exploration Company, Denver, Colorado

The present and future energy requirements and reserves of the United States were discussed, and the data were used to show that the oil industry will have need for a large production of oil from oil shale within the next 20 years.

No new data were contributed.

"Nuclear Explosives: A New Approach to Oil Shale Utilization", H. W. Sohns, U. S. Bureau of Mines, Laramie, Wyoming

This paper had Bureau of Mines "approval for oral presentation only", hence no copies are available. In his presentation,

H.W.Sohns stated that the Bureau has no data concerning nuclear blasts in oil shale so the Bureau study was made assuming that oil shale would have the same breaking characteristics as displayed by the granite formations within which a nuclear shot was detonated and which was reported in the literature[2/].

A 50 kiloton blast was assumed to create a 100-foot diameter by 2000-foot cylinder of oil shale rubble which would then be retorted by internal combustion. Two schemes for retorting the crushed rock in place were studied by the Bureau. One scheme involved horizontal firing and the other scheme involved vertical firing. For studies of horizontal firing, fires were visualized as being started in peripheral holes at controlled sequential levels, and production obtained from a central well. For the vertical firing scheme, the studies visualized fires as being started over the top surface of the cylinder of crushed rock, withdrawing gases at the bottom.

Two cases of pressure drop were evaluated, one at 40 psi, the other at 600 psi. Oil recovery was assumed to be 50 percent. The shale oil cost, at 6 percent return after investment, varied from a low of $1.35 per barrel to a high of $2.95 per barrel.

Of course, the entire study is on rather shaky ground since there is no assurance that oil shale will break up like granite under the influence of a contained nuclear blast. In the discussion it was brought out that it is not the fall from the roof of the cavern which breaks the formation into rubble. Rather it is the nature of the formation itself that causes it to peel off layer by layer and fall to the floor of the cavern.

Intermountain Association of Petroleum Geologists, 13th Annual Field Conference, Vernal, Utah, September 16-19, 1964

This conference consisted of a comprehensive field trip throughout the Uinta Basin area of Utah for the purposes of studying the geology of the area and of observing deposits of oil shale, bituminous sands, gilsonite, coal and other minerals in the Basin.

Intermountain Association of Petroleum Geologists, 13th Annual Field Conference, Vernal, Utah, September 16-19, 1964
(Continued)

A guidebook has been published[3/] presenting papers on oil and gas fields, geology of the area, oil shale and other hydrocarbon minerals in the area and historical and general data of interest. The papers listed below are presented in the Guidebook.

Author	Title
Curry, H. D.	Oil Content Correlations of Green River Oil Shales, Uinta and Piceance Creek Basins.
Cashion, W.B.	Distribution and Quality of Oil Shale in the Green River Formation of the Uinta Basin
Smith, J.W.	Oil Yields and Properties of Green River Oil Shales in Uinta Basin, Utah
Sohns, H.W.	A Summary of Current Techniques For Processing Green River Oil Shale
Covington, R.E.	Bituminous Sandstones in the Uinta Basin
Schell, E.M.	Coal in the Uinta Basin, Utah

The Intermountain Symposium on Fossil Hydrocarbons, Salt Lake City, Utah, October 9-10, 1964

This symposium was sponsored by Brigham Young University and had the expressed objective of showing the economic potential of the fossil hydrocarbon resources of the Intermountain West. For each particular hydrocarbon, the geographic location of deposits, the extraction methods, reserves, transportation mediums and end uses were discussed. Coal, oil shale, bituminous sands, gilsonite, viscous crudes and conventional petroleum and gas were subjects of papers. Abstracts of significant papers are presented below. (Papers will be published as a "proceedings").

"A Survey of Extraction, Retorting and Processing Methods for Oil Shale", presented by K. E. Stanfield, U. S. Bureau of Mines, Laramie, Wyoming.

This paper was strictly a review of previously published data.

"Bituminous Sands and Heavy Crude Oils", by R. E. Covington, Vernal, Utah.

R.E. Covington stated that there is a market for road oil in the Salt Lake City area amounting to 4000-6000 barrels per day at a well head price of $4 per barrel. Phillips petroleum was said to have an in situ project in T4S, R30E. Standard Oil of Ohio was said to have tried a fire flood at Asphalt Ridge Utah, some four years ago. Results are believed by Covington to be good. Covington said that Shell Oil is considering a steam injection in situ project in the White Rocks, Utah area where the zone is 1000 feet thick, is under 40 feet of overburden and has 26 to 39 percent porosity.

"Petrochemicals From Fossil Hydrocarbons", by Dr. J. H. Gary, Petroleum Refining Engineering Dept., Colorado School of Mines, Golden, Colorado

Dr. Gary discussed the production of liquids from coal, tar sands, gilsonite and oil shale. He presented commonly available data concerning water requirements, investment, hydrogen content, pressures required for processing, etc. Dr. Gary does not see a market for liquid fuel from coal. He does foresee that the coming oil shale industry will produce as a by-product, a feed stock material for petrochemicals.

"Oil Shale", by R. J. Cameron, Cameron and Jones, Incorporated, Denver, Colorado

R. J. Cameron's panel-session remarks summarized the data relating to oil shales in the area. Of the many and varied problems faced by the new industry, none appear to be unsolvable. Some of the technical and economic factors that have retarded shale include the immature status of the technology, the distance to markets and the uncertain status of foreign oil supplies. None of the processes now under consideration for oil retorting have been fully tested. He anticipates the expenditure of $5 billion for the production of 1 million barrels of shale oil products per day.

Independent Petroleum Association of America, Annual Meeting, Houston, Texas, October 25-27, 1964

The Shale Oil Committee of the Independent Petroleum Association convened at the IPAA's annual meeting in Houston. The Shale Oil Committee of the IPAA was addressed by Raymond D. Sloan, Shale Oil Project Manager for Humble Oil and Refining Company.

Sloan did not predict the quantity of shale oil which will enter the domestic market, but said that shale oil will supplement rather than supplant conventional crude production in the next 20 years. One of Sloan's conclusions was that the domestic industry will no longer be able to meet the demand in 1985, even though operating at capacity. "This is the wedge that will provide the entrance of synthetic fuels", Sloan said.

The Shale Oil Committee prepared a report at the annual meeting in Houston, and a copy of their report is presented in the Appendix. Three general recommendations were made in the report. They are:

1. Executive Order No. 5327 be continued until legislation is enacted insuring a program for leasing of public shale lands.

2. Free enterprise system, without subsidy, should be encouraged.

3. Size of leases should be much smaller than the 5120 acres now provided by law.

4. The IPAA should be alert to impact of shale developments on conventional crude oil industry.

The names of the members of the Shale Oil Committee of the Independent Petroleum Association of America are presented in the Appendix as part of the Oil Shale Committee's report.

COAL AND LIGNITE

Bituminous Coal Production

As shown by the weekly Coal Report of the U. S. Bureau of Mines, production of bituminous coal for comparable periods of 1963 and 1964 were as follows:

	1964	1963
Week ended November 14	10,200,000	9,705,000
Year's Production - January 1 through November 14	411,354,000	402,643,000

Current Research Projects for Office of Coal Research

Some of the current research projects for OCR were reported in our September 1 report. These projects are:

Project Name	Contractor
Coal Gasification	M. W. Kellogg Company
Coal Gasification	Institute of Gas Technology
Lignite Gasification	Consolidation Coal Company
Fluidized Coking Process	Atlantic Refining Company
Mining Simulations	Virginia Polytechnic Institute
Low Ash Coal	Spencer Chemical Company and Battelle Memorial Institute
Gasoline From Coal	Consolidation Coal Company and C. W. Nofsinger Company

Other current research projects for OCR are:

Project Bootstrap, General Electric Company. Work under this contract seeks to develop a process for hydrogenating coal using hydrogen activated by high-voltage electrical corona. Although it has been demonstrated that corona will activate hydrogen and that hydrogen will react with molecules in the coal, a practical corona has not been developed. The process probably will not be commercially feasible in the immediate future.

Current Research Projects for Office of Coal Research
(Continued)

Project Coed, FMC Corporation. The word coed is here derived from "Char-Oil Energy-Development". The contractor's work under this contract is to produce useful gases and liquids from coal and to transport the residual char to market via pipeline using the coal-derived liquid as the transport vehicle. The work to date has established that the process is apparently feasible.

Project Gas, Bituminous Coal Research, Inc. This project is said to represent the initial step in an over-all gasification program being developed by OCR. The total program is designed to produce pipeline gas, synthesis gas and hydrogen from coal.

Project Western Coal, University of Utah. This project has as its objective the development, on a laboratory scale, of process data concerning the behavior of Western coals. These data may assist in the adaptation of full-scale processes to Western coal.

Project Package Boiler, Pope, Evans and Robbins. Not of signficant interest to oil shale.

Project Fuel Cell, Westinghouse Electric Association. Not of significant interest to oil shale.

Project Waste Disposal, Rand Development Corporation. Not of significant interest to oil shale.

Coal Acreage Bill, H.R. 8960 (78 STAT. 710)

A bill introduced by Rep. John Saylor (R-Pa.) to liberalize leasing arrangements for Federal coal lands was signed by the President in September. This bill, H.R. 8960, increases from 15,360 to 46,080 acres the amount of coal land that can be held by one company in a single state. A copy of H.R. 8960 is presented in the Appendix.

The old rules actually allowed a maximum of 10,240 acres of coal land in any single state, with the possibility that

5,120 acres could or could not be granted as "fringe" acreage, dependent upon the result of hearings. The new rules, H.R. 8960, actually allow a maximum of 30,720 acres in any one state,with 15,360 additional "fringe" acres a possibility, dependent upon a hearing.

The purpose for the bill was to permit dedication of sufficient reserves to attract investments in facilities needed to serve Far Western coal market needs.

Coal's Efforts to Share in California's Future Energy Market

The future cost of energy for the California market is a subject which is currently under hot debate. The Federal Power Commission is now holding hearings on competing applications by natural gas and pipeline companies to supply additional quantities of natural gas. Gulf-Pacific Pipeline Company proposes a new $314 MM pipeline from Texas. A competing proposal by El Paso Natural Gas and Transwestern Pipeline Company involves expansion of existing facilities.

The National Coal Association presented as testimony at the California gas-line hearings, a power cost study made by R. W. Beck and Associates for Fuels Research Council, Inc., a subsidiary of the NCA. This study, entitled "Power Cost Study" was submitted as Exhibit RWB-1, Docket No. CP63-204 et al. The main conclusion of the study is that electric energy produced in coal-fired thermal generators is feasible for use in the Los Angeles area and should become an important factor in supplying the growing energy requirements of that area. Table 2 presents the delivered cost of electricity to the Los Angeles load center for various mine-mouth plants, unit train schemes, and coal deposits locations considered in the study.

Other studies made by coal groups interested in a coal breakthrough into the future California power market are:

1. Robert R. Nathan Associates, a $169,000 contract with OCR to study markets for Western coal.

2. Study by C. H. Hoper and Associates for group of Utah Coal Operators represented by Independent Coal

TABLE 2

SUMMARY OF PRO FORMA COST OF ENERGY

DELIVERED TO LOS ANGELES AREA

20-YEAR AVERAGE

Date From: "POWER COST STUDY" Presented to FPC Hearings at Los Angeles

COLUMN	1	2	3	4	5	6	7	8
	Plant Site	Fuel Source	Fuel Price at Mine ¢/MMBTU	Transportation Price ¢/MMBTU	Delivered Price of Fuel ¢/MMBTU	Bus Bar Cost Mills/KWH(4)	Transmission Fixed Cost Mills/KWH	Delivered Cost to Load Center Mills/KWH(5)
	Green River, Utah (1) (640 Miles of Power Transmission)	Utah	15	2.	17	4.13	1.37	5.50
	Emery, Utah (1) (640 Miles of Power Transmission)	Utah	15	-	15	4.18	1.37	5.55
	Black Mesa, Ariz. (1) (480 Miles of Power Transmission)	Arizona	15	-	15	4.09	.99	5.08
	San Juan County, N. Mex.	New Mexico	15	-	15	3.89	1.37	5.26
	Los Angeles, Calif. (2)	Texas	-	-	(3) 35.21	5.53	.17	5.70
	Victorville, Calif. (7)	Arizona	15	13.18	28.18	5.19	.17	5.36
	Victorville, Calif. (7)	Utah	15	14.00	29.00	5.27	.17	5.44
	Victorville, Calif (7)	New Mexico	15	17.50	32.50	5.60	.17	5.77

NOTES:
(1) Mine-mouth plant.
(2) Gas-fired plant.
(3) Cost of gas from FPC Docket CP63-204, Exhibit 13, Sub-exhibit-D.
(4) Bus bar cost which includes an allowance for transmission losses to the Los Angeles area.
(5) Delivered cost based on 90% load factor, and 11% fixed charges for mine-mouth generation, 12% fixed charges for California generation, 11-1/2% fixed charges for transmission, including 1% for operation and maintenance.
(6) Columns 6, 7, and 8 are computed on the basis of delivered energy.
(7) Coal hauled to Victorville by unit trains.

and Coke Company to evaluate mine-mouth power generation at Green River, Utah.

3. Bechtel study for Salt River Project of Phoenix, Arizona on coal-fueled power generation possibilities.

4. Union Pacific Railroad study, indicating that coal can be transported to California for 22 cents per MMBTU.

5. Power studies for State of California by the Fluor Corporation.

6. Power studies by Stone and Webster for Arizona Public Service Company.

Status of 10MM KW Coal-Fueled Utah Power Project

The Utah State Engineer, who grants water rights in the State of Utah, has not yet assigned a date for the public hearing on the water right application by Resources Company, Inc., for 200,000 acre feet of water per year for power generation use. This application, number 35818, has attracted widespread attention in the West. The consumptive use of 200,000 acre feet of water per year represents a significant portion of the unappropriated water of the Colorado River apportioned to Utah under terms of the Upper Colorado River Compact. Many objections to this water right application have been made by Federal, State and private organizations. Actual development of the 10MM KW coal-fueled power complex will await the acquisition of firm water rights. Approximately 125,000 barrels of coal liquids may ultimately be recovered per day by Richfield Oil Company, which plans to carbonize the mined coal. Char from the liquefaction process will provide fuel for electric power generation.

The State of Utah has agreed to sell a 3760-acre site for the plant to Resources Company, Inc., the sale to be made if and when the Federal government takes the land out of the Glen Canyon National Recreation Area.

Effect on Coal of the Pacific NW - Pacific SW Electric Power Intertie

The Pacific NW - Pacific SW Electric Power Intertie, involving both Federal and private utilities, was proposed by Interior Secretary Udall last June. About $750 MM is to be spent on transmission and other facilities to intertie all major private and public electric generating facilities in the eleven-state area of the western United States. The intertie also provides for the future distribution, within this area, of surplus electric power from western Canada.

An overall engineering guidance committee and three task-force committees have been found to coordinate the technical aspects of this intertie program. Pacific Intertie Engineering Guidance Committee is the title given the group charged with coordinating the technical aspects of the program. It is headed by E. J. Harrington, of Bonneville Power Administration. The Systems Studies Task Force, headed by W. R. Johnson of Pacific Gas and Electric Company is the group that will conduct studies of the electrical performance of the systems comprising the interties. The Design and Construction Task Force, headed by J. E. Conner of Southern California Edison Company is the group that will review the designs by all parties to determine that they are compatible and reliable. The Operations Task Force, headed by E. G. Olmsted of the Los Angeles Department of Water and Power, is the group that will develop procedures for normal and emergency operation of the interties.

The National Coal Association originally opposed the Pacific NW - Pacific SW Intertie concept. NCA Vice President Robert E. Lee Hall wrote Secretary Udall stating that mine-mouth plants fill "the missing link of the intertie system--the source of ample quantities of dependable, low-cost power for the entire area for the foreseeable future". Secretary Udall replied that the intertie "will hasten the day when mine-mouth coal-fired steam electric plants will become commonplace". A copy of Secretary Udall's letter reply to Hall is presented in the Appendix.

Opposition to this huge intertie program by coal organizations seems to have diminished. In fact, opposition is being replaced by optimism, as the existence of modern,

high capacity transmission facilities will obviously permit the wheeling of large blocks of power over great distances. This should permit the development of large coal-fueled power plants at coal reserve areas all over the West.

Major transmission facilities of this intertie system include nearly 5000 miles of 500 KV AC lines by West Coast utilities, one all-federal 750 KV DC line from The Dalles, Oregon to Hoover Dam, one 750 KV DC line from The Dalles to Los Angeles, 1500 miles of 500 KV AC line in British Columbia and numerous lower voltage lines. All Colorado River Storage Project generators (Glen Canyon - Flaming Gorge - Curecanti) are now interconnected with each other and with private utility systems.

These developments are of significance to the liquid fuel industry because the use of mine-mouth generating facilities is now in the immediate future. This offers the possibility that coal liquefaction processes may be included in these facilities which utilize very large tonnages of coal. Also, the possibility of economically wheeling large blocks of power over great distances provides a possible market for the great quantitiies of low-Btu gas produced as an excess energy source during the retorting of oil shale. Normally, the organic content of oil shale will produce 2/3 of its weight as liquid shale oil and 1/3 of its weight as non-condensible fuel gas and carbonized residue when retorted by conventional processes.

The Formation of WEST Associates

Of interest to the coal industry and to all industries which provide fuels in the West, is the formation of WEST Associates, the largest regional power development program ever planned.

On September 22, Western Energy Supply and Transmission Associates announced the formation of their organization. Known as WEST Associates they plan at $10.5 billion, 20-year program involving some 36 MM KW of new generating capacity and extra-high voltage transmission systems. This joint approach to the power needs of the area comprising New Mexico, Colorado, Arizona, Utah, Nevada, Southern California and parts

of Texas, Wyoming and Idaho may save several billion dollars in construction and operating costs in this area over the next 20 years.

WEST was originally composed of ten investor-owned utilities and probably will include five or more local government-owned electric suppliers. Present members are:

Arizona Public Service Company
El Paso Electric Company
Nevada Power Company
Public Service Company of Colorado
Public Service Company of New Mexico
San Diego Gas and Electric Company
Sierra Pacific Power Company
Southern California Edison Company
Tucson Gas and Electric Company
Utah Power and Light Company

Other groups that meet the objectives of WEST Associates will be invited to join. Those known to be invited are:

Los Angeles Department of Water and Power
Burbank Public Service Department
Pasadena Municipal Light and Power Department
Imperial (California) Irrigation District

The giant Utah power plant project on the Kaiparowits plateau in southern Utah is one major coal-fueled power generating facility planned by WEST Associates. This 10 MM KW plant is still pending final action on its water right application, before the Utah State Engineer, for consumptive use of 200,000 acre feet of water per year. Probably the first new major coal-fueled generating facilities to be announced from WEST Associates will be a 325,000 KW power plant near the present Four Corners site of Arizona Public Service Company. Studies on this, and other sites, are still in progress.

Secretary of the Interior Udall has expressed the hope that federal facilities will be interconnected with all systems of WEST Associates, and suggests that the WEST plan may be the "first fruits" impact of the Pacific NW - Pacific SW intertie.

General data concerning WEST Associates are presented in the Appendix.

SODIUM PERMITS AND APPLICATIONS

ON FEDERAL OIL SHALE LANDS

No action of any sort has been taken on the applications for sodium prospecting permits during the period. Spokesmen for the Department of Interior have stated that no additional permit applications will be accepted. Of the 27 applications for permits, only 12 have been granted. Officials feel that sodium prospecting only complicates the process of resolving Federal oil shale land problems.

J. T. Juhan, holder of Permit No. C-0120057, is now drilling a core hole in the permit area. Juhan reports that a significant section of Nahcolite, a mineral having the formula $NaHCO_3$, has been encountered and that he intends to file for a sodium lease.

Plate 6, opposite page 68, presents general data concerning the sodium mineral activities.

TAR SANDS AND RELATED MINERAL DEPOSITS

UTAH BITUMINOUS SANDS

Utah State Bituminous Sand Lands Under Lease

A listing of all leases of State-owned asphaltic and bituminous sands land was obtained from the Utah State Land Borad in mid-October of 1964. The total lands under lease is 300,000 acres. The record of leases, as furnished by the Utah State Land Board is presented in the Appendix.

State Selection of "In-Lieu" Lands Containing Tar Sand Deposits

Max Gardner, Director of the Utah State Land Board, has stated that the Bureau of Land Management has suspended action on state selection of "mineral-rich" lands from the public domain. This is discussed fully under the heading "Oil Shale - Utah State Government Developments".

In-Situ Operations in Utah Tar Sands

It was announced at the Intermountain Symposium on Fossil Hydrocarbons, Salt Lake City, that Phillips Petroleum Company proposes a fire-flood project in tar sands in Uintah County. It is our understanding that the site is Section 36, T.4S., R.20 E., which is in the Asphalt Ridge area.

Shell Oil Company was said to be considering a steam-injection project in the White Rocks area, some 25 miles NW of Vernal, Uintah County. The bituminous sand zone in this area is reportedly 1000 feet thick under 40 feet of overburden, with 26 to 39 percent porosity.

On inquiry to the Utah State Engineer, who grants water rights in Utah, we are informed that neither Phillips nor Shell have water right applications on file in his office under their names for water in Uintah County.

PLATE 6 – SODIUM PROSPECTING PERMIT APPLICATIONS

KENTUCKY OIL SANDS

It has been reported that a firm is putting together a project to strip mine Kentucky silica tar sands. From investigations, it is our belief that the firm is W. G. Reynolds and Associates. W. G. Reynolds is the "Billy" Reynolds of Reynolds Aluminum. Apparently, the project is still in the promotional stage.

Preston McGrain, Assistant State Geologist, Kentucky Geological Survey, stated that an estimated reserve of one billion barrels of oil is contained in the rock asphalt deposits of Edmonson, Grayson, Hardin, Breckinridge, Logan and Warren Counties in Western Kentucky. The deposit in Edmonson County is the largest and best known.

ALBERTA TAR SANDS

Amendments to Alberta Drilling Production Regulations

The Alberta Oil and Gas Conservation Board has issued a Schedule of Amendments to the Drilling and Production Regulations under the Oil and Gas Conservation Act. A copy of Alberta Regulation AR 502/64, which is the Schedule of Amendments is included in the Appendix.

