

OIL & GAS CONSERVATION COMMISSION  
January 17, 1975  
Minister, Exec. Sec.

RULES AND REGULATIONS  
GOVERNING  
GEOTHERMAL RESOURCES LEASES  
SEPTEMBER 5, 1972

Rentals  
\$1.50 / Ac 1<sup>st</sup> year  
.50 / Ac each year thereafter

ARIZONA STATE LAND DEPARTMENT  
1624 West Adams  
Phoenix, Arizona 85007

# INDEX

RULES	Page
RULE 1 Definitions - - - - -	1
RULE 2 Who may Lease for Geothermal Resources - Qualified Lessees - -	2
RULE 3 Applications for Non-Competitive Geothermal Resources Leases - -	2
RULE 4 Application for Non-Competitive Leases - Time for Filing - - - -	2
RULE 5 Simultaneous Filings - Conflicts - - - - -	3
RULE 6 Department's Decisions - Conflicts - - - - -	3
RULE 7 Applications - Refunds - - - - -	3
RULE 8 Non-Competitive Lease Form - - - - -	4
RULE 9 Term of Lease - - - - -	4
RULE 10 Acreage Limitation - - - - -	5
RULE 11 Withdrawals from Leasing - - - - -	5
RULE 12 Competitive Leases - Designation and Offer of Lands for Lease - -	5
RULE 13 Notice of Competitive Lease Offer - - - - -	5
RULE 14 Qualification of Successful Bidder - - - - -	6
RULE 15 A. Award of Lease. B. Tie Bids - - - - -	6
RULE 16 Surface Use - - - - -	6
RULE 17 Conduct of Operations - - - - -	7
RULE 18 Cooperative and Unit Agreements - - - - -	7
RULE 19 Assignments - - - - -	8
RULE 20 Surrender - - - - -	8
RULE 21 Rental - - - - -	9
RULE 22 Monthly Statements - - - - -	9
RULE 23 Royalty - - - - -	9
RULE 24 Logs - Reports - Records - - - - -	9
RULE 25 Fees - - - - -	10

# RULE 1

DEFINITIONS. In these Rules and Regulations the following terms shall have the meaning herein given:

- (A) "Department" means the State Land Department
- (B) "Geothermal Resources" means:
  - (a) All products of Geothermal Processes embracing indigenous steam, hot water and hot brines.
  - (b) Steam and other gases, hot water and hot brines resulting from water, other fluids or gas artificially introduced into Geothermal formations.
  - (c) Heat or other associated energy found in Geothermal formations, including any artificial stimulation or induction thereof.
  - (d) Any mineral or minerals, exclusive of fossil fuels and helium gas, which may be present in solution or in association with Geothermal steam, water or brines.
- (C) "Lease" as used herein, shall mean Geothermal Resources lease issued pursuant to the provision, Section 37-132, A-5.
- (D) "Lessee" means the holder of a Geothermal Resources lease issued by the Department; and shall also include any assignee of an original Lessee.
- (E) "Surface Lease" means a lease on the surface of any State Land for grazing, agricultural, commercial, or homesite purposes.
- (F) "Surface Lessee" means the holder of a lease on the surface of any State Land for grazing, agricultural, commercial or homesite purposes.
- (G) "Known Geothermal Resource Area (KGRA)" means an area in which the geology, nearby discoveries, competitive interests, and other indicia would, in the opinion of the Department, engender a belief in the men who are experienced in the subject matter that the prospects for the extraction of Geothermal Resources are good enough to warrant expenditures of money for that purpose.
- (H) "Geothermal Area" means the same general surface area which is underlain or reasonably appears to be underlain by one or more formations containing Geothermal Resources.
- (I) "Produced" when used herein shall be deemed to include the words "Procured and Produced".

- (J) "State Lands" means any land or any interest therein owned or held in trust, or otherwise, by the State, including, but not limited to, leased school or university lands.
- (K) "Cooperative or Unit Agreement" that agreement between the leasehold interests in two or more separate tracts of land to validly consolidate their properties; overlying, as closely as it is possible to determine by use of all available geological and engineering information, an entire reservoir, for the purpose of providing unitized management, development, and operation of such as a single unit and for maximum efficiency of reservoir drainage.

#### RULE 2

WHO MAY LEASE FOR GEOTHERMAL RESOURCES - QUALIFIED LESSEES. Any person of the age of eighteen (18) years or over, a citizen of the United States, or who has declared an intention to become a citizen of the United States, or any firm, association, or corporation which has complied with the laws of the State, shall be qualified to lease State Lands.

#### RULE 3

APPLICATIONS FOR NON-COMPETITIVE GEOTHERMAL RESOURCES LEASES. A non-competitive Geothermal Resources lease is one covering State Lands not located within any geological structure of a known Geothermal Resource area as determined and designated by the Department. A right of priority to a Non-Competitive Geothermal Resources Lease shall be had by the first qualified applicant who shall file a proper application therefor in the office of the Department, together with payment of the required fees and advance rental. The application shall be on a form prescribed by the Department completely filled out and duly signed by the applicant. Any false or wilfully incomplete statement will be considered misrepresentation and will be cause for rejection. Where an applicant supplies incomplete or otherwise defective information in an application which is not false or wilfully incomplete as determined by the Department, such applicant may at any time up to the issuance of the lease to another applicant, file an amended application, which shall carry the same filing date as his original application.