Amendments of particular interest concern the release of information by the Board. For laboratory or experimental data on tar sands recovery processes, the Board can hold data for five years. This particular amendment reads,

> "58 (8) Where laboratory or experimental data concerning the development or application of an enhanced recovery method for the recovery of oil or gas or concerning the recovery of crude hydrocarbon product of oil sands are submitted to and accepted by the Board as confidential, the Board, after five years from the commencement of any

> commercial production in Alberta in which the data is applied, and whether or not the data was submitted to the Board voluntarily, upon the requirement of the Board pursuant to an approval or otherwise, may make the data available to the public.--"

The above is an entirely new restriction. Previously, data could be released long before contemplated date of commercial production.

Alberta Bituminous Sands Regulations

For reference purposes, a copy of Alberta Regulation 342/62, the Bituminous Sands Regulations under the Mines and Minerals Act is presented in the Appendix.

Great Canadian Oil Sands, Ltd.

Based on results obtained from operation of a five ton per hour pilot plant at McMurray, Canadian Bechtel has been engaged in engineering, equipment procurement and construction activities on the $191 MM project to mine and recover 45,000 barrels of synthetic crude per day from Athabasca tar sands.

The Great Canadian Oil Sands deposit for which open pit mining is contemplated, consists of a thick, 4-1/2 mile square section of the McMurray formation which is covered by a relatively thin overburden. The lease, Sun Lease No. 4, is held by Sun Oil Company, Ltd., a principal shareholder of Great Canadian Oil Sands, Ltd. Great Canadian has stated that conventional shovels and earth-moving equipment will strip away the overburden material and that bucket wheel excavators will then cut a 60 to 80-foot vertical face directly into the oil sands. Mining will continue year-around at a rate near 100,000 tons per day.

Tar Sands Leases and Prospecting Permits in the Athabasca Tar Sands Area of Alberta

The tar sand leases and the tar sand prospecting permits currently issued for lands in the Athabasca tar sands area of Alberta are presented in Table Number 3 and are shown on Plate Number 7.

MELVILLE ISLAND TAR SANDS

Oil impregnated sands, reportedly containing up to 32 percent oil, by volume, were discovered near Marie Bay, Melville Island in August 1962. J. C. Sproule and Associates, discoverers of the deposit, have furnished a comparison of the Melville Island and the McMurray oil sands.

Data from the J. C. Sproule comparison are presented below and in Table 4.

Oil-impregnated sands were discovered in the Canadian Arctic Archipelago near Marie Bay, Melville Island, in August 1962 by G. V. Lloyd of J. C. Sproule and Associates, Ltd. The areal extent of the oil sands is imperfectly known, but it now seems certain that the oil impregnation in the Bjorne Formation of Triassic Age is local and controlled by structure. This oil could probably be produced from well, if it occurs below the permafrost zone which is 1,600 feet thick.

Sproule stated, "From the practical standpoint of possible oil recovery, it appears probable that oil can be produced by holes drilled to depths beneath the permafrost, which is reported to extend to about 1,600 feet in Dome et al., Winter Harbour well, on the south shore of Melville Island. We believe such subsurface recovery to be practical because of the relationship, along the outcrop, between the occurrence of oil sands and the structural features. Whether or not it will also become practical to mine the oil sands affected by permafrost remains to be seen".

TABLE 3

TAR SANDS LEASES AND PROSPECTING PERMITS IN THE ATHABASCA TAR SANDS AREA OF ALBERTA, CANADA

TAR SAND LEASES

COMPANY NAME	LEASE NUMBER	ACREAGE
AQUITAINE COMPANY OF CANADA, LTD.	39	49,742
ARROWHEAD EXPLORATION COMPANY, LTD.	23	36,937
BAILEY SELBURN OIL & GAS LTD., AND WHITEHALL CANADIAN OILS LTD.	19	18,758
	20	13,657
	42	21,729
B.O.C. OF CANADA LTD. AND COLORADO OIL AND GAS CORPORATION	25	49,964
CAN-AMERA OIL SANDS DEVELOPMENT LTD.	5	5,874
	43	49,784
CANADIAN FINA OIL LTD.	9	5,601
	12	4,174
	33	22,700
	34	9,129
	82	48,589
CANADIAN HUSKY OIL LTD. AND HUSKY OIL COMPANY	35	49,904
CANEX GAS LTD.	15	2,094
CITIES SERVICE ATHABASCA, INC. AND RICHFIELD OIL CORPORATION AND IMPERIAL OIL LTD. AND ROYALITE OIL COMPANY LTD.	17	49,788
	22	49,591
	29	49,722
	31	49,870
	32	11,365
	41	18,491
	78	36,086
COLORADO OIL AND GAS CORPORATION	SEE B.O.C. OF CANADA	

COMPANY NAME	LEASE NUMBER	ACREAGE
CONSOLIDATED MIC MAC OILS LTD.	18	49,969
FRENCH PETROLEUM COMPANY OF CANADA LTD.	50	32,824
GREAT CANADIAN OIL SANDS LTD.	14	4,177
HOME OIL COMPANY LTD.	30	49,870
HUSKY OIL COMPANY	SEE CANADIAN HUSKY OIL LTD.	
IMPERIAL OIL LTD.	SEE CITIES SERVICE ATHABASCA, INC.	
MURPHY OIL COMPANY LTD.	11	2,483
NEW CONTINENTAL OIL CO. OF CANADA LTD.	8	1,393
PACIFIC PETROLEUMS LTD.	6	6,440
	7	2,866
PAN AMERICAN PETROLEUM CORPORATION	73	49,931
	76	49,837
REGENT REFINING LTD.	67	25,969
	68	46,154
	69	23,377
RICHFIELD OIL CORPORATION	40	22,054
	54	49,483
	55	26,002
	56	23,377
	57	49,451
	58	36,042
	59	45,414
	60	31,250
	61	26,641
	62	21,417
	63	43,562
	64	23,377
	65	49,467

TABLE 3 (CONTINUED)

COMPANY NAME	LEASE NUMBER	ACREAGE
RICHFIELD OIL CORPORATION (CONT.)	66	49,419
	70	46,802
	71	36,492
	72	41,618
RICHFIELD OIL CORPORATION AND IMPERIAL OIL LTD. AND CITIES SERVICE ATHABASCA LTD.	79	27,265
	80	49,763
ROYALITE OIL COMPANY LTD. SEE CITIES SERVICE ATHABASCA		
SHELL CANADA LTD.	13	49,872
	26	23,506
	28	40,642
	42	16,209
	45	49,731
	53	49,419
SINCLAIR CANADA OIL COMPANY	52	35,109
	74	23,353
	75	25,945
SOCONY MOBIL OIL COMPANY OF CANADA LTD.	16	5,824
	21	2,584
	36	12,156
	37	49,751
SUN OIL COMPANY LTD.	4	3,898
	10	11,227
	27	49,994
SUPERTEST PETROLEUM CORPORATION	24	49,941
TEXACO EXPLORATION COMPANY	44	49,775
	46	49,751
	47	49,735
	48	49,763
	49	49,727
	51	49,503

COMPANY NAME	LEASE NUMBER	ACREAGE
WHITEHALL CANADIAN OIL LTD.	SEE BAILEY SELBURN OIL	
WOOD OIL COMPANY	77	6,792

TAR SANDS PROSPECTING PERMITS

COMPANY NAME	PERMIT NUMBER	ACREAGE
AMERADA PETROLEUM CORPORATION	127	35,258
	128	28,734
	129	11,918
BARAMY INVESTMENTS LTD.	122	49,883
BRITISH AMERICAN OIL COMPANY	122	13,001
THE ROYAL TRUST COMPANY	120	49,411
SUN OIL COMPANY LTD.	125	49,419
	126	49,379
TENNECO OIL COMPANY	124	49,427

C A E O I A D O S I C F R E

PLATE NO. 7

MAP OF

BITUMINOUS SANDS AREA

ALBERTA

LEGEND

Bituminous Sands Leases ..... 22 (PERMIT NO.)
Bituminous Sands Permits .....
Patented .....
Indian Reserves .....
Road Allowance Surveyed .....
Road Allowance Unsurveyed .....
Town Boundaries .....
Railways .....
Lakes .....

NOTE: BALANCE OF AREA AVAILABLE FOR BITUMINOUS SANDS APPLICATIONS

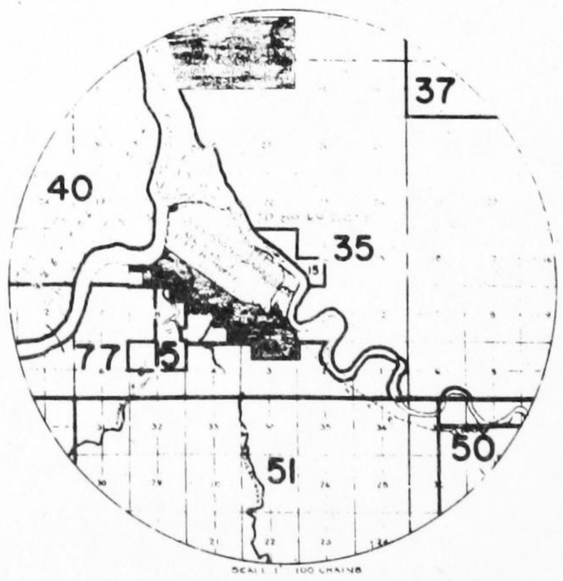


TABLE 4

Comparison of Melville Island and McMurray Tar Sands

	McMurray Oil Sands	Melville Island Sands
Date of discovery	1788	1962
Age of sands	Early Cretaceous	Triassic
Nature of sands	Cross-bedded, deltaic and shoreline	Cross-bedded, deltaic and shoreline
Thickness of oil impregnation	0 to 200 feet	0 to 85 feet
Areal distribution	Greater than 10,000 square miles	Unknown
Degree of impregnation (% by volume)	0 - 25	0 - 32
Overburden (feet)	0 - 2,000	0 - 2,000 plus (probably)
Origin of oil	Probably Paleozoic	Probably Paleozoic
Mining conditions	Relatively small area having low overburden, large area of overburden prohibitive for mining	Relatively large areas of low overburden; thick overburden areal extent unknown
	Several mining or other recovery methods believed practical	Permafrost to 1,600 feet; mining methods uncertain, probably can be produced from drilled holes below a depth of about 1,600 feet
Sulphur content (%)	4.5 (approx.)	Variable: 0.97 to 2.24
Base	Asphalt	Asphalt
Gravity (Degrees API)	Less than 10	Greater than 10
Nitrogen Content		Unknown

MANITOBA TAR SANDS

The Chief Mining Recorder for the Department of Mines and Natural Resources, T. Morgan, advises that there are no known deposits of tar sands in Manitoba.

SASKATCHEWAN TAR SANDS

The Oil Shale regulations recently prepared and approved by the Provincial Government apply to tar sands as well as to oil shales. Part I, Section 3 (g) of the Regulations, states, "Oil Shale means shale or tar sands from which oil shale products as hereinafter defined may be produced or any other such substance that the Minister may define as oil shale". A complete copy of the Oil Shale Regulations for Saskatchewan is presented in the Appendix.

Although there is strong interest in the oil sand possibilities of northwestern Saskatchewan, positive proof of the occurrence of oil sands in the area apparently is lacking. W. O. Kupsch, reporting on "Bituminous Sands in Till of the Peter Pond Lake Area, Saskatchewan Geological Survey, stated that the bituminous sands are blocks of Athabasca tar sand bodily transported by the glacier ice. Kupsch also stated that maps which show the Athabasca tar sands as extending into Western Saskatchewan are in error. Names of companies that have applied for tar sand permits under the Oil Shale Regulations will not be disclosed until all application procedures under the new regulations have been completed.

TAR SANDS LITERATURE SURVEY

Ball Associates of Denver, Colorado, has a contract to prepare a survey of the literature on tar sands and similar oil-impregnated deposits as well as oil fields occurring at depths shallower than 500 feet. This study is being financed by the Interstate Oil Compact Commission and is being conducted under the supervision of the Bureau of Mines. K. E. Stanfield of the Bureau of Mines, Laramie station, is the coordinator of the work.

Tar Sands Literature Survey (Continued)

The study has been underway for the last year and is now nearing completion. All material is to be assembled by late November and drafts of the report are to be in the hands of the Bureau of Mines for review by December 15. No decision has been made as to whether the report will be published as a bulletin or made an open file report. The latter is a distinct possibility since the size of the report is considerably larger than was originally anticipated--now estimated to be some 800 pages.

The report is to contain a complete list of literature references of all occurrences of heavy oils as described above, cross indexed and keyed to maps showing locations. The report should be of considerable value to anyone interested in heavy hydrocarbons.

Publication of U. S. Bureau of Mines Bulletin 611, "Oil-Shale Mining, Rifle, Colorado, 1944-1956".

Bulletin 611, Bureau of Mines, U. S. Department of the Interior, entitled "Oil-Shale Mining, Rifle, Colorado 1944-1956" was issued during the quarter. The authors of this bulletin are Jack H. East, Jr., former Regional Director, Region III, and E. D. Gardner, former Chief Mining Engineer of the Bureau of Mines, both now retired. Gardner headed the oil shale mining program of the Bureau of Mines from its inception in 1944. East also was associated with the mining research work as a safety engineer and administratively as Regional Director.

The bulletin summarizes the research data and equipment developed by Bureau of Mines personnel at the Anvil Points Mine near Rifle, Colorado, under the authorization of the Synthetic Liquid Fuels Act of 1944. The authors have done an excellent job summarizing these data and in describing the operations, equipment, procedures, and cost studies conducted at Rifle. However, the usefulness of the information suffers from having been delayed almost 15 years in publication.

Also included in the bulletin is a description of an alternate mining method proposed by Bureau personnel. The proposed method is termed sublevel panel mining.

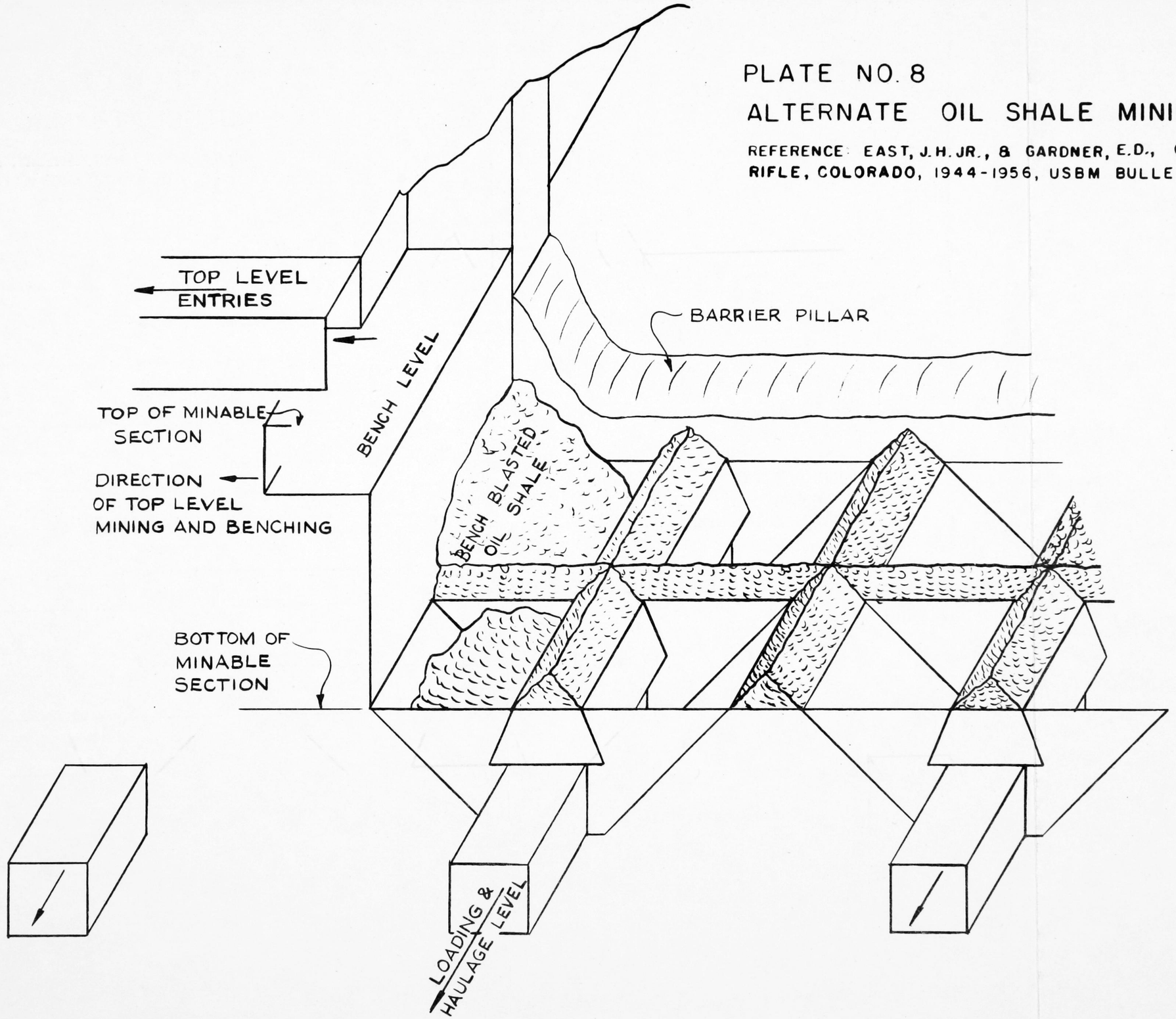
Plate 8 is an isometric sketch of the proposed system showing the mining and development levels. As show, a parallel series of haulage tunnels are driven below the minable section (Mahogany Ledge). At regular intervals, pairs of raises or drawpoints are excavated upward to the bottom of the minable section. These drawpoints serve as ore passes through which drilled and blasted oil shale from the Mahogany Ledge is withdrawn.

Oil shale from the Mahogany Ledge is mined by advancing the top portion of the Ledge by drilling and blasting. The broken shale is bulldozed over the bench created by the advance of the top portion. As the top portion develops, the bench

PLATE NO. 8

ALTERNATE OIL SHALE MINING METHOD

REFERENCE: EAST, J.H. JR., & GARDNER, E.D., OIL SHALE MINING, RIFLE, COLORADO, 1944-1956, USBM BULLETIN 811, 1964



is also advanced by drilling and blasting as in surface quarry operations. The broken oil shale produced by both advancing and benching operations is withdrawn through the drawpoints by conventional loaders and truck haulage. The method uses a block and panel system of development and mining. Block, panel and pillar dimensions would have to be determined by experimentation.

The advantage claimed for the system is maximum safety at costs only slightly higher than for the room-and-pillar system developed at Rifle. The arguments presented for added safety and economy are questionable. For example, equipment is commercially available to inspect and scale the high faces and roof in the room-and-pillar system. Equipment is also available to place explosives into blast holes irrespective of heading height. The present use of low cost ammonium nitrate for explosives minimizes any savings that might develop in the bench blasting for the sublevel system as opposed to bench blasting in the room-and-pillar system.

A real economic disadvantage does exist for the proposed sublevel panel system. All sublevel development is shown to be below the minable Mahogany Ledge. Dependent upon final determination of dimensions for drawpoints, pillars, and haulageways, development excavation could add 15 to 20 percent to total tonnage excavated. This 15 to 20 percent is waste material and development excavation costs will be higher than product mining thus increasing per barrel production costs by 20 to 30 percent.

The bulletin describes the sublevel system applied to the 73-foot Mahogany Ledge at Anvil Points. As indicated in the previous discussion the method does not appear attractive. However, for minable sections of increased thickness, the ratio of development waste to retort feed decreases and the system may have merit. The system can be applied to considerably thicker sections than the room-and-pillar method and for thick sections such as occur in the central Piceance Basin, sublevel panel mining may be of interest.

Appendix A of the Bulletin summarizes the recommendations of a committee of consultants appointed by the Director of the Bureau of Mines following a roof-fall at the Anvil Points mine. The group recommended the continuation of the room-and-pillar system using different room-and-pillar dimensions. Their

recommendations reduced room widths to 40 feet compared to the 60-foot dimensions used at Rifle. The reduction of room widths to 40 feet appears to be too conservative in the light of other experience. Commercial oil shale mining by the room-and-pillar system will undoubtedly evolve room dimensions, spans, recovery, etc., that will be dependent upon local conditions and may differ from site to site.

A section on "Recommended Future Research" is included in the bulletin. The program as set forth by the authors certainly has merit but also has several shortcomings. The need for more accurate data concerning grade, thickness, etc. of oil shale lands particularly in the Piceance Basin is evident to anyone that has made a serious attempt to correlate the latest data published by the Bureau of Mines. The last publication on assay data prepared from gas and oil industry activities was issued in 1960 based on data from 1954 to 1957. With the year 1964 almost past, the data available is now seven years old. It would appear that the first order of research activity would be to speed up the processing and publishing of sample data as received by the Bureau of Mines.

Development of alternative underground and opencut mining systems should receive consideration in research activities. However, emphasis should be given to more imaginative schemes and equipment development than to modification of existing methods.

The proposed work on roofstone studies in the Mahogany Ledge would provide valuable data. However, the specific data would be applicable only at the sites where these data were collected and would have questionable value say in the central Piceance Basin. Stress on roofstone research should be toward gathering and application of more fundamental data. The study of rock mechanics is now a specialized field with new and better understanding developing rapidly. Computers have aided substantially in determining the effects and interplay of various static and dynamic load conditions.

Bulletin 611, "Oil-Shale Mining, Rifle, Colorado, 1944-1956" is available at $1.25 per copy from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.

Nuclear Underground Blast in Dolomite

Early in November, the Atomic Energy Commission announced that it had detonated a deep underground nuclear blast at a Nevada test site in a test of a possible new way "of recovering buried minerals, oil and gas". The explosion, equivalent to 10,000 tons of TNT, was made at the bottom of a 1320-foot deep vertical hole in dolomite. This experiment, named Project Handcar, is the latest in the AEC Plowshare program to develop peaceful uses for nuclear explosives. A final report is not yet available.

David Rabb of the University of California's Lawrence Radiation Laboratory at Livermore, California, said that this was the first underground nuclear detonation in carbonate rock and that non-condensable gases, mainly CO_2 and CO, were formed from the rock. Rabb also stated that the shot evidently was completely successful, as indicated by seismic and geophone records immediately available. Rabb's group is now assembling data and will evaluate the results of the work. Actual results will be compared to predicted results by Rabb's group. Results will ultimately be published by the Lawrence Radiation Laboratory. A paper by H. W. Sohns entitled, "Nuclear Explosives: A New Approach to Oil Shale Utilization" is reviewed under the Meetings and Conferences section of this report. Additional papers4/, 5/, 6/ on the use of nuclear explosions for mining are listed in the Appendix.

COMING EVENTS

Second Annual Oil Shale Symposium

A second annual Oil Shale Symposium has been scheduled by the Colorado School of Mines and the Colorado School of Mines Research Foundation for April 29 - 30, 1965.

Interim Report by Federal Oil Shale Advisory Board to Secretary Udall

Date unannounced, but expected in January of 1965.

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APPENDIX

		Page
1.	H.R. 8070, Public Land Law Review Commission 78 STAT. 982	A-1
2.	Letter to Utah State Attorney General from Director of Utah State Land Board	A-5
3.	Letter to Director of Utah State Land Board from Utah State Attorney General	A-7
4.	Letter to Secretary of Interior from Chairman of House Committee on Interior and Insular Affairs	A-9
5.	Letter to Chairman of House Committee on Interior Affairs from Secretary of Interior	A-10
6.	Instruction Memorandum to All State Directors from Director of the Bureau of Land Management	A-11
7.	H.R. 10699, a Bill to Amend Sections 2275 and 2276 of the Revised Statutes With Respect to Certain Lands Granted to the States.	A-12
8.	Manitoba Regulation 42/64	A-16
9.	The Oil Shale Regulations, Province of Saskatchewan	A-19
10.	Report of the Shale Oil Committee of the Independent Petroleum Association of America, October 1964	A-40
11.	H.R. 8960, Coal Acreage Bill, 78 STAT. 710	A-42
12.	Letter to National Coal Association from Secretary of Interior	A-43
13.	News-Release Data Announcing Formation of WEST Associates	A-44

14. Copy of Utah State Land Board Listing of Leases of State-Owned Bituminous Sands Land A-48

15. Alberta Regulation AR 502/54; Schedule of Amendments to Drilling and Production Regulations A-66

16. Alberta Regulation 342/62; Bituminous Sands Regulations A-71

Public Law 88-606
88th Congress, H. R. 8070
September 19, 1964

An Act

78 STAT. 982.

For the establishment of a Public Land Law Review Commission to study existing laws and procedures relating to the administration of the public lands of the United States, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That—

DECLARATION OF POLICY

SECTION 1. It is hereby declared to be the policy of Congress that the public lands of the United States shall be (a) retained and managed or (b) disposed of, all in a manner to provide the maximum benefit for the general public.

Public Land Law Review Commission. Establishment.

DECLARATION OF PURPOSE

SEC. 2. Because the public land laws of the United States have developed over a long period of years through a series of Acts of Congress which are not fully correlated with each other and because those laws, or some of them, may be inadequate to meet the current and future needs of the American people and because administration of the public lands and the laws relating thereto has been divided among several agencies of the Federal Government, it is necessary to have a comprehensive review of those laws and the rules and regulations promulgated thereunder and to determine whether and to what extent revisions thereof are necessary.

COMMISSION ON PUBLIC LAND LAW REVIEW

SEC. 3. (a) For the purpose of carrying out the policy and purpose set forth in sections 1 and 2 of this Act, there is hereby established a commission to be known as the Public Land Law Review Commission, hereinafter referred to as "the Commission."

Composition.

(b) The Commission shall be composed of nineteen members, as follows:

(i) Three majority and three minority members of the Senate Committee on Interior and Insular Affairs to be appointed by the President of the Senate;

(ii) Three majority and three minority members of the House Committee on Interior and Insular Affairs to be appointed by the Speaker of the House of Representatives;

(iii) Six persons to be appointed by the President of the United States from among persons who at the time appointment is to be made hereunder are not, and within a period of one year immediately preceding that time have not been, officers or employees of the United States; but, the foregoing or any other provision of law notwithstanding, there may be appointed, under this paragraph, any person who is retained, designated, appointed, or employed by any instrumentality of the executive branch of the Government or by any independent agency of the United States to perform, with or without compensation, temporary duties on either a full-time or intermittent basis for not to exceed one hundred and thirty days during any period of three hundred and sixty-five consecutive days; and

(iv) One person, elected by majority vote of the other eighteen, who shall be the Chairman of the Commission.

Chairman.

Vacancies.

[illegible] the Commission shall not affect the performance of functions [illegible] in the same manner in which the original appointment was made.

(d) The organization meeting of the Commission shall be held at such time and place as may be specified in a call issued jointly by the senior member appointed by the President of the Senate and the senior member appointed by the Speaker of the House of Representatives.

(e) Ten members of the Commission shall constitute a quorum, but a smaller number, as determined by the Commission, may conduct hearings.

(f) Members of Congress who are members of the Commission shall serve without compensation in addition to that received for their services as Members of Congress; but they shall be reimbursed for travel, subsistence, and other necessary expenses incurred by them in the performance of the duties vested in the Commission.

(g) The members appointed by the President shall each receive $50 per diem when engaged in the actual performance of duties vested in the Commission, plus reimbursement for travel, subsistence, and other necessary expenses incurred by them in the performance of such duties.

DUTIES OF THE COMMISSION

SEC. 4. (a) The Commission shall (i) study existing statutes and regulations governing the retention, management, and disposition of the public lands; (ii) review the policies and practices of the Federal agencies charged with administrative jurisdiction over such lands insofar as such policies and practices relate to the retention, management, and disposition of those lands; (iii) compile data necessary to understand and determine the various demands on the public lands which now exist and which are likely to exist within the foreseeable future; and (iv) recommend such modifications in existing laws, regulations, policies, and practices as will, in the judgment of the Commission, best serve to carry out the policy set forth in section 1 of this Act.

Report to President and Congress.

(b) The Commission shall, not later than December 31, 1968, submit to the President and the Congress its final report. It shall cease to exist six months after submission of said report or on June 30, 1969, whichever is earlier. All records and papers of the Commission shall thereupon be delivered to the Administrator of General Services for deposit in the Archives of the United States.

DEPARTMENTAL LIAISON OFFICERS

SEC. 5. The Chairman of the Commission shall request the head of each Federal department or independent agency which has an interest in or responsibility with respect to the retention, management, or disposition of the public lands to appoint, and the head of such department or agency shall appoint, a liaison officer who shall work closely with the Commission and its staff in matters pertaining to this Act.

ADVISORY COUNCIL

SEC. 6. (a) There is hereby established an Advisory Council, which shall consist of the liaison officers appointed under section 5 of this Act, together with 25 additional members appointed by the Commission who shall be representative of the various major citizens' groups interested in problems relating to the retention, management, and disposition of the public lands, including the following: Organizations representative of State and local government, private organizations working in the field of public land management and outdoor recreation resources and opportunities, landowners, forestry interests, livestock

interests, mining interests, oil and gas interests, commercial and sport fishing interests, commercial outdoor recreation interests, industry, education, labor, and public utilities. Any vacancy occurring on the Advisory Council shall be filled in the same manner as the original appointment.

(b) The Advisory Council shall advise and counsel the Commission concerning matters within the jurisdiction of the Commission.

(c) Members of the Advisory Council shall serve without compensation, but shall be entitled to reimbursement for actual travel and subsistence expenses incurred in attending meetings of the Council called or approved by the Chairman of the Commission or in carrying out duties assigned by the Chairman.

(d) The Chairman of the Commission shall call an organization meeting of the Advisory Council as soon as practicable, meetings of such council each six months thereafter, and a final meeting prior to approval of the final report by the Commission.

GOVERNORS' REPRESENTATIVES

SEC. 7. The Chairman of the Commission shall invite the Governor of each State to designate a representative to work closely with the Commission and its staff and with the advisory council in matters pertaining to this Act.

POWERS OF THE COMMISSION

SEC. 8. (a) The Commission or, on authorization of the Commission, any committee of two or more members, at least one of whom shall be of each major political party, may, for the purpose of carrying out the provisions of this Act, hold such hearings and sit and act at such times and places as the Commission or such authorized committee may deem advisable. Subpenas for the attendance and testimony of witnesses or the production of written or other matter may be issued only on the authority of the Commission and shall be served by anyone designated by the Chairman of the Commission.

The Commission shall not issue any subpena for the attendance and testimony of witnesses or for the production of written or other matters which would require the presence of the parties subpenaed at a hearing to be held outside of the State wherein the witness is found or resides or transacts business.

A witness may submit material on a confidential basis for the use of the Commission and, if so submitted, the Commission shall not make the material public. The provisions of sections 102–104, inclusive, of the Revised Statutes (2 U.S.C. 192–194) shall apply in case of any failure of any witness to comply with any subpena or testimony when summoned under this section.

(b) The Commission is authorized to secure from any department, agency, or individual instrumentality of the executive branch of the Government any information it deems necessary to carry out its functions under this Act and each such department, agency, and instrumentality is authorized and directed to furnish such information to the Commission upon request made by the Chairman or the Vice Chairman when acting as Chairman.

(c) If the Commission requires of any witness or of any governmental agency production of any materials which have theretofore been submitted to a government agency on a confidential basis, and the confidentiality of those materials is protected by statute, the material so produced shall be held confidential by the Commission.

APPROPRIATIONS, EXPENSES AND PERSONNEL

SEC. 9. (a) There are hereby authorized to be appropriated such sums, but not more than $4,000,000, as may be necessary to carry out the provisions of this Act and such moneys as may be appropriated shall be available to the Commission until expended.

(b) The Commission is authorized, without regard to the civil service laws and regulations and without regard to the Classification Act of 1949, as amended, to fix the compensation of its Chairman and appoint and fix the compensation of its staff director, and such additional personnel as may be necessary to enable it to carry out its functions except that any Federal employees subject to the civil service laws and regulations who may be employed by the Commission shall retain civil service status without interruption or loss of status or privilege.

(c) The Commission is authorized to enter into contracts or agreements for studies and surveys with public and private organizations and, if necessary, to transfer funds to Federal agencies from sums appropriated pursuant to this Act to carry out such aspects of the review as the Commission determines can best be carried out in that manner.

(d) Service of an individual as a member of the Advisory Council, as the representative of a Governor, or employment by the Commission of an attorney or expert in any job or professional field on a part-time or full-time basis with or without compensation shall not be considered as service or employment bringing such individuals within the provisions of the Act of October 23, 1962 (76 Stat. 1119).

DEFINITION OF "PUBLIC LANDS"

SEC. 10. As used in this Act, the term "public lands" includes (a) the public domain of the United States, (b) reservations, other than Indian reservations, created from the public domain, (c) lands permanently or temporarily withdrawn, reserved, or withheld from private appropriation and disposal under the public land laws, including the mining laws, (d) outstanding interests of the United States in lands patented, conveyed in fee or otherwise, under the public land laws, (e) national forests, (f) wildlife refuges and ranges, and (g) the surface and subsurface resources of all such lands, including the disposition or restriction on disposition of the mineral resources in lands defined by appropriate statute, treaty, or judicial determination as being under the control of the United States in the Outer Continental Shelf.

Approved September 19, 1964.

LEGISLATIVE HISTORY:

HOUSE REPORT No. 1008 (Comm. on Interior & Insular Affairs).
SENATE REPORT No. 1444 (Comm. on Interior & Insular Affairs).
CONGRESSIONAL RECORD, Vol. 110 (1964):
Mar. 10: Considered and passed House.
Sept. 3: Considered and passed Senate, amended.
Sept. 4: House agreed to Senate amendments.

GPO 35-137

COPY OF LETTER FROM MAX GARDNER, DIRECTOR,
UTAH STATE LAND BOARD TO THE ATTORNEY GENERAL
FOR THE STATE OF UTAH

September 3, 1964

The Honorable
Attorney General
B U I L D I N G

Dear Sir:

As you probably know, the Land Board has had under consideration for some time formal requests from industry people that the State of Utah oil shale lease form be modified. Any lease. modification will be predicated on the notion that the oil shale lease form at present is too onerous to foster oil shale development.

On August 19, 1964, the Board held a public hearing concerning proposed modifications. After the public hearing, the Board tentatively suggested certain modifications as a starting point. The Board's proposals should be considered tentative and in the nature of "straw men". These proposals are as follows:

1. A primary term of 20 years and so long thereafter as oil shale or the oil, gas, hydrocarbons, or other elements or components of oil shale is being produced in commercial quantities.

2. A unitization clause authorizing unitization of State lands with other lands as in our oil and gas lease form.

3. A royalty rate of 5% of the gross value of the products for a period of 5 years after the first commercial production on the leased lands, the royalty rate to graduate thereafter at a rate of not more than 1% per year until a maximum of 12-1/2% is reached, the royalty in any State lease to be, in any event, not less than the highest royalty rate on any other State lease in the State of Utah.

4. A rental of 50¢ per acre for the first 10 years of the primary term, to graduate to $1.50 per acre for the

2nd 10 year period of the primary term, rentals to be a credit on any royalty for each calendar year.

5. The research and development provisions of Section 5 should be eliminated.

If these modifications are finally adopted, the Board would like to give existing lessees the opportunity to take advantage of these changes in the lease form. We would therefore appreciate receiving your opinion as to the legality of each of the modifications as well as to whether we could permit each holder of an existing lease to take advantage of the modifications.

If these modifications can be made, we would also ask that you draft them in sufficient and adequate legal language for inclusion in an oil shale lease form.

We have, for your information, enclosed a copy of our existing oil shale lease form together with a copy of our oil and gas lease form. If you need any additional information concerning these matters, please let me know.

Yours sincerely,

MAX C. GARDNER
DIRECTOR

Enclosures (2)
MCG:lw

STATE OF UTAH
OFFICE OF THE ATTORNEY GENERAL
SALT LAKE CITY

A PRATT KESLER
ATTORNEY GENERAL

October 13, 1964

Mr. Max C. Gardner, Director
State Land Board
B U I L D I N G

Dear Mr. Gardner:

Pursuant to your letter of September 3, 1964, we have considered the questions contained therein relating to the proposed modification of the oil shale lease form. The provisions and questions which you have set out will be answered in the order in which they appear in your letter.

1. 65-1-18, Utah Code Annotated 1953, empowers the State Land Board to issue mineral leases. There is no limitation contained in that provision which would prohibit the board from issuing a lease for a period of twenty years. 65-1-44, U.C.A. 1953, also empowers the State Land Board to issue leases and does not restrict the primary term of the lease. It would appear, therefore, that these provisions are not obstacles to the issuance of a lease for twenty years.

65-1-44 provides that if the Land Board deems it advisable to lease land for purposes other than oil and gas, that the lands must be appraised. The term "oil and gas" where used within that provision would undoubtedly cover oil and gas produced from oil shale. Consequently, it would appear that an appraisal would not be necessary.

The provisions of 65-1-86 provide that no oil and gas leases of lands or <u>mineral interests</u> belonging to the State shall be made except in accordance with the provisions of the Oil & Gas Leasing Act. That act provides for a particular term of oil and gas leases. 65-1-89, U.C.A. 1953. It does not allow leases to be issued for twenty years. To the extent that that act may be deemed to cover oil and gas leases issued on oil shale, it may not be permissible for the board to issue a twenty year lease. It was undoubtedly the intent of the Legislature to cover the standard forms of production of oil and gas by drilling into reservoirs or aquifers. It is doubted that the

Legislature intended the act to apply to oil shale processing. It is, therefore, felt that the provisions of 65-1-86 and 65-1-89 would not prohibit the issuance of a twenty year oil shale lease. However, the board should be aware of the possible legal challenge to any lease issued since it may be argued that the term "oil and gas" encompasses oil shale.

2. There would appear to be no objection to the board issuing a lease with a unitization clause. Although 65-1-63 might relate exclusively to pools, the general power of the Land Board to manage State lands acknowledged in 65-1-14 would allow the board to manage the lands in any reasonable manner; and since 65-1-18 and 65-1-21 grant the board general power to issue leases for mining, etc., on whatever terms it deems in the best interest of the State, it would seem that a unitization clause would be proper.

3. The royalty provisions would not be objectionable unless it was argued that 65-1-88 was applicable to oil shale leases. As noted before, such an argument can be made.

4. A rental of 50¢ per acre would be in accord with the provisions of 65-1-18, U.C.A. 1953, if it were assumed that the rental provisions of 65-1-91 would not otherwise apply. The argument noted under 1. and other paragraphs above is equally applicable here.

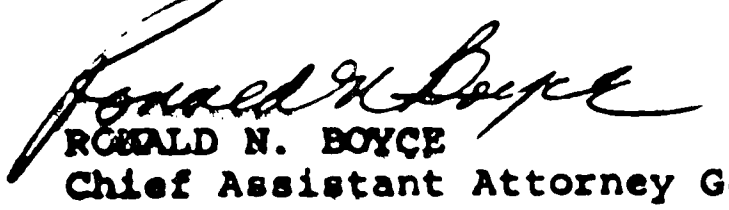
5. There would appear to be no objection to deleting Section 5 of the present oil shale lease, if this were deemed to be in the best interest of the State.

There is a substantial question raised as to whether or not the board may allow existing lessees the opportunity to take advantage of any of the changes in the lease form. There would be no consideration for granting many of the benefits contained in any modified lease form. We are, therefore, of the opinion that in the absence of some consideration flowing to the State, that it would not be permissible to make modifications in present leases. However, a consideration to the State may arise by means other than cash reward.

At such times as the board approves the possible modifications, we will be most happy to undertake to draft appropriate clauses for inclusion in any lease.

Sincerely,

A. PRATT KESLER
Attorney General



RONALD N. BOYCE
Chief Assistant Attorney General

RNB:dyh

COMMITTEE ON INTERIOR AND INSULAR AFFAIRS
HOUSE OF REPRESENTATIVES
Office of the Chairman
Washington 25, D.C.

February 11, 1963

Dear Mr. Secretary:

My attention has been called to the letter to you dated February 7, 1963 from the Attorney General in which he advises you, in effect, that public lands which are known to contain valuable mineral deposits and are under mineral lease or permit but are not yet in producing status may be selected by the States as indemnity for school lands which were originally reserved for them but which, for various reasons, are no longer available for this purpose.

I note the Attorney General's comments that certain language in the 1958 Act, upon which this matter hinges, seems not to have been based on an evaluation by Congress of its effects in the case of lands containing solid materials but, rather, with an eye to oil and gas; that the importance of these effects is such that Congress may wish to consider remedial legislation; and that, in the meantime, your Department is in a position to maintain the status quo with respect to the selectability of lands (if I may use this term) by virtue of the authority given you by section 7 of the Taylor Grazing Act.

With this in mind, I suggest that you consider the desirability of refraining from opening for selection other mineral-rich lands in which the situation is similar to that involved in the case your Department placed before the Attorney General until Congress has had an opportunity to consider this matter fully. I also think that your Department should prepare to make, in the very near future, such recommendations for legislation as it believes necessary or desirable in the light of the Attorney General's opinion.

Sincerely yours,

WAYNE N. ASPINALL

Honorable Stewart L. Udall
Secretary of the Interior
Washington 25, D.C.

February 15, 1963

Dear Mr. Chairman:

Your letter of February 11 quite properly raises very serious questions concerning the recent opinion of the Attorney General and the effect of the 1958 Act on monies which would otherwise normally accrue to the Reclamation Fund. This, as you know, also presented us with a very close legal question--which the Attorney General resolved in favor of the position taken by Senator Moss and the State of Utah. In light of the questions you have raised--and your suggestion that Congress should have an opportunity to consider remedial legislation, it is my intention to follow your suggestion and maintain the status quo with respect to the selectability of lands until the respective committees have had an opportunity to make a re-evaluation of this problem.

In the meantime, I should also advise you that I have asked the Bureau of Land Management and the Bureau of Reclamation to make a joint evaluation of the prospective effect which this law will have on the Reclamation Fund, and once this study is completed we will be in a position, if that is the wish of your Committee, to make recommendations concerning remedial legislation.

Sincerely,

/s/ Stewart L. Udall

Stewart L. Udall
Secretary of the Interior

Honorable Wayne N. Aspinall, Chairman
Committee on Interior and Insular Affairs
House of Representatives
Washington 25, D.C.

In reply refer
6.03
2300

UNITED STATES
DEPARTMENT OF THE INTERIOR
Bureau of Land Management
Washington 25, D.C.

February 27, 1963

Instruction Memo No. AD-L&M- 3
Expires 6/30/63

To: All SD's

From: Director

Subject: State Selections

Attached are copies of a letter dated February 11, 1963 from Chairman Wayne N. Aspinall, House Interior and Insular Affairs Committee, to Secretary Udall, of Secretary Udall's reply dated February 15, and of a communication dated February 7 from the Attorney General to the Secretary, with respect to the above subject.

As you will note, Mr. Aspinall advised that "Congress may wish to consider remedial legislation" with respect to state selections of mineral-rich lands. He suggested that the Department consider the desirability of refraining from opening for selection under Section 7 other "mineral-rich lands similar to that involved in the case your Department placed before the Attorney General until Congress has had an opportunity to consider this matter fully."

Also please note the Secretary's reply to Mr. Aspinall in which he stated "* * * In light of the questions you have raised--and your suggestion that Congress should have an opportunity to consider remedial legislation, it is my intention to follow your suggestion and maintain the status quo with respect to the selectability of lands until the respective committees have had an opportunity to make a re-evaluation of this problem."

Accordingly, you are requested to assure that all essential elements and information in relation to the above question, including the results of the proposed Congressional consideration, are in your hands before favorably acting in this type of case where "mineral-rich" lands are concerned.

Karl S. Landstrom

Enclosures 3

Distribution:
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AD-L&M - 25
O&M - 5

88TH CONGRESS
2D SESSION

H. R. 10699

IN THE HOUSE OF REPRESENTATIVES

APRIL 7, 1964

Mr. ASPINALL (by request) introduced the following bill; which was referred to the Committee on Interior and Insular Affairs

A BILL

To amend sections 2275 and 2276 of the Revised Statutes, as amended, with respect to certain lands granted to the States.

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 2275 of the Revised Statutes, as amended (43
4 U.S.C. 851), is further amended by
5 (a) Deleting the words "or Territory" wherever they
6 appear in that section;
7 (b) Deleting the words "prior to survey" wherever
8 they appear in that section and substituting therefor the
9 words "before title could pass to the State".
10 SEC. 2. Section 2276 of the Revised Statutes, as amended
11 (43 U.S.C. 852) is further amended by

I

1 (a) Deleting the words "or Territory" and "or Terri-
2 tories" wherever they appear in that section;
3 (b) Inserting in subsection (a) between the word
4 "restrictions" and the colon the following: "and conditions";
5 (c) Substituting for subparagraphs numbered (1), (2),
6 and (3) of subsection (a) the following:
7 "(1) No mineral lands believed to contain any of those
8 mineral deposits (a) enumerated in section 1 of the Act of
9 February 25, 1920, as amended (30 U.S.C. 181), or (b)
10 which hereafter become subject to leasing by the United
11 States under that Act or similar Acts (both of which are
12 hereinafter called 'leasable minerals'), and no retained or
13 reserved interest of the United States in lands which have
14 been disposed of with a reservation to the United States
15 of any or all of such mineral deposits (hereinafter called
16 'the retained mineral interest'), may be selected by a State
17 except to the extent that the selection is being made for
18 lands which contain leasable minerals and were lost to the
19 State before title could pass to it: *Provided,* That the
20 mineral lands, or the retained mineral interest, selected shall
21 not exceed in monetary value the value of the lost lands
22 for which they are to indemnify the State. The respective
23 values of the selected lands and lost lands shall be deter-
24 mined by the Secretary of the Interior by appraisal as of

1 the date the selected lands are, except for the question of
2 value, found by him in writing to be available and suitable
3 for selection under section 7 of the Taylor Grazing Act, as
4 amended (43 U.S.C. 315f). Where a State applies to
5 select a retained mineral interest, the respective values of
6 the retained mineral estate and the lost lands shall be deter-
7 mined by the Secretary of the Interior by appraisal as of the
8 date on which he makes a written finding that such selection,
9 except for the question of value, is in the public interest.
10 "The term 'mineral lands', as used in this section,
11 means lands with respect to which the known conditions
12 on the date prescribed by subsection (d) (2) of this section
13 are such that they would engender in a reasonable and pru-
14 dent man the belief that the lands contain mineral of such
15 quality and in such quantity as would justify expenditure
16 by him of funds for development and exploration thereof.
17 "(2) When title to selected lands passes to a State, it
18 will include title to all mineral deposits in those lands, except
19 that a State may decline to receive some or all of the leasable
20 mineral deposits. If a State declines to receive some or all
21 of the leasable mineral deposits, the value of the selected
22 lands, as determined by the Secretary, shall be decreased by
23 the value of the mineral deposits retained by the United
24 States. Land which has no value for leasable minerals, other

1 than for those mineral deposits so refused by the State and
2 retained by the United States, may be selected as nonmineral
3 land.

4 "(3) Land covered by a mineral lease or permit issued
5 under the aforementioned Mineral Leasing Act may be
6 selected by a State, subject to the provisions of this section."

7 (d) Deleting in subparagraph d(2) the following
8 words "of application for selection and upon the basis of the
9 best evidence available at that time" and substituting there-
10 for the following: "specified in this section for the determina-
11 tion of values".

MANITOBA REGULATION 42/64

Being
A Regulation under The Mines Act
to amend Manitoba Regulation 29/50
(Filed June 24th, 1964.)

1. Subsection (1) of section 176 of Manitoba Regulation 29/50, as enacted by Manitoba Regulation 3/51, is amended by adding thereto, immediately after the figure "(1)" in the first line thereof, the words, figures, and letter "Subject to section 192 O".

2. Part X of Manitoba Regulation 29/50, as enacted by Manitoba Regulation 3/51, is amended by adding thereto, immediately after section 192 thereof, the following sections:

GEOLOGICAL AND GEOPHYSICAL RESERVATIONS

192A. Subject to the approval of the minister, the director may grant a reservation for boring claims for oil shale in a tract of land to an applicant therefor for the purpose of carrying on geological or geophysical examinations or both, including investigations relating to subsurface geology, if satisfactory representations are made that the prospecting program to be undertaken will obtain information that will be of value.

192B. (1) An application for a reservation under section 192A shall be made to the chief mining recorder.

(2) An application for a reservation under section 192A shall be supported by complete data setting out the extent of the examination to be made and the estimated cost thereof, and where all or part of the reservation is situated in unsurveyed territory shall be accompanied by such further information as will enable the director to adequately determine the boundaries thereof.

192C. (1) An application for a reservation shall be accompanied by

(a) an application fee of $250.00; and

(b) a cash deposit for each twenty thousand acres or portion thereof comprising the area of the reservation of

(i) $750.00 where the work to be performed is restricted to geological investigations, and

(ii) $2000.00 where the work to be performed includes geophysical operations or any investigation relating to subsurface geology.

(2) Where the cash deposit in respect of a reservation has been made under sub-clause (i) of clause (b) of subsection (1), if the holder of the reservation, after the reservation has been granted, decides to carry out geophysical operations or any investigation relating to subsurface geology, he shall pay an additional cash deposit of $1250.00 for every twenty thousand acres or a portion thereof comprised in the reservation.

192D. Where an application for a reservation is refused, the fee and cash deposit for which provision is made in subsection (1) of section 192C shall be returned to the applicant.

192E. No geophysical operations or examination relating to subsurface geology in a reservation granted under section 192A shall be conducted by a person who is not the holder of a valid subsisting geological or geophysical licence issued under Part III of Manitoba Regulation 14/47, and such operations and examination shall be subject to Part III of Manitoba Regulation 14/47.

192F. The area of a reservation granted under section 192A shall not exceed two hundred thousand acres and shall not be less than ten thousand acres.

192G. Where, prior to the granting of a reservation under section 192A, a person has defined in the prescribed manner a location for a boring claim for oil shale in unsurveyed territory within a reservation, and he applies for a lease of the location within the prescribed time, he shall have a prior right to the lease.

192H. (1). The cash deposit for which provision is made under section 192C shall be held as a guarantee that an expenditure will be made in approved geological examinations, geophysical operations, or examination relating to the subsurface geology, of the area comprising the reservation in respect of which the deposit was made.

(2) If the holder of a reservation granted under section 192A fails to provide evidence that during the term of the reservation an expenditure, satisfactory to the director, was made for the purposes for which the reservation was granted, the cash deposit made under section 192C shall be forfeited to the Crown.

(3) If the holder of a reservation granted under section 192A, or the holder of more than one such reservation for the purposes of a single program of prospecting, suspends field operations for more than ninety days except during the period between the thirtieth day of September and the first day of April, the cash deposit made under section 192C in respect of the reservation shall be forfeited to the Crown.

192I. (1) The holder of a reservation granted under section 192A shall from time to time file progress reports with the director.

(2) Subject to subsection (3), on the basis of progress reports and such other information as the director may require in respect of expenditures, the director may order that portions of the cash deposit made in respect of a reservation granted under section 192A equal to the expenditure made in respect of the reservation for the purposes for which the reservation was granted be returned to the holder of the reservation from time to time, but no portion of the cash deposit shall be returned until the director has received a statement setting forth the several items of expenditure incurred for the purpose for which the reservation was granted and the specific purpose for which each such item was expended verified by a statutory declaration of an independent auditor.

(3) At least thirty per cent of the cash deposit made in respect of a reservation granted under section 192A shall be retained until after the holder of the reservation has submitted the record required to be submitted under section 192M.

192J. (1) Before operations are commenced in a reservation granted under section 192A and not later than thirty days after the reservation is granted, or where the reservation is granted during the period between the thirtieth day of September and the first day of April, prior to the first day of May, the holder of the reservation shall submit to the director

(a) evidence of the employment of qualified personnel for the operations to be performed; and

(b) information as to the date the operations will commence.

(2) Where the reservation is granted for investigation of subsurface geology, the holder thereof shall have sixty days in which to provide the evidence and information required under subsection (1).

192K. (1) The term of a reservation granted under section 192A shall be twelve months from the date on which it is issued.

(2) The director may renew a reservation granted under section 192A for a further period of one year upon the holder thereof filing with the director satisfactory progress reports.

(3) The minister may further extend a reservation granted under section 192A for a period not exceeding one year upon the payment at the time of the extension by the holder thereof of a fee of five cents per acre for each acre comprising the reservation.

192L. Where the holder of a reservation has commenced an investigation relating to subsurface geology, on a reservation, or a group of reservations, the Lieutenant-Governor-in-Council may grant further extensions to the said reservation, or reservations, subject to such terms and conditions as are deemed advisable.

192M. Within six months of the expiry of a reservation granted under section 192A, the holder thereof shall submit to the director a complete record of the information as to geological, geophysical, and other data obtained as a result of the examination, and attested to by a registered engineer.

192N. The holder of a reservation granted under section 192A may terminate it at any time, but he shall not be entitled to a refund of any cash deposit made in respect thereof under section 192C in excess of the amount he has expended for the purposes for which the reservation was made.

192 O. (1) Subject to subsection (2), the holder of a reservation granted under section 192A has an exclusive right to a lease or leases of tracts within the reservation up to the date of expiry or termination thereof.

(2) The holder of a reservation granted under section 192A shall not be granted a lease for

more than ten per cent of the tract described in the reservation; but where he holds more than one reservation for the purposes of a single program of prospecting, all of which were granted at the same time, he may lease not more than ten per cent of all the tracts comprising all those reservations without regard to the boundaries of the reservations.

(3) Where the holder of a reservation granted under section 192A desires to apply for a lease of lands comprising part of the reservation, he shall apply in accordance with the provisions of this Part dealing with leases, and sections 185 to 191 apply to the application for a lease and to the lease.

(4) Where a lease of a boring claim for oil shale in a reservation granted under section 192A is granted to the holder of the reservation, the lease shall bear and the rentals shall be payable from the date of issue, but the term thereof shall be computed from the date the reservation was issued.

192P Any assignment, transfer, sub-lease, or other disposition, of a reservation granted under section 192A is of no effect unless the minister has given his written consent thereto.

192Q Where the holder of a reservation granted under section 192A defaults in the due observance of or compliance with the terms and conditions under which the reservation was granted, the minister may cancel the reservation.

192R Where the records of the branch indicate that a reservation for oil shale or a lease of a boring claim has expired or been terminated or cancelled, the rights described therein shall not be disposed of until such time and except on such terms and conditions as the minister may prescribe.

The Oil Shale Regulations

made under The Mineral Resources Act, 1959

(Province of Saskatchewan, Canada)

Part I

Title

1. These regulations may be cited as The Oil Shale Regulations, 1964.

Interpretation

2. Subject to section 3, these regulations shall be construed with reference to the terms and interpretation of The Mineral Resources Act, 1959.

Definitions

3. In these regulations unless the context otherwise requires:

(a) "adjoin" or "adjoining" where used in connection with subdivisions of land means touching at one or more points and subdivisions that are separated by a correction line, road allowance, railway or other right of way, river or stream shall be deemed to be adjoining;

(b) "department" means the Department of Mineral Resources;

(c) "director" means the Director of Mineral Lands of the department;

(d) "grantee" means the holder of a permit, lease or other disposition issued under these regulations;

(e) "lease" means "oil shale lease";

(f) "minister" means the Minister of Mineral Resources;

(g) "oil shale" means shale or tar sands from which oil shale products as hereinafter defined may be produced or any such other substance that the minister may define as oil shale;

(h) "oil shale products" means hydrocarbon gas or oil and includes all minerals and substances that may be produced from oil shales or tar sands in association with the production of hydrocarbon gas or oil;

(i) "tar sands" means all sands and rocks in the sedimentary basin of Saskatchewan lying north of fifty-five degrees and twenty minutes north latitude, and west of the third meridian, and lying above the top of the Devonian formation;

(j) "work" means geological and geophysical surveys, drilling, coring logging, mining, constructing and operating a pilot plant for experimentation and testing, constructing processing plant and any other work approved by the minister for the purpose of exploring for, developing or mining oil shales and carried on in the disposition area or, with the written consent of the minister, carried on in any other place;

(k) "year" means the twelve month period from the date of issue of the permit, lease or other disposition from the Crown or from the anniversary date thereof, as the case may be.

Application

4. -(1) These reguations shall apply to the rights to oil shales that are the property of the Crown in the right of Saskatchewan and to the disposition thereof as follows:

(a) Part II shall apply to dispositions of Crown rights to oil shales made heretofore or hereafter by means of permits under these or any other regulations;

(b) Part III shall apply to dispositions of Crown rights to oil shales by means of leases;

(c) Part IV shall apply to all permits, leases or other dispositions of Crown rights to oil shales granted heretofore or hereafter.

(2) Notwithstanding subsection (1), Part V shall apply to all lands situated in Saskatchewan except freehold lands where the owner of the surface rights is also the owner of all the rights to the oil shales thereunder.

Part II
Permits

Application for permit

5. An application for a permit to explore for oil shales shall be submitted to the department, and the minister may issue a permit in accordance with these regulations for an area of land not exceeding one hundred thousand acres in respect of which the rights to oil shales are the property of the Crown in the right of Saskatchewan.

Requirements

6. An application for a permit shall be accompanied by:

Requirements for application

6. An application for a permit shall be accompanied by:

(a) a plan and description of the lands applied for satisfactory to the minister;

(b) a program of work that the applicant intends to carry out in respect thereof;

(c) a statement proving the applicant's ability to have the proposed work done where such proof is not already on record in the department;

(d) the rent for the first year, and such rent shall be retained by the department if the permit is granted, or returned to the applicant if the application is rejected; and

(e) the names and addresses of the directors and officers of the applicant if the applicant is a corporation and if such information is not on record in the department.

Rights granted

7. The permit shall, subject to these regulations, grant to the permittee the right, license, privilege and authority to explore, mine, quarry and work the permit lands for oil shales but not to remove, produce or recover, except for test purposes, oil shale products from such shales until a lease pursuant to these regulations has been granted.

Term of permit

8 -(1) The permit shall, subject to subsection (2) be for a maximum term of five years from the date of issue.

(2) Upon written application the minister may grant up to three one-year extensions to the term of the permit. All conditions applicable in the fifth year of the permit shall mutatis mutandis apply in each year of the extension period and in any extension the minister may impose such other conditions as he deems advisable.

Permit rent

9. The rent shall be payable yearly in advance as follows:

(a) for the first and second years of the term of the permit, at the rate of two cents an acre for each year;

(b) for the third year of the term of the permit, at the rate of five cents an acre;

(c) for the fourth and fifth years of the term of the permit, at the rate of ten cents an acre for each year.

Rental credits

10. Notwithstanding section 9, the permittee shall, upon compliance with these regulations, be entitled at the end of each year of the term of the permit to a rental credit of fifty per cent of the rent paid or deemed to have been paid or satisfied through rental credit for such year and such credit may be applied toward the rent required under section 9 for the following year.

Minimum expenditure requirements

11. - (1) The permittee shall expend in work with respect to the permit as follows:

(a) at the rate of two cents an acre in the first year of the permit;

(b) at the rate of four cents an acre in the second year of the permit;

(c) at the rate of six cents an acre in the third year of the permit;

(d) at the rate of eight cents an acre in the fourth year of the permit;

(e) at the rate of ten cents an acre in the fifth year of the permit.

Proof of expenditures

12. - (1) The permittee shall, within thirty days next following the anniversary date of each year of the term of the permit, submit to the minister a statement setting forth the estimated sums of money expended during such year in carrying out the work with respect to the permit.

(2) The permittee shall, within four months next following the anniversary date of each year of the term of the permit, submit to the minister a detailed statement setting forth the sums of money expended in carrying out the work with respect to the permit; and such statement shall be certified by a chartered accountant or a certified public account satisfactory to the minister, or verified by statutory declaration by a person with personal knowledge of the facts and accompanied by original vouchers or certified copies thereof, verifying the expenditures provided that, if the minister in any particular case so requires, the statement shall be certified by a chartered accountant or a certified public accountant satisfactory to the minister.

(3) If there is a deficiency in the amount of expenditures required to be made pursuant to section 11, the permittee may in order to maintain the permit in good standing:

(a) make a cash payment equivalent to the amount of such deficiency;

(b) make a cash deposit equivalent to the amount of the deficiency and such deposit shall be refunded upon proof shown by the permittee that he has expended during any subsequent year in the first five years of the term of the permit an amount equivalent to the amount of the expenditures required by section 11 up to and including such subsequent year; and, if the permittee has not expended the amount equivalent to such expenditures, the minister may refund a portion of the cash deposit equivalent to the amount of the actual expenditures, if any, made during such subsequent year in excess of the amount of expenditures required by section 11 up to and including such subsequent year; and the balance of the deposit shall, at the end of the said five year period, become the property of the Crown.

Credit for expenditures

13. - (1) The amount of expenditures approved by the minister in respect of the work carried out by the permittee during any year of the term of the permit shall be credited to the permittee against the amount of the expenditures required to be made during such year.

(2) If the permittee expends during any year an amount of money greater than that which he is required to expend pursuant to section 11, such excess expenditures shall be deemed to have been expended in work in the succeeding year or years of the term of the permit or may, at the option of the permittee, be applied for credit against lease rents pursuant to section 18.

Information and material to be submitted

14. - (1) The permittee shall, within six months after the end of each year of the term of the permit, submit to the minister a detailed statement setting forth full particulars of the work and operations conducted during the preceding year and specifically setting forth the following information and accompanied by the following material:

(a) the nature of the work and operations performed;

(b) the extent to which drilling operations were carried out;

(c) where a gravity meter survey has been made:

(i) a clear sepia copy of a map showing the location and ground elevation of each station.

(ii) a clear sepia copy of a map showing the final corrected value at each station contoured on a 0.5 milligals or less; and

(iii) a translucent copy of the complete report on the survey signed by a qualified geophysicist, geologist or engineer;

(d) where a geophysical survey approved by the minister or an aerial magnetometer or ground magnetometer survey has been made;

(i) a clear sepia copy of a map contoured on suitable scale, showing the location of each station and the corresponding observed value; and

(ii) a translucent copy of the complete report of the survey signed by a qualified geophysicist, geologist or engineer;

(e) where a seismic survey has been made:

(i) a clear sepia copy of a map showing on the map, or in a suitable translucent tabular form, the location and ground elevation of each shot hole and the depth of the overburden, glacial drift, water, sand, gravel, coal, clay, and other minerals encountered;

(ii) a clear sepia copy of maps for the most dependable and continuous reflecting horizon above, at and below the top of the Palaeozoic group where information at such levels is available, based on the best current interpretation of all the seismograms obtained in the permit area indicating the correction datum and velocity functions applied, showing at each shot point the corrected time values or corresponding depths and contoured on the basis of these values, employing a contour interval of 0.010 seconds or less if the value at the shot point if represented in corrected time and fifty feet or less if the value at the shot point is given in feet; and

(iii) a translucent copy of the complete report of the survey submitted by the contracting seismograph company to the operator or by the operator's own seismograph department;

(f) where maps are required to be submitted to the minister or copies thereof under this section, the paper on which such maps are printed shall not be larger in size than forty inches by forty-eight inches; and

(g) in addition to the information requested under subclause (ii) of clause (e), the minister may request clear copies of the seismograms taken at each shot point, with the necessary computational data included on the face of each record and a departmental employee authoried by him may at any time examine the original seismograms and any pertinent data related to them.

Release of Information

(2) No information submitted pursuant to subsection (1), except information with respect to the surrendered lands, shall be made available to the public without the consent of the permittee.

Surrender of permit lands

15. The permittee shall have the right to surrender all or any part of the permit lands at any time during the term of the permit, but no refund of rent shall be made and the expenditure requirements shall be based upon the acreage of permit lands at the commencement of each rental year.

Right to lease

16. The permittee shall, subject to compliance with section 11 and 12, have the exclusive right at any time during the term of the permit and during the period of sixty days after the end of the term of the permit, unless it is terminated for any default on the part of the permittee, to apply for and obtain one or more leases of permit lands or portion thereof.

Part III to apply in lease selections

17. An application for and granting of a lease pursuant to section 16 shall be in accordance with Part III.

Lease rental credits

18. The minister shall, if he is satisfied that the permittee has fulfilled all the requirements of these regulations during the term of the permit, credit the permittee with the amount by which the expenditures approved by the minister exceed the expenditures required to be made pursuant to section 11 and such credit shall be applied toward the rent for the first twenty-four months or any portion thereof

on a pro rata basis, or at the option of the permittee, for the first twenty-four months or any portion thereof on a pro rata basis, of the term commencing from the first day of April, of any lease that may have been, or may thereafter be, granted to the permittee in respect of any permit lands

Other parts applicable to permits

19. All permits shall be subject to Parts IV and V.

Part III
Leases of Crown Lands

Granting of lease

20. The minister may grant to an applicant a lease of the rights to oil shales in accordance with these regulations.

Lease area

21. Subject to section 27, the area that may be included in any one lease shall be not less than one legal subdivision or forty acres and all lands in the lease shall be adjoining or shall form a solid block.

Application

22. An application for a lease shall be accompanied by:

(a) a plan showing the area applied for and the lands in the area within which the rights to oil shales are the property of the Crown in the right of Saskatchewan;

(b) a legal description of such lands if they are in a surveyed territory;

(c) subject to section 18, the rent at the rate of five cents an acre for each month or portion thereof, if any, between the effective date of the lease and the first day of April next following;

(d) an application fee of $10; and

(e) the names and addresses of the directors and officers of the applicant if the applicant is a corporation and if such information is not already on record in the department.

Term of lease

23. - (1) The lease shall be for a term commencing on the effective date thereof and extending to the first day of April next following and thenceforth for a period of twenty-one years unless the effective date of the lease is the first day of April in which case the term of the lease shall be twenty-one years from the effective date of the lease.

(2) Upon the expiration of the twenty-one year period mentioned in subsection (1), the lease shall be renewable for successive terms of twenty-one years each upon the application of the lessee, provided that the lessee has complied fully with the conditions of the lease or renewal thereof and with the provisions of these regulations as amended or substituted from time to time.

Annual rent

24. - (1) The rent subsequent to the rent referred to in clause (c) of section 22 shall be at the rate of one dollar an acre per annum, and subject to section 18, is payable yearly in advance on or before the first day of April of each year.

(2) Notwithstanding subsection (1), if a lessee elects to apply rental credits in lieu of cash rent covering the first twenty-four months of the lease or portion thereof as provided for in section 18, the rent for that portion of the year from the termination of the credit period to the next succeeding rent anniversary date of April 1 shall be due and payable on the termination date of such credit period on a pro rata basis.

What lease conveys

25. Subject to these regulations, the lease shall grant to the lessee the exclusive right, license, privilege and authority to search, dig, bore and drill for and work the oil shales within the lands described in the lease and to win, get, recover, procure, work, carry away, dispose of and sell the oil shale or oil shale products extracted from the oil shales found within such lands.

Surrender whole or part of a lease

26. - (1) The lessee may surrender the whole or part of the lands covered by his lease provided that:

(a) the surrendered portions conform to legally described parcels of land and include all the rights granted in the original lease with respect to the surrendered portions; and

(b) the retained portion of the lease is not less than one legal subdivision or forty acres.

(2) Where lands are surrendered there shall be no refund of rent.

Maximum lease area

27. - (1) Notwithstanding anything contained in these regulations but subject to subsections (2), (3) and (4), the maximum area that may be leased from the permit lands in any one permit shall be five thousand acres.

(2) If the necessary arrangements for custom processing of oil shales have been made to the satisfaction of the minister by the permittee with another person for producing oil shale products in a processing plant located in Saskatchewan, the maximum area that the permittee may lease from the permit lands in any one permit shall be twenty-five thousand acres.

(3) If the permittee has built a processing plant in Saskatchewan for, commercial production of oil shale products or, if the permittee has satisfied the minister that such plant will be built by the permittee and the permittee undertakes to expend within three years after the effective date of the applied for lease (unless the permittee has already expended such sum of money for such purpose) not less than $5,000,000 toward the construction of a processing plant in Saskatchewan, the maximum area that the permittee may lease from the permit lands held by the permittee under one or more permits shall be twenty-five thousand acres for each such permit plus an additional acreage from such one or more permits not exceeding for such additional acreage an aggregate acreage, exclusive of the twenty-five thousand acres from each permit, calculated on the basis of one acre for every $1000 of the capital expenditures made or to be made, as the case may be, for such processing plant.

(4) Notwithstanding anything contained in this section, the total acreage of Crown lands that may be held under lease in Saskatchewan by any one lessee shall not exceed two hundred and fifty thousand acres.

Form of lease

28. The minister shall prescribe the form of lease in accordance with these regulations.

Royalty

29. - (1) In this section:

(a) "fiscal year" means the period for which the accounts of the business of a person, including a corporation, partnership or syndicate are ordinarily made up and accepted for purposes of assessment under this section and, in the absence of an established practice, the fiscal year shall be the one adopted by the person, but no fiscal year shall exceed fifty-three consecutive weeks and no change in the usual and accepted fiscal year shall be made without the consent of or in accordance with the direction of the minister;

Sunday, November 29, 1964

Executive Session of the Oil Shale Advisory Board

Monday, November 30, 1964

Shell Oil Company
National Resource Council
Rocky Mountain Oil and Gas Association
The Oil Shale Corporation
Humble Oil and Refining Company
Colorado Governor's Oil Shale Advisory Committee
American Chemical Society

Tuesday, December 1, 1964

Socony Mobil Oil Company, Inc.
Valley Association
Sinclair Oil Company
Union Oil Company
National Coal Association
American Institute of Mining & Metallurgical Engineers
American Gas Association

The American Chemical Society is being asked to have available an expert who will be willing to discuss recovery of petrochemicals from oil shale. The American Gas Association is being asked to provide someone who can talk on and answer questions concerning gas from oil shale. From the Mining Branch, American Institute of Mining, Metallurgical and Petroleum Engineers it is hoped to get an expert from a leading mining organization, such as Utah Construction and Mining Company, to be able to talk about and answer questions on mining. From the National Coal Association it is hoped that someone from a major coal company, such as Consolidation Coal, will be provided. The Valley Association was asked so that a representative from a local group of landowners could be available.

Dr. Orlo Childs, President of the Colorado School of Mines, one of the Board members, stated that additional

meetings will be held with industry groups. These later meetings will be held in various areas of the country utilizing sub-committees formed of two or more members of the Board, with Childs and Mock serving the Mountain area, Galbraith and Gavin serving the New York area, etc. The dates of later meetings and the composition of the sub-committees have not been finalized. Childs stated that "full exposure" of the Oil Shale Advisory Board to all matters of interest is desired.

Fisher's announcement also stated that he anticipates than an interim report of the Oil Shale Advisory Board will be submitted to Secretary Udall shortly after the first of the year and that Secretary Udall will make it available for public comment.

(a) income taxes;

(b) depletion or exhaustion of the resources;

(c) interest and expenses on funded debt;

(d) royalties;

(e) moneys paid or portion thereof in the purchase of or in acquiring an option to purchase or in acquiring a right to produce or process oil shale products.

(5) In the event that any oil shale products are produced from operations on lands other than Crown lands and processed with any oil shale products produced from Crown lands, the net profit derived from the production of oil shale products from Crown land shall be determined by allocating the net profit as determined by this section to Crown land and to land other than Crown land on the proportion of the amount of oil shale products from oil shales produced from Crown land to the amount of oil shale products produced from land other than Crown land.

(6) Notwithstanding anything contained in subsection (2), a producer of oil shale products from oil shales shall be allowed a period of three years commencing on the date of first production of oil shale products in reasonable commercial quantities from oil shales in which no royalty may be payable to the Crown; and in the event of a dispute on the date of such first production, the decision of the minister shall be final and conclusive.

(7) The minister shall have the power to determine from time to time any questions that may arise in determining the amount of royalty payable in any particular case including, without restricting the generality of the foregoing, power to settle the amounts allowable as deductions for the purpose of determining net profit derived from the production and processing of oil shale products from oil shales under this section.

(8) Within two months after the end of each period of three months of every royalty year the person liable for the payment of royalty under this section shall estimate the amount of the royalty payable on the oil shale products produced and processed during such period of three months and pay the estimated royalty. A royalty return in a form

approved by the minister shall be submitted to the department within three months from the end of the royalty year of such person. If the royalty payable exceeds the total of the amounts paid on account of the estimated royalty during the royalty year such person shall pay the amount of the difference within three months following the end of the royalty year. If the royalty payable is less than the total of the amounts paid on account of the estimated royalty the amount of the difference shall be refundable.

No lease or assignment for person in default

30. - (1) No person who owes to the Crown any royalty shall be entitled to acquire any further lease from the Crown or acquire any further Crown lease by assignment unless settlement of such royalty payment is made in full except as provided herein.

(2) No person who owes to the Crown any royalty in respect of an operation for oil shale products shall assign any lease unless settlement of such royalty payment is made in full except as provided herein.

Part IV
Conditions Applicable to Permits and Leases

Manner of applying

31. The application for a permit or lease may be filed by the applicant in person or by his agent or may be sent by mail to the department.

Not binding until documents executed.

32. No application for a lease or permit shall be binding on the Crown until the document of disposition in respect of the rights applied for has been executed by the minister.

Application in unsurveyed territory

33. An application for a permit or lease situated in an unsurveyed territory shall contain a plan and land description satisfactory to the minister.

Good practices

34. The grantee shall carry out all his operations in accordance with the best accepted geological, geophysical and engineering practices applicable to such operations.

Accurate records

35. The grantee shall at all times keep accurate and detailed records, books and accounts of his operations hereunder and of the expenditures made in connection with such operations and shall, whenever requested by the minister to do so, furnish to the director with true copies of such records verified by affidavit.

Examine records

36. - (1) The minister or any person authorized by him may at any time and from time to time enter upon the lands of the grantee and into the office or other place where the grantee's books and records are kept, and inspect and examine the operations of the grantee and the plant, works, books and records used or kept in connection with or having any reference to the operations, examine samples of mineral and other substances encountered during the operations and make copies of such books and records or of any part thereof.

(2) The grantee shall give or cause to be given all such assistance as the minister or the person authorized by him may reasonably require for the purpose of effecting subsection (1).

(3) No information obtained pursuant to subsection (1) shall be made available to the public without the consent of the grantee.

Assignments, subleases and transfers

37. - (1) Every grantee of as assignment, sublease or transfer of a lease or permit shall submit to the department for registration such assignment, sublease or transfer within sixty days of the date of execution thereof.

(2) Two signed copies of the assignment, sublease or transfer shall be submitted to the department.

(3) Upon registration one signed copy of the assignment, sublease or transfer shall be retained by the department.

(4) No assignment, sublease or transfer shall be registered in the department unless it is submitted by or on behalf of a person or company who or which has registered in the department an interest in the lease or permit assigned, subleased or transferred.

(5) The minister may in his discretion refuse to register an assignment, sublease or transfer.

New lease where partial surrender, etc.

38. Where an assignment, transfer, surrender or cancellation of a lease affects or relates to only a portion of the lands included in the lease the minister shall, upon registration of the assignment, transfer, surrender or cancellation grant to the assignee, transferee or lessee a new lease in respect of the lands, included in the assignment or transfer or excepted from the assignment, transfer, surrender or cancellation, for the unexpired term of the original lease and these regulations shall mutatis mutandis apply to the new lease.

Company registered in Saskatchewan

39. No permit or lease shall be granted to a corporation or partnership and no consent to the assignment of a permit or lease to a corporation or partnership shall be given unless the laws of Saskatchewan respecting registration of corporations or partnerships have been complied with.

Assignment to bank

40. - (1) Notwithstanding anything contained in these regulations, a copy of an assignment of a permit or lease by way of security given to a chartered bank under section 82 of the Bank Act, certified by an officer of the bank to be a true copy, may be registered in the department.

(2) Except as provided for in subsection (3) a bank shall not sell or assign or otherwise dispose of any interest of any person, including itself, in a permit or lease without the prior written consent of the minister.

(3) Where the moneys borrowed have been repaid to the bank by the assignor together with such other sums as the bank may be entitled thereto, as soon as may be possible thereafter the bank shall execute and the assignor shall register in the department a disclaimer of interest under the assignment or a reassignment of the permit or lease, or such other document as may be necessary to effectually place the original assignor with respect to the permit or lease in the same position in relation to the bank as he was before the assignment to the bank was executed. Such disclaimer of interest, reassignment or other document shall be in such form as may be approved by the minister.

Failure to register

41. Failure to register in the department any assignment or transfer of a permit or lease, whether by way of mortgage or otherwise, shall not invalidate the same as between the parties thereto, but such documents as to other assignees and transferees shall take effect from the date of registration and not from the date of the document.

Document register

42. - (1) The director shall be responsible for registering in the department assignments and other documents pertaining to Crown lands that have been approved and he shall keep a book to be called the "Document Register" in which he shall make an entry of each assignment and each other document received by him that is in proper form. Such entry shall contain a short description of the assignment or other document, together with the day, hour and minute of the receipt thereof.

(2) For purposes of priorities among assignees and transferees the time entered pursuant to subsection (1) with respect to assignments and transfers shall be taken as the time of registration.

(3) In addition to the documents registered pursuant to this section, the director may accept for filing but not for approval or registration certain other documents such as trust agreements that are in proper form.

(4) The director shall make such other entries and keep such other records of assignments and other documents registered or filed pursuant to these regulations as he may deem necessary.

Cancellation of permit or lease

48. - (1) If the grantee fails to fulfill, perform or observe any provision of these regulations, the minister may give the grantee written notice of his intention to cancel the permit or lease and if the grantee fails to remedy or commence to remedy the default to the satisfaction of the minister within sixty days after receiving such notice the minister may cancel the permit or lease.

(2) The notice shall be sent by registered mail addressed to the grantee at his last known addresss according to the records of the department, and such notice shall be deemed to have been received by the grantee within three days after the mailing thereof.

Address for service

44. Every grantee shall file with the department an address for service in Saskatchewan unless otherwise approved by the minister.

Delivery of notices

45. Any notice, document or communication required to be given or delivered pursuant to these regulations shall be sufficiently given if served upon or delivered personally to the minister or the grantee, as the case may be, or if it is mailed to the minister at Regina, Saskatchewan, or if it is left at the address filed pursuant to section 44 or mailed to the grantee at such address.

Part V
Surface Rights

No surface rights conveyed by disposition

46. A disposition under these regulations shall not convey any right or interest in the surface of the land under which the oil shales occur.

A 35

Compensation for surface rights

47. The grantee shall pay compensation to the owner of the surface rights for any loss or damage that may be caused to the surface of the land by the grantee entering upon, locating, using or occupying such surface for his purposes.

Restricted or prohibited areas

48. - (1) No operator shall conduct any work with respect to oil shales on:

(a) patented land, without the consent of the person named in the certificate of title issued with respect to the surface of the land as the registered owner or of any person who has the right of possession to the surface of the land;

(b) land owned or occupied by the Crown in the right of Canada, without the consent of the Government of Canada;

(c) occupied public land, without the consent of the person who has a right of possession under a disposition made by the Crown;

(d) land within a provincial park constituted under The Provincial Parks and Protected Areas Act, 1960, or any former Provincial Parks and Protected Areas Act, without the consent of the Minister of Natural Resources;

(e) land within a forest reserve constituted under The Forest Act, 1959, without the consent of the Minister of Natural Resources;

(f) land within the boundaries of a community, without the consent of the community concerned;

(g) land owned by or occupied by the Crown, without the consent of the Crown;

(h) land defined as a restricted area by the minister.

(2) In obtaining any consent required by clause (a), (c) or (g) of subsection (1), the operator shall describe accurately on a plan the location of all his operations thereon.

Arbitration re surface rights and right of entry

49. - (1) In case of dispute in the amount of compensation payable for surface rights or in any matter connected with the acqusition of surface rights, the owner of the surface rights or the grantee may apply to the minister for arbitration of the matter in dispute; and upon such application the arbitration provisions of The Mineral Disposition Regulations, 1961, governing surface rights shall mutatis mutandis apply.

(2) The applicant may apply to the minister at any time for permission to enter forthwith upon the area described in the notice of application for arbitration and the minister may grant such permission upon such terms and conditions as he deems proper.

SCHEDULE "B"

The following fees shall be paid to the department in respect of work for services arising out of these regulations:

(1)	Application for lease	$ 10.00
(2)	Registration of assignment or disclaimer of interest, per permit or lease	10.00
(3)	Registration of partial assignment of permit or lease, including issuing new permit or lease covering assigned portion and amending original permit or lease	25.00
(4)	Division of lease by issue of new lease and amending original lease	15.00
(5)	Amending permit or lease upon withdrawal of portion of land or surrender of rights covered thereby	5.00
(6)	Registration of sublease or other agreement where no change in registered ownership results, permit or lease	5.00
(7)	Filing of document pursuant to subsection (3) of section 42	10.00
(8)	Preparing certified copy of lease	10.00
(9)	Preparing photocopy of any document, each page (unless otherwise authorized by the minister)	1.00
(10)	Preparing plans, maps, etc., per hour	2.00
	Minimum charge	1.00
(11)	Search as per Schedule "C"	1.00
	With land description of permit	2.00
(12)	Historical abstract as per Schedule "D"	5.00
(13)	Special case requiring Order in Council	20.00
(14)	Change of name - per document	2.00

SCHEDULE "C"

Search of Permit/Lease

No.....

Name of Present Permittee/Lessee

Address:

Commencement Date of Permit or Lease:

Total Acreage in Permit or Lease:

Land Description of Lease: (If permit schedule is required, additional fee of $1.00 will be charged):

Remarks:

Dated at Regina, Saskatchewan, this _____day of

_____ 19___

_____

Director of Petroleum Lands

(This information is provided for the convenience of the public and the Department of Mineral Resources does not assume any liability for any errors or omissions).

SCHEDULE "D"

Government of Saskatchewan

Department of Mineral Resources

Abstract of Oil Shale Permit or Lease

Abstract of the Records of Oil Shale Issued to:

Permit/Lease No.

Land Description:

Acres: Commencement date: Term:

ASSIGNMENTS, AGREEMENTS, LIENS AND ENCUMBRANCES REGISTERED

Document Number	Date of Instrument	Date Registered	Nature of Instrument	From	To	Remarks

Searched by: Time:

Checked by: Date:

Director of Petroleum Lands

(This information is provided for the convenience of the public and the Department of Mineral Resources does not assume any liability for any errors or omissions.)

REPORT OF THE
SHALE OIL COMMITTEE

INDEPENDENT PETROLEUM ASSOCIATION OF AMERICA
ANNUAL MEETING
HOUSTON, TEXAS
OCTOBER 26-27, 1964

Production of shale oil is apparently imminent. To some extent such production will replace our domestic market. This will add to the present oversupply condition.

In view of these facts we believe that any program to lease public lands should provide an opportunity for participation by independent producers whose domestic activities, operations and markets will be impaired. We believe that the present law does not provide such an opportunity for our segment of the industry.

Therefore, the Shale Oil Committee makes the following recommendations to the membership of this Association.

1. Executive Order No. 5327 be continued until appropriate legislation is enacted that will insure a program for the orderly, fair and simultaneous leasing of the public shale oil lands.

2. Such legislation should encourage development of public shale oil lands under our free enterprise system by private industry without Government financial assistance or subsidy.

3. The size of leases awarded under the program should be limited and much smaller than provided in the present law in order that private firms, both small and large, will be able to participate in the leasing program. A multiplicity of operators, both large and small, will promote competition and eliminate the threat of monopoly in this potentially vast energy source.

4. That this Committee, and other appropriate committees of the Independent Petroleum Association of America, must be continuously alert to developments in shale oil and its impact on the conventional crude oil and natural gas industry in the United States.

SHALE OIL COMMITTEE

INDEPENDENT PETROLEUM ASSOCIATION OF AMERICA

Annual Meeting
Houston, Texas
October 26-27, 1964

COMMITTEE MEMBERS

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W. T. Blackburn, Vice Chairman	Denver, Colorado
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R. W. Trueblood, Jr.	Los Angeles, California
Bruce Anderson	Denver, Colorado
Bob Burch	Denver, Colorado
Collis P. Chandler, Jr.	Denver, Colorado
James S. Holmberg	Denver, Colorado
Ted P. Stockmar	Denver, Colorado
H. M. McClure, Jr.	Alma, Michigan
David Schaenen	Billings, Montana
S. P. Yates	Artesia, New Mexico
Kye Trout, Jr.	Bismark, North Dakota
A. I. Levorsen	Tulsa, Oklahoma
S. J. Rhoades, Jr.	Tulsa, Oklahoma
R. A. Eichenberger	Dallas, Texas
Jake L. Hamon	Dallas, Texas
Gordon Simpson	Dallas, Texas
W. V. Coffey	Fort Worth, Texas
Harodd Decker	Houston, Texas
Robert L. Wood	Midland, Texas
J. L. Dougan	Salt Lake City, Utah
R. S. McKnight	Salt Lake City, Utah
William H. Curry	Casper, Wyoming
George R. Veronda	Casper, Wyoming

Public Law 88-526
88th Congress, H. R. 8960
August 31, 1964

An Act

78 STAT. 710.

To amend section 27 of the Mineral Leasing Act of February 25, 1920, as amended, in order to promote the development of coal on the public domain and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That subsection (a) (1) of section 27 of the Act of February 25, 1920, as amended (30 U.S.C. 184), is further amended to read as follows:

Mineral Leasing Act, amendment.

74 Stat. 785.

"(a) (1) No person, association, or corporation shall take, hold, own, or control at one time, whether acquired directly from the Secretary under this Act or otherwise, coal leases or permits on an aggregate of more than forty-six thousand and eighty acres in any one State."

SEC. 2. (a) Subsection (a) of section 2 of the Act of February 25, 1920, as amended (30 U.S.C. 201(a)), is further amended by the deletion from the first sentence of the words "but in no case exceeding two thousand five hundred and sixty acres in any one leasing tract.".

62 Stat. 289.

(b) Subsection (b) of section 2 of the Act of February 25, 1920, as amended (30 U.S.C. 201(b)), is further amended by changing the words "two thousand five hundred and sixty acres" in the first sentence thereof to "five thousand one hundred and twenty acres".

(c) For the purpose of more properly conserving the natural resources of any coalfield or prospective coal area, or any part or zone thereof, lessees and permittees and their representatives may enter into a contract with each other or others for collective prospecting, development, or operation of such field or prospective coal area, or any part or zone thereof, whenever determined and certified by the Secretary of the Interior to be in the public interest. A contract approved hereunder shall not provide for an apportionment of production or royalties among the separate tracts comprising the contract area, but may provide for the commingling of production with appropriate allocation to the tracts from which produced. Notwithstanding any provision of this section to the contrary, the Secretary may, with the consent of the lessees or permittees involved, establish, alter, change, or revoke mining, producing, rental, minimum royalty, and royalty requirements of such leases or permits, and issue regulations that are applicable to such leases or permits or contracts. The Secretary is authorized to enter into a contract with a single lessee or permittee embracing his leases or permits. The Secretary may authorize the consolidation of separate Federal permits or leases into a lesser number of permits or leases, or into a single permit or lease.

Collective prospecting; Secretary of the Interior, authority.

(d) Coal leases and permits operated under a contract approved or executed by the Secretary pursuant to subsection (c) of this section may be excepted from limitations on maximum holdings or control imposed by this Act if the Secretary finds that such exception is required to permit economic development of the coal resources and is otherwise consistent with the public interest.

Maximum holdings, exceptions.

Approved August 31, 1964.

UNITED STATES
DEPARTMENT OF THE INTERIOR
OFFICE OF THE SECRETARY
WASHINGTON 25, D. C.

AUG - 4 1964

Dear Mr. Hall:

Thank you for your letter of June 30 with respect to the proposed Pacific Northwest-Pacific Southwest Intertie and the role of coal in meeting the nation's electric power requirements.

We believe the intertie will dramatize the engineering and economic feasibility of transmitting power over long distances which, in turn, we anticipate will hasten the day when mine-mouth coal-fired steam electric plants will become commonplace.

Additionally, we understand from the participants in the intertie proposal that the exchanges of energy contemplated as a result of the intertie will mean the burning of more coal than otherwise would be possible.

We appreciate your courtesy in providing us with a copy of the R. W. Beck "Power Cost Study".

Sincerely yours,

Secretary of the Interior

Mr. Robert E. Lee Hall
Vice President
National Coal Association
1130 17th St., N. W.
Washington, D. C.

News from:

WEST Associates

Albuquerque, New Mexico

FOR IMMEDIATE RELEASE

TUESDAY, SEPTEMBER 22, 1964

ALBUQUERQUE --

The largest regional electric power development program ever planned, in the United States or abroad, was announced today by D. W. Reeves, president of Western Energy Supply and Transmission Associates (known as "WEST"), the organization formed to carry it out. Mr. Reeves is president of Public Service Company of New Mexico with headquarters in Albuquerque.

The $10.5 billion, 20-year program, to be underwritten entirely by capital secured from the investing public, covers all or part of nine states in the Southwest, an area roughly equal to one-fifth of the continental United States. No federal tax money will be used.

WEST is presently composed of ten investor-owned utilities and probably will include five or more local government-owned electric power suppliers operating in all or parts of California, Arizona, Nevada, Utah, Colorado, Texas, New Mexico, Wyoming and Idaho.

"Basically, the WEST program calls for the long-range planning of some 36 million kilowatts of new generating capacity and an extra-high-voltage transmission system interconnecting its member power suppliers," Mr. Reeves said. "In addition to bringing a totally new concept of regional joint planning to the Southwest, it will save several billion dollars in construction and operating costs over the next 20 years. This joint approach will make possible the use of the latest technological advances and the lowest cost fuel sources to provide the most economical and reliable service possible for all the consumers of the growing Southwest which is expected to triple in population by 1985.

"That technology," according to Mr. Reeves, "will use large, efficient generating plants, located to best utilize the available fuel sources, be they coal, oil, natural gas or the atom. One of the initial projects being studied, for example, is a large scale plant on or near the coal fields in the Four Corners area of Colorado, New Mexico, Arizona and Utah.

"Dual-purpose nuclear power plants, capable of making fresh water from sea water and producing electricity simultaneously, have been and are being studied and are definite possibilities in the WEST program. Everyone in the Southwest, including the people who have organized WEST, is vitally concerned with the area's future water needs. The sheer magnitude of our program makes it more than merely an electric power undertaking, and we are hopeful that it can be tied economically and technically to the long-range solution of our water problems.

"Although specific plant site locations, ownership, approval of various regulatory bodies, and other matters are still being worked out," said Mr. Reeves, "WEST is so conceived that the power plants and transmission lines will be constructed and operated by individual members of WEST or by two or more members, but all will be coordinated to form an operating part of the over-all system serving the nine-state area."

Some idea of the projected size of WEST can be obtained by comparing it to other well known electric power projects in the United States and other parts of the world. Its new generation capacity will be more than three times the present capacity of Tennessee Valley Authority. Of the three largest electric power undertakings in the Soviet Union, it will be 15 times the size of Kuibyshev, 14 times bigger than Volgograd, and eight times the size of the Bratsk project in Siberia. It will be equivalent to 18 Grand Coulee dams and have the capacity of almost 17 High Aswan dams, of the size presently being built in Egypt.

The impact of such a program on the economic development of the Southwest was spelled out in some detail by WEST power suppliers. Some examples of

the increases that will result:

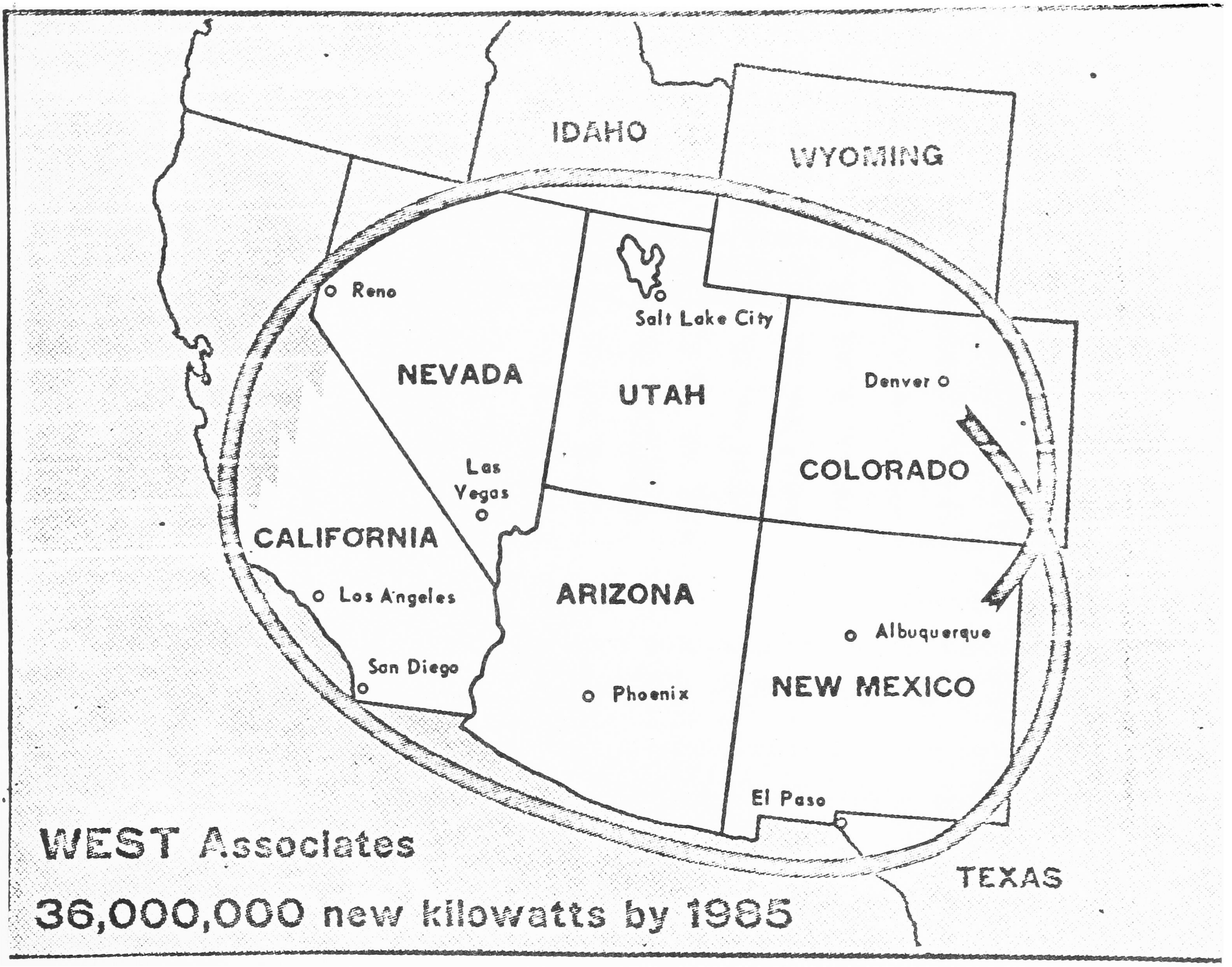
- o OIL, COAL, GAS AND NUCLEAR FUEL CONSUMPTION - By 1971, WEST expects to be using the energy equivalent of 10.5 million tons of coal a year. The figure goes to 50 million tons equivalent and 105 million tons equivalent by 1978 and 1986 respectively.
- o NEW JOBS CREATED - The program will create more than 6,000 new jobs by 1970; more than 18,000 by 1978; and almost 34,000 by 1986.
- o ANNUAL PAYROLL FOR THE ABOVE - $40 million by 1971; $114 million by 1978; and $207 million by 1986.
- o ANNUAL RETAIL SALES INCREASE - $13.7 million in 1971; $40.6 million in 1978; and $75.2 million in 1986.
- o ANNUAL LOCAL TAXES INCREASE - $8.0 million in 1971; $37.7 million in 1978; and $75.0 million in 1986.

Various committees within WEST have been set up to work on policy and legal matters and the new organization's relationship with and approval by various state regulatory agencies. Stone & Webster has been retained to do specific engineering assignments in connection with the long-range program.

The member utilities of Western Energy Supply and Transmission Associates are: Arizona Public Service Company, El Paso Electric Company, Nevada Power Company, Public Service Company of Colorado, Public Service Company of New Mexico, San Diego Gas & Electric Company, Sierra Pacific Power Company, Southern California Edison Company, Tucson Gas & Electric Company and Utah Power & Light Company.

The Los Angeles Department of Water and Power, Burbank Public Service Department, Glendale Public Service Department, Pasadena Municipal Light and Power Department and the Imperial Irrigation District, all in California, have indicated an interest in WEST Associates and, therefore, will be invited to become members.

Invitations will be extended to other power systems which meet the objectives and purposes of WEST Associates.


IDAHO
WYOMING
Reno
Salt Lake City
NEVADA
UTAH
Denver
COLORADO
Las Vegas
CALIFORNIA
Los Angeles
ARIZONA
Albuquerque
San Diego
Phoenix
NEW MEXICO
El Paso
TEXAS
WEST Associates
36,000,000 new kilowatts by 1985

COPY OF UTAH STATE LAND BOARD
LISTING OF LEASES OF STATE-OWNED
ASPHALTIC AND BITUMINOUS SANDS LAND

ASPHALTIC SANDS AND BITUMINEOUS SAND

18667	8/4/61	G. Harvey Hamilton	All Sec. 36, T. 14 S., R. 23 E.	640.00
18668	"	"	All Sec. 32, T. 14 S., R. 23 E.	640.00
18669	"	"	All Sec. 16, T. 14 S., R. 23 E.	640.00
18670	"	"	NE¼,NE¼NW¼,S½NW¼,S½ Sec. 16, T. 15 S., R. 23 E.	600.00
18671	"	"	All Sec. 2, T. 15 S., R. 23 E.	641.36
7920	5/7/54	J. R. Williams	Lots 1,2,3,4,5,6,7,8,W½E½,NW¼,E½,SW¼ Sec. 36, T. 5 S., R. 21 E.	642.47
19537	7/16/62	Consolidated Pacific	S½ Sec. 16, T. 4 S., R. 20 E.	320.00
19538	"	Daniel Meyer	SE¼SE¼ Sec. 21, NW¼NE¼ Sec. 28, T. 13 S., R. 14 E.	80.00
19539	"	"	W½SW¼ Sec. 27, T. 13 S., R. 14 E.	80.00
19540	"	"	NW¼NE¼ Sec. 21, T. 13 S., R. 14 E.	10.35
19541	"	"	NW¼NW¼ Sec. 21, T. 13 S., R. 14 E.	40.00
19542	"	"	NW¼NE¼ Sec. 20, T. 13 S., R. 14 E.	40.00
19550	8/13/62	John C. Osmond	All Sec. 16, T. 13 S., R. 14 E	640.00
19551	"	"	SE¼SW¼ Sec. 15, T. 13 S., R. 14 E.	40.00
19552	"	"	NW¼SW¼ Sec. 14, T. 13 S., R. 14 E.	40.00
19553	"	"	SW¼ Sec. 24,NW¼ Sec. 25, T. 13 S., R. 14 E.	320.00
19554	"	"	NW¼NW¼ Sec. 14,NE¼NE¼ Sec. 15, T. 12 S., R. 14 E.	80.00
19557	"	"	S½ Sec. 2,NE¼NE¼ Sec. 11, T. 13 S., R. 13 E.	357.76
19559	"	"	Lot 3 Sec. 31, T. 14 S., R. 15 E.	38.95
19560	"	"	All Sec. 32, T. 13 S., R. 15 E.	652.47
19561	"	"	SE¼NE¼ Sec. 31, T. 13 S., R. 15 E.	40.00

19562	8/13/62	John C. Osmond	S½ Sec. 2, T. 13 S., R. 14 E.	317.60
19563	"	"	Lots 7,8,9 Sec. 23, Lot 3 Sec. 24, T. 13 S., R. 13 E	110.65
19565	"	"	W½SW¼ Sec. 36, T. 5 S., R. 21 E.All Sec. 2, T. 6 S., R. 21 E	569.79
19566	"	"	All Sec. 36, T. 4 S., R. 20 E.	638.00
19567	"	"	All Sec. 2, T. 5 S., R. 20 E.	624.40
19568	"	"	W½,SE¼ Sec. 16, T. 5 S., R. 21 E.	483.81
19875	1/21/63	"	N½Sec. 16, SE¼NE¼,NE¼SE¼ Sec. 17, T. 4 S., R. 20 E	400.00
19894	1/21/63	John Morgan	All Sec. 2, T. 16 S., R. 22 E.	640.80
19895	"	"	All Sec. 32, T. 16 S., R. 22 E.	640.00
19896	"	"	All Sec. 32, T. 15 S., R. 23 E.	640.00
19897	"	"	All Sec. 2, T. 14 S., R. 23 E.	636.00
19898	"	"	All Sec. 16, T. 14 S., R. 24 E.	640.00
~~189~~ 19899	"	"	All Sec. 36, T. 15½S., R. 23 E.	453.36
19900	"	"	Lots 1,2,3,4,6,SW¼ Sec. 32, T. 15½S., R. 24 E.	329.43
19901	"	"	N½,SW¼,N½SE¼,SW¼SE¼ Sec. 36, T. 15 S., R. 23 E.	640.00
19905	"	"	All Sec. 2, T. 16 S., R. 23 E.	637.56

Bit Sandstone

20888	Sept. 10, 1963	Donald E. Kenney	S½ Sec. 9, T. 16 S., R. 23 E.	320.0
20889	"	"	W½ Sec. 10, T. 16 S., R. 23 E.	
20890	"	"	All Sec. 32, T. 15½S., R. 23 E.	453.7
[redacted]	"	"	[redacted]	[redacted]
20892	"	"	All Sec. 36, T. 15 S., R. 22 E.	640.0
20893	"	"	All Sec 16, T. 15 S., R. 22 E., SLM	640.0
[redacted]	"	"	[redacted]	639.6
[redacted]	"	"	[redacted]	640.0
20896	"	"	All Sec. 36, T. 14 S., R. 22 E.	640.0

20966	Otto 7, 1963	John H. Morgan Jr. etal	All Sec. 36, T. 15 S., R. 24 E., SLM	640.00
20967 20968				
20969	"	"	All Sec. 2, T. 15 S., R. 24 E.,	642.16
20970	"	"	All Sec. 36, T. 14 S., R. 24 E.	640.00
20977	"	John C. Osmond	W½NW¼,SE¼NW¼,SW¼NE¼ Sec. 32, T.4S.,R.21E.	160.00
20978	"	"	S½SE¼,NW¼SE¼ Sec. 32, T. 5 S., R. 22 E., SLM	120.00
20979, 20980, 20981, 20982, 20983				
20984	"	J. D. Archer Co.	All Sec. 36, T. 13 S., R. 13 E., SLM	640.00
20987	"	John H. Morgan Jr.etal	All Sec. 2, T. 12 S., R. 14 E., SLM	518.96
20991	"	"	All Sec. 36, T. 12 S., R. 15 E., SLM	640.00
20992	"	"	All Sec. 32, T. 12 S., R. 15 E., SLM	640.00
20993	"	"	All Sec. 2, T. 12 S., R. 13 E., SLM	554.68
20994				
20995	"	"	All Sec. 32, T. 12 S., R. 14 E., SLM	640.00
20996	"	"	All Sec. 16, T. 12 S., R. 14 E., SLM	640.00
21000	"	John C. Osmond	Lots 1,2,3,4,Sec. 2, T. 4 S., R. 19 E., SLM	167.30
21014	"	John H. Morgan,Jr. etal	All Sec. 36, T. 10 S., R. 23 E., SLM	640.00
21015	"	"	All Sec. 2, T. 9 S., R. 22 E.,SLM	634.40
21016	"	"	All Sec. 32, T. 8 S., R. 23 E., SLM	640.00
21017	"	"	All Sec. 36, T. [illegible] S, R. 22 E., SLM	640.00
21018	"	"	All Sec. 32, T. 11 S., R. 13 E., SLM	640.00
21019	"	"	All Sec. 36, T. 11 S., R. 13 E., SLM	640.00
21020	"	"	Lots 1,2,3,4,N½SE¼,NE¼,N½NW¼,SE¼NW¼	520.76
21021	"	"	All Sec. 32, T. 11 S., R. 14 E., SLM	640.00
21022	"	"	All Sec. 16, T. 12 S., R. 15 E., SLM	640.00
21023	"	"	All Sec. 2, T. 12 S., R. 15 E., SLM	476.9[illegible]
21025	"	"	All Sec. 36, T. 11 S., R. 12 E., SLM	637.0[illegible]

Bit. Sands

21026	Oct. 7, 1963	John H. Morgan, Jr.etal	All Sec. 36, T. 11 S., R. 15 E., SLM	640.00
21027	"	"	N½,N½SW¼,NW¼SE¼ Sec. 32, T. 11 S., R. 15 E.,	440.00
21029	"	"	All Sec. 32, T. 12 S., R. 16 E., SLM	640.00
21030	"		All Sec. 16, T. 12 S., R. 16 E., SLM	640.00
21031	"	"	Lots 1,2,3,4,N½S½,SW¼SW¼ Sec. 2, T. 12 S., R. 16 E	357.44
21032	"	"	All Sec. 36, T. 15 S., R. 15 E.,SLM	640.00
21033	"	"	All Sec. 16, T. 15 S., R. 15 E., SLM	640.00
21034	"	"	All Sec. 2, T. 15 S., R. 15 E.,	642.60
21044	Oct. 22,1963	J.D. Archer Company	N½ Sec. 36,T.11S.,R.16E.,SLM	320.00
21045	"	"	All Sec. 32,T.11S.,R.17E.	640.00
21046	"	"	All Sec. 36,T.11S.,R.17E.	640.00
21047	"	"	All Sec. 32,T.11S.,R.18E.	640.00
21048	"	"	All Sec. 16,T.11S.,R.13E.,	640.00
21049	"	"	All Sec. 32,T.11S.,R.25E.	640.00
21050	"	"	Lots 1,2,3,4,S½ Sec. 2,T.12S.,R.17E.	476.96
21051	"	"	W½E½ Sec. 36, T. 13 S., R. 19 E.	160.00
21052	"	"	All Sec. 2,T.14S.,R.19E.	641.00
21053	"	"	All Sec. 16, T. 12 S., R. 17 E.	640.00
21054	"	J.H. Morgan Jr. et al	All Sec. 16, T. 16 S., R. 22 E.,	640.00
21058	"	"	All Sec. 32, T. 10 S., R. 24 E.	640.00
21059	"	"	All Sec. 36, T. 11 S., R. 23 E.	640.00
21060	"	"	N½NE¼,SE¼NE¼,NW¼SE¼,S½SE¼,W½ Sec. 32, T. 11 S., R. 24 E.	580.00
21061	"	"	All Sec. 2, T. 12 S., R. 24 E.	640.16

Bit. Sands

21062	Oct. 22, 1963	J.H. Morgan et al	All Sec. 36, T. 12 S., R. 24 E.	640.00
~~21063~~	"			
21075	"	"	SW¼SW¼ Sec. 33,T.11S.,R.14E.	40.00
21076				
21077	"	"	All Sec. 16, T. 11 S., R. 16 E.	640.00
21078	"	"	all Sec. 32, T. 11 S., R. 16 E.	640.00
21079	"	"	N½SW¼,SW¼SW¼,SE¼SE¼ Sec. 36, T. 11 S.,R.16E.	160.00
21087	"	"	All Sec. 32, T . 15 S., R. 15 E.	640.00
21089	"	"	N½NE¼,SW¼,N½ Sec. 32, T. 15 S.,R.16E.	560.00
21090	"	"	All Sec. 36, T. 15 S., R. 16 E.	640.00
21091	"	"	All Sec. 32, T 15 S., R. 22 E.	640.00
21092	"	"	All Sec. 32, T. 15½S., R. 22 E.	457.12
21127	"	"	N½,SE¼,E½SW¼ Sec. 36,T.15S.,R.14E.	560.00
21128	"	"	N½,S½S½,N½SW¼,NW¼SE¼ Sec. 25,T.15S.,R.14E.	600.00
21129	"	"	W½SE¼,SE¼SW¼ Sec. 1,SE¼,E½SW¼,S½NW¼ Sec. 11,NE¼ Sec. 26 T. 15 S., R. 14 E.	600.00
21130	"	¼	S½N½,N½S½,N½NE¼,NE¼NW¼ Sec. 12,T.15S.,R.14E.,S½N½ Sec. 13 T.15S.,R.14E.	600.00
21131	"	"	E½NW¼,NE¼,S½ Sec. 14,T.15S.,R.14E.	560.00
21132	"	"	All Sec. 23,T.15S.,R.14E.	640.00
21133	"	"	S½,S½N½,NE¼NW¼,NW¼NE¼ Sec. 24,T.15S.,R.14E.	560.00
~~21147~~	"	Shell Oil Co.	All Sec. 36, T. 29 S., R. 15 E.	640.00
~~21148~~	"	"	All Sec. 32,T.29S.,R.16E.	640.00
~~21149~~	"	"	All Sec. 36, T. 29 S., R. 16 E,	640.00
21150	"	"	All Sec. 2, T. 30 S., R. 15 E.	639.72
~~21151~~	"	"	All Sec. 16,T.30S.,R.15E.,SLM	640.00

Bit Sands

~~21152~~	~~Oct. 22, 1963~~ Shell Oil Co.		All Sec. 36,T.30S.,R.15E.	640.00
~~21153~~	"	"	~~Lots 1,2,3,4,S½N½,S½ Sec. 2,T.30S.,R.16E~~	638.36
21154	"	" — Min Royalty begins Jan 1 1963	All Sec. 16,T.30S.,R.16E.	640.00
21155	"	" "	All Sec. 32,T.30S.,R.16E.	640.00
21156	"	" "	All Sec. 36, T. 30 S.,R.16E.	640.00
21157	"	"	All Sec. 32,T. 30 S.,R.16E.,SLM	640.00
21158	"	"	All Sec. 36,T.30½S.,R.16E	640.00
~~21159~~	~~"~~	~~"~~	~~All Sec. 2, T. 31 S.,R.15E.~~	~~880/84~~
21160	"	" Min Royalty begins Jan 1, 1963	All Sec. 16,T.31S.,R.15E.	640.00
21161	"	" "	All Sec. 32, T. 31 S., R. 15 E	640.00
~~21162~~	~~"~~	~~"~~	~~All Sec. 36,T.31S.,R.15E.~~	~~640.00~~
21163	"	" "	All Sec. 2,T.31S.,R.16E	641.88
21164	All Sec. 16,T.31S.,R.16E	"	640.00	
~~21165~~	~~"~~	~~"~~	~~All Sec. 2,T.32S.,R.15E.~~	~~630.00~~
21179	Nov. 1, 1963	John H. Morgan Jr. et al Min Royalty begins Jan 1, 1963	All Sec. 32,T. 4 S.,R. 20 E.,	640.00
21180	"	"	All Sec. 36,T.4S.,R.19E.	640.00
21181	"	"	All Sec. 2, T. 6 S., R. 20 E.	507.04
21182	"	"	All Sec. 16,T. 5 S., R. 20 E.	640.00
21183	"	"	All Sec. 32,T.5S.,R.20E.	658.84
21184	"	"	All Sec. 36,T.5S.,R.20E.	641.76
21185	"	"	W½ Sec. 32,T.13S.,R.14E.	320.00
~~881~~	~~Nov. 15, 1963~~	~~Robert C. Manly~~	~~S½NW¼ Sec. 3,W½NW¼,Sec. 7,W½SE¼ Sec. 17,SE¼SE¼ Sec. 18~~ NE¼NE¼ Sec. 19,~~E½SW¼,W½SE¼ Sec. 20,W½NW¼,SE¼NW¼ Sec. 30,~~ N½NE¼,~~NE¼NW¼~~ Sec. 31, ~~SW¼NE¼,SE¼NW¼,NE¼SW¼,NW¼SE¼~~ ~~Sec.~~ 33, T. 1 S., R. 4 W., US.,~~NE¼NE¼~~ Sec. 25,~~E½W½~~ Sec. 23, T. 1 S., R. 5 W., USM	108...

Mt Sands

882	Nov. 15, 1963	Robert C. Manly	N½NW¼ Sec. 3, S½NW¼, N½SE¼ Sec. 4, SE¼ Sec. 5, S½N½ Sec. 11 NW¼ Sec. 17, NE¼ Sec. 18, T. 2 S., R. 1 W. USM	880.00
883	"	"	SE¼SE¼ Sec. 20, SW¼SW¼ Sec. 21, NW¼ Sec. 28, T. 2 S. R. 5 W., USM	196.70
884	"	"	SW¼, W½NW¼, W½SE¼ Sec. 1, S½SE¼ Sec. 13, N½SE¼ Sec. 13, SE¼, E½NE¼, SE¼SW¼ Sec. 23, NW¼ Sec. 24, N½NW¼ Sec. 26, T. 2 S., R. 2 W., USM	926.66
885	"	"	NE¼NW¼, S½N½, NE¼SE¼ Sec. 10, SW¼NW¼ Sec. 11, NE¼ Sec. 24, S½SE¼ Sec. 22, NE¼SW¼, NW¼SE¼, SE¼SW¼ Sec. 23, N½N½ Sec. 27, N½S½, E½NW¼ Sec. 35, T. 1 S., R. 2 W., USM	1030.00
886	"	"	N½SE¼, SW¼NE¼ Sec. 25, S½NE¼ Sec. 26, T. 2 S., R. 3 W. USM, SW¼SW¼ Sec. 1, S½SE¼, SE¼SW¼ Sec. 2, N½NE¼, SE¼NE¼, NE¼NW¼ Sec. 7, N½NE¼ Sec. 11, W½NE¼ Sec. 12, T. 3 S., R. 3 W., USM	680.0
887	"	~~Dale E. Armstrong~~	See file for description	
21199	"	John Morgan et al *Mrs. Royalty Beaty, Jan.*	All Sec. 16, T. 12 S., R. 24 E.	640.00
21200	"	"	All Sec. 32, T. 12 S., R. 24 E.,	640.00
21201	"	"	All Sec. 16, T. 12 S., R. 25 E.	640.00
21202	"	"	All Sec. 32, T. 12 S., R. 25 E.	640.00
21203	"	"	All Sec. 2, T. 13 S., R. 21 E.,	642.36
21204	"	"	E½E½ Sec. 16, T. 13 S., R. 21 E.	160.00
21205	"	"	All Sec. 32, T 13 S., R. 21 E.	640.00
21206	"	"	All Sec. 36, T. 13 S., R. 21 E.	640.00
21207	"	"	Lots 1, 2, 5, 6, SE¼NE¼NW¼, S½NE¼, NE¼SE¼NW¼, E½SE¼SE¼NW¼, N½N½NE¼SE¼, W½NE¼NW¼SE¼, W½NW¼SE¼, W½SW¼SE¼, E½NE¼NE¼SW¼, d Sec. 2, T. 13 S., R. 23 E.	248.09
21208	"	"	SW¼SE¼SW¼, W½SE¼SE¼SW¼, E½SE¼SW¼SW¼, SW¼SE¼SW¼SW¼, S½SW¼SW¼SW¼ Sec. 16, T. 13 S., R. 23 E.	27.50
21209	"	"	All Sec. 32, T. 13 S., R. 23 E.	
21210	"	"	All Sec. 36, T. 13 S., R. 23 E.	640.00
21211	"	"	All Sec. 2, T. 13 S., R. 24 E.	696.80

Bit Sands

al				
21212	Nov. 15, 1963	John H. Morgan et al	NE¼,NE¼NW¼,S½NW¼,S½ Sec. 16, T. 13 S., R. 24 E.	600.00
21213	"	"	All Sec. 32, T. 13 S., R. 24 E.	640.00
21214	"	"	all Sec. 36, T. 13 S., R. 24 E.	640.00
21215	"	"	All Sec. 2, T. 13 S., R. 25 E.	711.16
21216	"	"	All Sec. 16, T. 13 S., R. 25 E.	640.00
21217	"	"	All Sec. 32, T. 13 S., R. 25 E.	640.00
21218	"	"	all Sec. 36, T. 13 S., R. 25 E.	640.00
21219	"	"	All Sec. 2, T. 16 S., R. 21 E., SLM	640.76
21220	"	"	All Sec. 16, T. 16 S., R. 21 E.,	640.00
21221	"	"	All Sec. 32, T. 16 S., R. 21 E.	640.00
21222	:	:	All Sec. 36, T. 16 S., R. 21 E.	640.00
~~21223~~21225	"	"	All Sec. 16, T. 11 S., R. 10 E.	640.00
21226	"	"	All Sec. 2, T. 11 S., R. 11 E.	629.94
21227	"	"	All Sec. 16, T. 11 S., R. 11 E.	640.00
21228	"	"	All Sec. 2, T. 11 S., R. 12 E.	336.25
21229	"	"	All Sec. 16, T. 11 S., R. 12 E.	640.00
21230	"	"	all Sec. 32, T. 11 S., R. 12 E.	640.00
21240	"	"	Lot 1,S½,S½NW¼ Sec. 16, T. 6 S., R. 22 E.	432.00
21231	"	"	SW¼NE¼,SE¼NW¼ Sec. 5,All Sec. 16, T. 14 S., R.14E.	720.00

Bit Sands

21715	5/27/64	John H. Morgan et al	All Sec. 16, T.14S., R.19E	640.00
21716	"	"	All Sec. 32, T. 14 S., R. 19 E	"
21717	"	"	All Sec. 36, T. 14 S., R. 19 E.	594.49
21718	"	"	All Sec. 2, T. 14 S., R. 20 E.	639.91
21719	"	"	All Sec. 16, T. 14 S., R. 20 E.	640.00
21720	"	"	All Sec. 32, T. 14 S., R. 20 E.	640.00
21721	"	"	All Sec. 36, T. 14 S., R. 20 E.,	640.
21722	"	"	Al Sec. 2, T. 15 S., R. 19 E.	638.56
21723	"	"	All Sec. 16, T. 15 S., R. 19 E	640.00
21724	"	"	All Sec. 32, T. 15 S., R.19E	640.00
21725	"	"	All Sec. 36, T. 15 S., R. 19 E	640.00
21726	"	"	All Sec. 2, T. 15 S., R. 20 E.	640.80
21727	"	"	All Sec. 16, T. 15 S., R. 20 E.	640.00
21728	"	"	All Sec. 32, T. 15 S., R. 20 E.	640.00
21729	"	"	All Sec. 36, T. 15 S., R. 20 E.	640.00
21753	5/27/64	Wm. Colman	All Sec. 32, T. 11 S., R. 25 E.	619.36
21754	6/17/64	John Morgan et al	All Sec. 16, T. 11 S., R. 13 E	640.00
21755	"	"	N½ Sec. 36, T. 11 S., R. 16 E.	320.00
21756	"	"	All Sec. 32, T. 11 S., R. 17 E.,	640.00
21757	"	"	All Sec. 36, T. 11 S., R. 17 E.	640.00
21758	"	"	All Sec. 32, T. 11 S., R. 18 E.	640.00
21760	"	"	All Sec. 2, T. 13 S., R. 14	319.00
21761	"	"	All Sec. 36, T. 13 S., R. 16 E.	640.00

21762	6/17/64	John Morgan et al	N½ Sec. 16,T.13S.,R.17E.	320.00
21763	"	"	Lots 3,4,S½NW¼,S½ Sec. 2,T.14S.,R.16E.	473.27
21764	"	"	All Se. 32, T. 14 S., R. 16 E.	640.00
21765	"	"	All Sec. 36,T.14S.,R.16E.,SLM	640.00
21766	"	"	All Sec. 2, T. 15 S., R. 16 E.	659.00
21767	"	"	All Sec. 16,T.15S.,R.16E.,	640.00
~~21770~~	~~"~~	~~Cherie Justice~~	~~N½,NE¼SE¼ Sec. 32,T.5S.,R.22E.~~ cancelled lease not returned –	360.00
21783	"	Shell Oil	All Sec. 36,T.23S.,R.9E.	640.00
21784	"	"	S½ Sec. 2,T.23S.,R.10E	320.00
21785	"	"	All Sec. 16,T.23S.,R.10E	640.00
21786	"	"	All Sec. 32,T.23S.,R.10E	640.00
21787	"	"	All Sec. 16,T.23S.,R.11E.	640.00
21788	"	"	Lots 1-12 incl.S½N½,S½ Sec.2,T.24S.,R.9E.	878.12
21789	"	"	Lots 1-12 incl,S½N½,S½ Sec. 2,T.24S.,R.10E.,	879.32
21802	John C. Osmond et al		All Sec. 32,T.24S.,R.10E.	640.00
21803	"	"	All Sec. 16,T.24S.,R.10E.	640.00
21804	"	"	All Sec. 36,T.12S.,R.23E.,SLM	640.00
21810	"	"	All Sec. 36,T.22S.,R.10E	640.00
21811	"	Phillips Pet. Co.	All Sec. 32,T.22S.,R.11E.	640.00
21812	"	"	Lots 1-4,S½N½ Sec. 2,T.23S.,R.10E	317.04
21813	"	"	All Sec. 36,T.23S.,R.10E	640.00
21820	"	Robert Manly	All Sec. 36,T.21S.,R.10E	640.00
21821	"	"	All Sec. 32, T. 21 S., R. 11 E.	640.00
21822	"	"	All Sec. 16,T.22S.,R.11E.	640.00

21835	7/6/64	John H. Morgan et al	All Sec. 36, T. 8 S., R. 15 E	640.00
21836	"	"	All Sec. 32, T. 8 S., R. 16 E.	640.00
21837	"	"	All Sec. 2, T. 9 S., R. 15 E.,	621.07
21838	"	"	All Sec. 36, T. 9 S., R. 15 E.	640.00
21839	"	"	All Sec. 2, T. 9 S., R. 16 E.	640.72
21840	"	"	All Sec. 16,T.9S.,R.16E	640.00
21841	"	"	All Sec. 32, T. 9 S., R. 16 E	640.00
21842	"	"	All Sec. 36, T. 9 S., R. 16 E.	640.00
21843	"	"	All Sec. 2, T. 9 S., R. 17 E.	640.20
21844	"	"	All Sec. 16, T. 9 S., R. 17 E.	640.00
21845	"	"	All Sec. 32, T. 9 S., R. 17 E.	640.00
21846	"	"	All Sec. 36, T. 9 S., R. 17 E.	640.00
21847	"	"	All Sec. 2, T. 9 S., R. 18 E	640.40
21848	"	"	All Sec. 16, T. 9 S., R. 18 E.	640.00
21849	"	"	All Sec. 32, T. 9 S., R. 18 E	640.00
21850	"	"	All Sec. 36, T. 9 S., R. 18 E.	640.00
21851	"	"	All Sec. 2, T. 10 S., R. 15 E.	641.76
21852	"	"	All Sec. 32, T. 10 S., R. 15 E.	640.00
21853	"	"	All Sec. 36, T. 10 S., R. 15 E.	640.00
21854	"	"	All Sec. 2, T. 10 S., R. 16 E.	639.12
21855	"	"	All Sec. 16, T. 10 S., R. 16 E	640.00
21856	"	"	All Sec. 32, T. 10 S., R. 16 E.	640.00
21857	"	"	All Sec. 36, T. 10 S., R. 16 E.	640.00
21858	"	"	All Sec. 2, T. 10 S., R. 17 E	639.80
21859	"	"	All Sec. 16, T. 10 S., R. 17 E.	640.00
21860	"	"	All Sec. 32, T. 10 S., R. 17 E	640.00
21861	All Sc 36, T. 10 S., R. 17 E.			640.00
21862	"	"	All Sec. 2, T. 10 S., R. 18 E.	640.00
21863	"	"	All Sec. 16, T. 10 S., R. 18 E.	640.00
21864	"	"	All Sec. 32, T. 10 S., R. 18 E.	640.00
21865	"	"	All Sec. 2, T. 11 S., R. 15 E.	640.92
21866	"	"	All Sec. 16, T. 11 S., R. 15 E.	640.00
21867	"	"	All Sec. 2, T. 11 S., R. 16 E.	634.92
21868	"	"	All Sec. 16, T. 11 S., R. 17 E.	640.00
~~21869~~				
21870	"	"	All Sec. 2, T. 11 S., R. 17 E.	638.00
20938	1/20/64	"	SW¼SE¼ Sec. 18,N½SE¼,SE¼SE¼,NE¼NW¼, Sec. 19,S½ Sec. 20 T. 13 S., R. 15 E	
20939	"	"	SW¼,W½SE¼ Sec. 21,W½NE¼,SW¼NW¼,SW¼SE¼ Sec. 28,NW¼SE¼ Sec. 29, T. 13 S., R. 15 E.	
20942	"	"	S½S½,NW¼SW¼,SW¼NW¼,NE¼NW¼ Sec. 31,E½SW¼,SW¼NW¼ Sec. 30, T. 13 S., R. 16 E.	400.00
20945	"	"	All Sec. 6, T. 14 S., R. 16 E.	640.00
	"	"	W½NW¼ Sec. 5,S½ Sec. 14,SE¼ Sec. 15, T. 14S.,R.16E.	560.00

20979	1/20/64	John Osmond	SE¼NE¼,SE¼ Sec. 13 T. 13 S., R. 14 E.	200.00
20980	"	"	NE¼ W½SE¼ Sec. 25, T. 13 S., R. 14 E.	240.00
20981	"	"	E½E½,W½NE¼,SW¼SE¼ Sec. 26,E½ Sec. 35, T. 13 S., R. 14E	
20982	"	"	E½SE¼,SW¼SE¼ Sec. 23, T. 13 S., R. 14 E.	120.00
20983	"	"	S½NW¼,NE¼NW¼ Sec. 24,T.13S.,R.14E.	120.00
20994	"	John H. Morgan et al	All Sec. 36, T. 12 S., R. 14 E.	640.00
21086	"	"	SE¼,E½SW¼,SW¼SW¼ Sec. 31,T.15S.,R.15E.	280.00
21883	July 13, 1964	Wm. A. Stevenson	All Sec. 32, T. 21 S., R. 12 E.,SLM	413.52
21884	"	"	All Sec. 36, T. 21 S., R. 11 E	640.00
21906	"	Kerr McGee Oil	All Sec. 26,NE¼,N½NW¼,SE¼NW¼,S½ Sec. 27, SE¼ Sec. 28,NE¼ Sec. 33,All Sec. 34, All Sec. 35, T. 15 S., R. 23 E.	2840.00
21907	"	Wm. Colman	Lots 1,2,3,4,5,6,NE¼SW¼,N½SE¼,SE¼SE¼ Sec. 31 T. 15½S., R. 24 E., SLM;Lots 3,4,5,6,7,SE¼NW¼,E½SW¼ Sec. 4, Lots 1,2,3,4,5,SW¼NW¼,W½SW¼ Sec. 5,Lots 2,3,4,5,6,7, SE¼NW¼,S½NE¼,SE¼,E½SW¼ Sec. 6	2160.86
21908	"	Kerr McGee Oil	Lots 1,2,SE¼ Sec. 34,All Sec. 35, T. 15½S., R. 23 E., SLM., Lots 1,2,3,4,SE¼NW¼,S½NE¼,S½ Sec. 1 Lots 1,2,S½NE¼,S½ Sec. 3,E½ Sec. 10,NE¼Sec. 11, T. 16S.,R. 23E., SLM	2240.02
21909	"	"	All Sec. 31,T.15½S., R. 23 E.,S½ Sec. 4, All Sec. 5, All Sec. 6,7,8,N½ Sec. 9, T. 16 S., R. 23 E.,	3590.24
21910	"	John Morgan Jr. et al	All Sec. 16,18,Lots 1,2,3,4,E½W½,NE¼,N½SE¼ Sec. 19 NW¼,SE¼,NW¼SE¼ Sec. 20,NW¼ Sec. 21,Lot 1,NE¼NW¼, Sec. 30 T. 16 S., R. 23 E., SLM	2387.02
21911	"	"	All Sec. 33,34,35 T. 15½S.,R.22E.,All Sec. 34, T. 16 S., R. 22 E., SLM	2658.16
21912	"	"	All Sec. 1,11,12,13,14,T. 16 S., R. 22 E.	3200.28
21913	"	"	All Sec. 9,10,15,21,22 T. 16 S., R. 22 E.	3200.00
21914	"	"	All Sec. 1,12 T. 16 S., R. 21 E., All Sec. 31, T. 15½S R. 22 E., All Sec. 5,6,7,8,T.16S.,R.22E.	4236.90
21915	"	"	E½ Sec. 13,E½,SE¼SW¼ Sec. 24,T.16S.,R.21E.,SLM All Sec. 17,18,19,20 T. 16 S., R. 22 E	3199.47
21916	"	"	N½,W½SE¼,SW¼ Sec. 23,NW¼NE¼,S½NE¼,NW¼,S½ Sec. 26,All Sec. 24,25,35,T. 16 S., R. 22 E.	3080.00
21917	"	"	All Sec. 27,28,33,34 T. 16 S., R. 22 E.	2560.00
21918	"	"	All Sec. 25,T.16S.,R.21E.,All Sec. 29,All Sec. 30 31 T. 16 S., R. 22 E	2521.40
21919	"	"	E½W½,S½NE¼,SE¼ Sec. 31,S½SE¼,SW¼ Sec. 33, T. 15 S., R. 21 E Lots 1,2,SE¼ Sec. 33,All Sec. 34,35,T.15½S.,R.21E S½NW¼,SW¼ Sec. 3,Lots 1,2,3½NE¼,SE¼ Sec. 4,T.16S.,R.21E.	2336.53
21920	"	"	S½SE¼ Sec. 5,E½SEc. 8,E½Sec. 17,SE¼Sec. 18, All Sec. 20,28,29,E½ Sec. 30,E½Sec. 31,T.16S.,R.21E	3440.00
21921	"	"	S½N½,S½ Sec. 22,All Sec. 23,26,27,35,NW¼NW¼,E½W½,E½ Sec. 34 T. 16 S., R. 21 E.,SLM	3560.00

21923	7/23/64	Jack E. Balnkenship	Lots 1,2,3,4,S½ Sec. 32,T.15½S.,R.21E.	448.22
21924	"	"	Lots 3,4,SW¼,W½SE¼ Sec. 36,T.15½S.,R.21E.	307.64
21925	"	"	Lots 1,2,3,4,S½ Sec. 36,T.15½S.,R.22E.	456.92
21926	"	R.S. McKnight	Lots 1,2,3,4, Sec. 2,T.30S.,R.5E.,	480.80
21927	"	"	All Sec. 16,T.30S.,R.6E.	640.00
21928	Jack E. Blankenship		All Sec. 16,T.11S.,R.22E	640.00
21929	"	R. S. McKnight	All Sec. 32, T. 28 S.,R.8E	632.36
21931	:	John C. Osmond	All Sec. 32,T.29S.,R.12E	640.00
21932	"	"	All Sec. 36,T.29S.,R.12E.	640.00
21933	"	"	All Sec. 16,T.30S.,R.12E.	640.00
21934	"	"	All Sec. 32,T.30S.,R.12E.	640.00
21935	"	"	All Sec. 36,T.30S.,R.12E	640.00
21936	"	"	All Sec. 16,T.31S.,R.12E	640.00
21937	"	"	All Sec. 2,T.31S.,R.12E	873.00
21938	"	"	All Sec. 2,T.30S.,R.12E	502.28
21940	8/6/64	John H. Morgan et al	N½SW¼,SW¼SW¼ Sec. 12,E½,NW¼NW¼,SE¼NW¼,E½SW¼ Sec. 13 E½ Sec. 14;W½,W½NE¼,NE¼NE¼,E½SE¼ Sec. 23,E½,E½NW¼, SW¼ Sec. 24, T. 17 S., R. 20 E.,	2000.00
21941	"	"	All Sec. 25;E½NE¼,NW¼,SE¼,NW¼SW¼,SE¼SW¼ Sec. 26 N½,N½SE¼,SW¼SE¼,SW¼ Sec. 27,W½,NW¼NE¼,SE¼NE¼,E½SE¼ Sec. 34 All Sec. 35, T. 17 S., r20 E., SLM	2840.00
21942	"	"	All Sec. 1,10,11,12 T. 17 S., R. 21 E.	25.12.32
21943	"	"	NE¼SE¼ Sec. 12,T.17S.,R.20E.,All Secs. 6,7,8,17,18 T. 17 S., R. 21 E.,	3739.85
21944	"	"	All Secs. 13,14,N½,SE¼,N½SW¼,SE¼SW¼ Sec. 15,N½NE¼ Sec. Sec. 22,NE¼,N½NW¼ Sec. 23,NE¼,N½NW¼,SE¼NW¼,N½S½,SE¼SE¼ Sec. 24, T. 17 S., R. 21 E., SLM	2680.00
21945	"	"	E½SE¼ Sec. 22,SE¼ S c. 23,SW¼SW¼ Sec. 24,W½NW¼,SE¼NW¼, S½ Sec. 25,All Sec. 26,E½NE¼,NE¼SE¼ Sec. 27,All Sec. 35, T. 17 S., R. 21 E., SLM	2120.00
21946	"	"	All Sec. 21,S½NW¼,SW¼ Sec. 22,W½SE¼,W½ Sec. 27,All Secs. 28,33,34 T. 17 S., R. 21 E., SLM	3200.00
21947	"	"	All Secs. 19,20,29,30,31,T.17S.,R.21E.,SLM	3775.17
21948	"	"	Lots 1,2,3,4,S½N½,NW¼SE¼,SE¼SE¼,SW¼ Sec. 1;Lots 1,2, S½NE¼,SE¼,SE¼SW¼ Sec. 3;E½SE¼ Sec. 9,NE¼,E½NW¼,S½ Sec. 10,All Sec. 11;W½NW¼,E½SW¼,E½ Sec. 12,T.18S.,R.20E., Lots 2,3,4,5,6,10,12,15,SW¼NE¼,NW¼SE¼,E½SW¼ Sec. 6;Lots 3,4,10 Sec. 7;T. 18 S., R. 21 E., SLM	3063.58
21949	"	"	All Secs. 13,14,23,24 T. 18 S.,R.20E.,SLM., Lots 4,9 Sec. 18;Lots 4,9 Sec. 19,T.18S.,R.21E.,	2604.62
21950	"	"	All Secs. 15,22,E½E½,SE¼SW¼ Sec. 21,T.18S.,R.20E	1480.00
21951	"	"	All Sec. 27;E½NE¼,E½NW¼,SW¼NW¼,SE¼SE¼,SW¼ Sec. 28;E½NE¼, NW¼,NE¼SE¼ Sec. 33;NW¼NE¼,S½NE¼ SE¼,[illegible] Sec. [illegible] T.18S.,R.20E	1920.00

[illegible]52	[illegible]5/64	[illegible] H. [illegible]gar., [illegible]r.	N½,[illegible]SE¼,[illegible]SE¼,[illegible] Se[illegible] 25,A[illegible] Sec. [illegible],N½,[illegible]E¼,[illegible] Sec. 35,T.18S.,R.20E.,SLM	1800.00
21953	"	"	Lots 1,2,3,4,S½N½,E½SW¼,SE¼ Sec. 3,Lots 1,2,S½NE¼,SE¼NW¼, S½ Sec. 4;Lots 3,4,S½NW¼,SW¼NE¼,W½SE¼,SW¼ Sec. 5;N½SE¼ Sec. 9,NE¼SE¼ Sec. 10,SW¼SW¼ Sec. 11,SW¼NW¼,NW¼SW¼ Sec. 14 NE¼NE¼ Sec. 15,SE¼NE¼, Sec. 17,S½NE¼,SW¼SW¼ Sec. 20;SW¼SE¼ Sec. 29, T. 18 S., R. 21 E.,	1867.79
21954	"	"	Lot 3,SE¼NW¼,E½SW¼,SE¼SE¼ Sec. 1;SE¼NE¼ Sec. 11;NE¼NE¼, S½NE¼,N½NW¼,SW¼NW¼,SW¼ Sec. 12,NW¼NW¼ Sec. 13,T.19S., R. 20 E.,Lots 3,4,5,12,Sec. 4;Lots 1,2,5,6,7,8,9,10,11,12,S½NW¼, NW¼SW¼ Sec. 5;Lots 1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18 19,20SE¼NW¼,S½NE¼,N½SE¼,NE¼SW¼ Sec. 6,T.19S.,R.21E.	2316.57
21955	"	"	Lots 2,3,SW¼NE¼,SE¼NW¼,W½SE¼,E½SW¼ Sec. 3;E½NW¼,S½S½ Sec. 10 W½W½ Sec. 11;S½NE¼,W½ Sec. 14;All Sec. 15;N½,NW¼SE¼,NE¼SW¼ Sec. 21, T. 19 S., R. 20 E.	2159.92
21956			All Sec. 2, T. 17 S., R. 21 E.	593.08
21957	"	"	All Sec. 16,T.17S.,R.21E.,	640.00
21957	"	"	All Sec. 16, T. 17 S., R. 21 E.	640.00
21958	"	"	All Sec. 36,T.17S.,R.20E.,	640.00
21959	"	"	All Sec. 2, T. 18 S., R. 20 E.	640.08
21960	:	"	All Sec. 36, T. 18 S., R. 20 E	640.00
21962	"	J.L. Rabiger	All Sec. 16, T. 22 S., R. 12 E.	640.00
21963	"	Wm. J. Colman	S½ Sec. 32, T. 13 S., R. 14 E.	320.00
21977	"	John C. Osmond	All Sec. 32, T. 27 S., R. 15 E.	640.00
21978	"	John C. Osmond	All Sec. 16, T. 27 S., R. 27 S., R. 15 E	640.00
21979	"	"	All Sec. 12T. 27 S., R. 14 E.	563.28
21980	"	"	All Sec. 32, T. 28 S., R. 16 E.	640.00
21981	"	"	All Sec. 36,T.28S.,R.15E.	640.00
21982	"	"	All Sec. 16,T.25 .,R.14E.	640.00
21983	"	"	All Sec. 2,T.25 .,R.13E.,	690.00
21984	"	"	All Sec. 2,T.26S.,R.15E.,SLM	595.08
21985	"	"	All Sec. 36,T.25 .,R.14E.	640.00
21986	"	"	All Sec. 32,T.25 .,R.15E	640.00
21987	"	"	All Sec. 16,T.29S.,R.16E	640.00
21988	"	"	All Sec. 2,T.29S.,R.16E	640.28
21989	"	"	All Sec. 2,T.24S.,R.13E	716.52
21990	"	"	All Sec. 16,T.24S.,R.13E	640.00
21991	"	"	All Sec. 36,T.24S.,R.13E.	640.00
21992	"	"	All Sec. 32,T.24 .,R.14E.	640.00

22022	John H. Morgan et al	All Sec. 36, T. 7 S., R. 22 E., SLM.,	640.00
22023	"	All Sec. 32,T.7S.,R.22E.,SLM	640.00
22024	"	All Sec. 16, T. 7 S., R. 22 E., SLM	640.00
22025	"	All Sec. 2, T. 7 S., R. 22 E	736.04
22026	"	All Sec. 36, T. 7 S., R. 21 E., SLM	640.00
22027	"	All Sec. 16, T. 7 S., R. 21 E.	640.00
22028	"	Lots 4,5,6,7,8,S½ Sec. 2,T.7S.,R.21E.,SLM	520.00
22029	"	All Sec. 36,T.7S.,R.20E.,	640.00
22030	NW¼,NW¼SW¼,NW¼NE¼ Sec. 32, T. 7 S., R. 20 E.,		240.00
22031	John H. Morgan et al	All Sec. 2, T. 7 S., R. 20 E., SLM	642.88
22035	"	Lots 1,2,3,4,5,7,8,W½NW¼,NW¼SW¼,SE¼NE¼,E½SE¼,SW¼SE¼	450.10
22032	"	Lots 1,2,3,4,5,SE¼NE¼,NE¼SE¼ Sec. 2,T.7S.,R.19E	245.35
22033	"	All Sec. 36,T.6S.,R.22E.,SLM	640.00
22034	"	All Sec. 32,T.6S.,R.22E.	640.00
22036	"	Lot 1,N½NW¼,SE¼NW¼,NE¼ Sec. 32,T.6S.,R.21E.,	399.40
22037	"	All Sec. 36,T.6S.,R.20E.,SLM	640.00
22038	"	W½NE¼,E½NW¼,W½SW¼ Sec. 32,T.6S.,R.20E	240.00
22039	"	All Sec. 16,T.6S.,R.20E.,SLM.,	640.00
22040	"	N½N N½,N½S½,S½SW¼ Sec. 36,T.6S.,R.19E.,SLM	560.00
22041	"	Lots 1,2,3,4 Sec. 2,T.6S.,R.19E.,SLM	29.82
22042	"	All Sec. 36,T.9S.,R.20E.,SLM	640.00
22043	"	All Sec. 32,T.9S.,R.20E.	640.00
22044	N½,Lots 1,2,3,4,5 Sec. 32,T.9S.,R.19E.,SLM		476.29
22045	"	SE¼,E½SW¼,NW¼SW¼ Sec. 2,T.9S.,R.20E	280.00
22046	"	All Sec. 36, T. 9 S., R. 19 E., SLM	640.00
22047	"	All Sec. 16,T.9S.,R.19E.	640.00
22048	"	All Sec. 32,T.8S.,R.22E	640.00
22049	"	All Sec. 16,T.8S.,R.22E	640.00
22050	"	Lots 1,2,3,4,5,6,7,8,S½N½,S½ Sec. 2,T.8S.,R.22E	722.20
22051	"	N½,N½SW¼ Sec. 36,T.8S.,R.21E	400.00
22052	"	N½,N½S½ Sec. 32,T.8S.,R.21E.	480.00
22053	"	All Sec. 16,T.8S.,R.21E	640.00
22054	"	NW¼ Sec. 36,T.8S.,R.20E.	640.160.00
22055	"	E½,E½W½,NW¼NW¼,Lots 3,4,5 Sec. 16,T.8S.,R.20E	640.00
22056	"	All Sec. 2,T.8S.,R.20E	619.16
22057	"	All Sec. 36,T.8S.,R.18E.	630.32
22058	"	All Sec. 32,T.8S.,R.18E	640.00
22059	"	All Sec. 36,T.8S.,R.17E	640.00
22060	"	All Sec. 32,T.8S.,R.17E	598.67
22061	"	All Sec. 36,T.8S.,R.16E	640.00
22062	"	All Sec. 16,T.8S.,R.23E	640.00
22063	"	All Sec. 2,T.8S.,R.23E	638.16
22064	"	All Sec. 36,T.7S.,R.24E	640.00
22065	"	All Sec. 32,T.7S.,R.24E.	640.00
22066	"	All Sec. 16,T.7S.,R.24E.	640.00
[illegible]	"		

22068	John H. Morgan, 9/10/64	All Sec. 32,T.7S.,R.23E	640.00
22069	"	All Sec. 36,T.7S.,R.23E	640.00
22070	"	All Sec. 16,T.7S.,R.23E	640.00
22071	"	All Sec. 2,T.7S.,R.23E.	883.36
22072	"	All Sec. 36,T.8S.,R.23E	640.00
22073	"	All Sec. 36,T.8S.,R.24E.	640.00
22074	"	All Sec. 32,T.6S.,R.23E	640.00
22075	"	S½ Sec. 36,T.6S.,R.23E.	320.00
22076	"	All Sec. 2,T.8S.,R.24E.	639.84
22077	"	All Sec. 16,T.8S.,R.24E.	640.00
22078	"	All Sec. 32,T.8S.,R.24E.	640.00
22079	Daniel H. Meyer	Lots 1,2,3,4,S½N½,S½ Sec. 2,T.27S.,R.15E	639.00
22080	"	All Sec. 32,T.27S.,R.16E.,SLM	640.00
22081	"	All Sec. 16,T.26S.,R.14E.	640.00
22082	John C. Osmond	All Sec. 36,T.26S.,R.14E	640.00
22083	"	Lots 1,2,3,4,S½N½,S½ Sec. 2,T.26S.,R.14E	672.64
22084	"	All Sec. 32,T.26S.,R.14E.,SLM	640.00
22085	"	All Sec. 36,T.26S.,R.13E.	640.00
22086	"	All Sec. 16,T.26S.,R.15E	640.00
22087	"	All Sec. 36,T.26S.,R.15E	640.00
22088	"	All Sec. 32,T.26S.,R.15E	640.00
22089	"	All Sec. 32,T.26S.,R.16E	640.00
22090	"	All Sec. 36,T.27S.,R.14E	640.00
22091	"	All Sec. 16,T.27S.,R.14E.	640.00
22092	"	All Sec. 36,T.27S.,R.15E.	640.00
22093	"	All Sec. 16,T.28S.,R.15E.	640.00
22094	"	All Sec. 16,T.28S.,R.16E.	640.00
22095	"	All Sec. 36,T.25 .,R.15E.	640.00
22096	"	All Sec. 16,T.26S.,R.16E.	640.00
22097	"	Lots 1,2,3,4,S½N½,S½ Sec. 2,T.29S.,R.15E.,SLM	[illegible]
22098	"	Lots 1,2,3,4,S½N½,S½ Sec. 2,T.28S.,R.15E.	[illegible]
22099	Wm. J. Colman	SW¼NW¼ Sec. 1,SW¼SW¼ Sec. 15,NE¼ Sec. 20,T.16S.,R.23E.	240.00

ALBERTA REGULATION AR 502/64

Schedule of Amendments

DRILLING AND PRODUCTION REGULATIONS

Under

THE OIL AND GAS CONSERVATION ACT

The Drilling and Production Regulations under The Oil and Gas Conservation Act, being Alberta Regulation 3/57, as amended by Alberta Regulation 16/57, Alberta Regulation 208/59, Alberta Regulation 346/59, Alberta Regulation 417/59, Alberta Regulation 123/60, Alberta Regulation 244/60, Alberta Regulation 303/61, Alberta Regulation 346/61, Alberta Regulation 39/62, Alberta Regulation 133/62, Alberta Regulation 521/62, Alberta Regulation 26/63, Alberta Regulation 179/63, Alberta Regulation 213/63, Alberta Regulation 449/63 and Alberta Regulation 175/64, are amended.

2. Section 43, subsection (5) is struck out and the following is substituted:

(5) No flame-type or open electric element-type equipment, including heaters, shall be placed or remain within seventy-five feet of a well or crude oil storage tank, except

(a) where the well is classified by the Board as a water supply well, or water injection well,

(b) that an emergency operation requiring the use of any of the above described types of equipment may be conducted within seventy-five feet of a well, provided that the well head valves are closed and where a blow-out preventor is installed, it is closed,

(c) where extenuating circumstances exist, the Board may suspend the application of this subsection in any field or area.

3. Section 58 is struck out and the following is substituted:

58. (1) In this section

(a) "experimental well" means a well drilled or operated pursuant to an approved experimental scheme,

(b) "oil sands test hole" means an orifice in the ground drilled or being drilled to any depth for the purpose of evaluating oil sands.

(2) This section applies to oil sands test holes and to wells other than test holes, but does not apply to test holes.

(3) The Board, at any time, may make available to the public, from records, reports or information submitted to or acquired by it,

(a) any application or submission of an applicant or intervener in any proceedings before the Board or any record, report or information of an applicant or intervener filed by him in connection with the proceedings,

(b) the location, elevation, current depth, status, or casing and cementing data of a well other than an experimental well or oil sands test hole,

(c) monthly totals of oil, gas or water production from a well other than an experimental well,

(d) the monthly totals of each type of fluid injected into an injection well other than an experimental well,

(e) with respect to a well classified by the Board as a development, outpost or service well within a field designated by the Board, and with respect to the interval between surface and the base of the lowest previously established producing zone at a well classified by the Board as a deeper-pool test within a field designated by the Board

(i) any gas, oil or water analysis,

(ii) any pressure temperature or flow test data.

(iii) any log, drill stem test data, wire line formation test data, completion details or any sample cuttings or core preserved by the Board.

(4) The Board, at any time, may make available to the public any report required by section 57c or 57d or by the terms and conditions of an approval granted pursuant to section 38 of the Act, unless the approval otherwise specifies.

(5) The Board, after one year from the finished drilling date of a well of the start of substantially uninterrupted suspension of drilling operations at a well, may make available to the public, from records, reports or information submitted to or acquired by it, the well's location, elevation, current depth, status, casing and cementing data, any log, drill stem test data, wire line formation test data, completion details, sample cuttings or core, in any case where such data is not earlier available under subsection (3); but in the case of an experimental well or oil sands test hole, the Board shall make data available pursuant to this subsection only if all of the penetrated strata display their original characteristics.

(6) The Board, after one year from the date of a test or analysis, may make available to the public, from records, reports or information submitted to or acquired by it,

(a) any gas, oil or water analysis not earlier available under subsection (3),

(b) any pressure, temperature or flow test data not earlier available under subsection (3),

(c) a connate water determination or other liquid saturation measurement,

(d) any porosity, permeability or capillary pressure data,

(e) any other information regarding the properties of a formation or of the contents of a formation;

but in the case of an experimental well or oil sands test hole,

GOVERNMENT OF THE PROVINCE OF ALBERTA

ALBERTA REGULATION 342/62

BITUMINOUS SANDS REGULATIONS

under

THE MINES AND MINERALS ACT, 1962

(O.C. 891/62)

(Filed June 15, 1962)

1. These regulations may be cited as the "Bituminous Sands Regulations, 1962"

2. In these regulations,

(a) "bituminous sands" and "bituminous sands rights" have the meaning given in The Mines and Minerals Act, 1962;

(b) "Department" means the Department of Mines and Minerals;

(c) "Director" means the Director of Minerals;

(d) "lease" means a bituminous sands lease;

(e) "Minister" means the Minister of Mines and Minerals;

(f) "permit" means a bituminous sands prospecting permit.

Permits

3. (1) An application for a permit shall be filed at the office of the Director and may be granted subject to the provisions of these regulations.

(2) An application under subsection (1) shall be made

(a) in person where the applicant is a natural person, or

(b) by an agent in person where the applicant is a corporation.

4. (1) An application for a permit shall be accompanied by

(a) a fee of $250.00,

(b) the rental for one year at five cents an acre, and

(c) a deposit of $50,000.00.

(2) The deposit may be in the form of

(a) cash,

(b) negotiable bearer bonds of the Government of Canada or the Province of Alberta,

(c) negotiable bearer bonds guaranteed as to principal and interest by the Province of Alberta,

(d) savings certificates issued under The Savings Certificates Act, or

(e) term savings certificates issued by a treasury branch under The Treasury Branches Act and assigned as to principal to the Minister.

(3) The fee, rental and deposit shall be refunded if the granting of the permit is refused.

(4) The deposit shall be held by the Department as a guarantee that the examination will be carried out in accordance with these regulations.

(5) The deposit shall be forfeited to the Crown if during the currency of the permit an examination satisfactory to the Minister was not made in accordance with the plan of examination.

5. The maximum area of a permit shall be 50,000 acres and its boundaries shall be in the discretion of the Minister.

6. The proposed plan of examination to be conducted shall be included in the application and if the proposed plan is approved by the Minister a permit may be granted.

7. The permit shall be in such form as may be determined by the Minister and may include such terms and conditions as the Minister may prescribe.

8. (1) The permittee is prohibited from transferring a part of the location contained in the permit.

(2) Subject to subsection (1) the permittee may transfer the permit to the extent permitted under The Mines and Minerals Act, 1962.

9. (1) A permit conveys the right to enter for, mine, quarry, work and remove bituminous sands in lands contained in the permit and to extract products therefrom in an amount necessary for the permittee to carry out proper tests of the bituminous sands, but subject to any exceptions expressed in the permit.

(2) The permittee shall not dispose of bituminous sands or products recovered therefrom without the consent in writing of the Minister.

10. (1) The term of a permit shall be one year from the date of the permit, renewable for a second term of one year upon payment of rental for the second year at the rate of ten cents an acre and renewable for a third term of one year upon payment of rental for the third year at the rate of ten cents an acre.

(2) With each application for renewal the permittee shall supply a report on the progress of the examination carried out together with an estimate of the cost thereof and particulars of the extent and nature of the work to be conducted during the next term.

11. The plan of examination as approved may not be subsequently varied in any way without the consent of the Minister.

12. The permittee shall furnish to the Minister or to his authorized representative a complete copy of every log taken of each hole drilled and such other information, data and reports pertaining to the examination as the Minister may from time to time require.

13. Upon the termination of a permit, the permittee shall furnish to the Director a statutory declaration setting forth the several items of expenditure incurred in the examination and the specific purpose for which each item was expended.

14. A permittee may surrender at any time, or from time to time, any part of the lands contained in the permit.

15. A permit may be terminated at any time at the option of the permittee, and if he has complied with these regulations he shall have the exclusive right to apply for a lease of bituminous sands rights in lands contained in the permit.

16. If a permittee does not make application for a lease and has complied with the terms and conditions of the permit to the satisfaction of the Minister, the deposit will be refunded.

17. The permittee shall comply with the provisions of The Mines and Minerals Act, 1962, The Quarries Regulation Act and The Oil and Gas Conservation Act, and with the provisions of any regulations now made or that at any time hereafter may be made under any of the said Acts.