#### RULE 4

##### APPLICATION FOR NON-COMPETITIVE LEASES - TIME FOR FILING.

Applications for non-competitive Geothermal Resources leases shall be received for filing in the office of the Department in Phoenix during the office hours of any business day. Except as hereinafter specifically provided, all such applications received, whether by U.S. mail or by personal delivery over the counter, shall be immediately stamped with the date and time of filing. Each application filed by U.S. mail shall be considered to have been filed in the Department at the time and date it is delivered to the mail room of the Department. The time of filing so indicated on each application shall evidence the priority of the first qualified appli-

cant and the right to a lease which may be had thereby: subject, however, to the adjudication of conflicts which may arise by reason of applications simultaneously filed as hereinafter set forth.

#### RULE 5

##### SIMULTANEOUS FILINGS - CONFLICTS

In the event it is determined that two or more applications for a lease have been filed at the same time as indicated by the time stamp applied as set forth in Rule 4, such applications shall be deemed to be simultaneous filings. In the event two or more simultaneously filed applications include any lands which are identical, a conflict shall exist as to such lands. Issuance of leases and adjudication of conflicts shall be in accordance with the provisions of Rule 6 hereof.

#### RULE 6

##### DEPARTMENT'S DECISIONS - CONFLICTS

The Department will not issue any lease pursuant to an application unless the land is vacant, and then in accordance with the following procedure:

- (1) NO CONFLICT. Where there is no conflict of filing the Department shall issue a non-competitive lease to the first qualified applicant.
- (2) CONFLICTS. Where there is a simultaneous filing which constitutes a conflict the Department shall provide for a drawing between the qualified applicants to determine which applicant shall be entitled to a lease. The Department shall give notice to the conflicting applicants by registered mail, fixing a date and hour on which a drawing will be held for the land in conflict, which date shall not be less than ten (10) days or more than thirty (30) days from the date of said notice. The drawing will be held and the lease, by the Department's decision, will be awarded to the winner. The Department will then give notice of the results of said drawing to each applicant.

#### RULE 7

##### APPLICATIONS - REFUNDS

- (A) When an application for lease is rejected in its entirety, all monies paid by the applicant, except the filing fees, will be refunded; when rejected in part, the unused portion of the rental payment will be refunded.
- (B) An acceptable application may be withdrawn at any time prior to issuance of lease, but if withdrawn, the rentals and fees transmitted with said application will thereupon be forfeited to the State as penalty for failure to fulfill the obligations.

#### RULE 8

##### NON-COMPETITIVE LEASE FORM

Non-competitive Geothermal Resources leases shall be on a lease form prescribed by, and which may be amended by the Department from time to time.

#### RULE 9

##### TERM OF LEASE

- (a) Geothermal Resources leases shall be issued for a primary term of five (5) years and as long thereafter as Geothermal Resources are procured and produced in commercial quantities; provided, however, that in the event Lessee is conducting drilling operations in a good and workmanlike manner as generally accepted in the drilling industry, on the expiration date of said five (5) year primary term, the lease shall continue in force and effect for an additional two (2) year period and as long thereafter as Geothermal Resources are procured and produced in commercial quantities from the Lands and the continuation of the lease is in the best interests of the State as determined by the State Land Commissioner.
- (b) If, after the expiration of the five (5) year primary term or the additional two (2) year period provided for in subsection (a) above, this lease is maintained in force and effect by the production of Geothermal Resources in commercial quantities and said commercial production shall cease, this lease shall continue in force and effect provided Lessee pays the rentals provided for in Section 3 hereof and conducts operations on said Lands with reasonable diligence for the purpose of restoring the commercial production of Geothermal Resources from said Lands. In the event commercial production of Geothermal Resources from said Lands is restored within the above specified two year period, this lease shall remain in full force and effect as provided in 9 (a) above.
- (c) If Geothermal Resources in commercial quantities are discovered on the Lands covered by this lease or on Lands joined therewith in a cooperative or pooled unit, while the lease is in full force and effect, but Lessee is unable to produce said Geothermal Resources because of lack of transportation, processing or generating facilities, the lease shall be extended beyond the primary term of five (5) years from year to year, but not to exceed a period of three (3) years, by payment of a shut-in Geothermal Resources royalty of two dollars (\$2.00) per acre per year, payable in advance annually on the anniversary date of the lease, and if said payment is made it will be considered Geothermal Resources are being procured and produced in commercial quantities from the leased premises for such year.
- (d) If the said Lands or any part thereof covered by this lease be com-



mitted to any cooperative or unit plan for the development and operation of any Geothermal Resources, and said plan has been approved by the State Land Department, and Geothermal Resources are procured and produced in commercial quantities from any Lands committed to any such plan, this lease shall continue in force and effect as to the Lands covered by this lease or unit plan as long as Geothermal Resources are procured and produced in commercial quantities from any Lands committed by any such plan.

#### RULE 10

##### ACREAGE LIMITATION

Lands under a single lease shall be in as compact a body as possible, but may include non-contiguous Lands within an area of six (6) miles square if the maximum acreage of contiguous Land is not available, but in no event to exceed the total of 2,560 acres.

#### RULE 11

##### WITHDRAWALS FROM LEASING

The Department may refuse to lease any State Lands for Geothermal Resources when such Lands are being used by the State, or any State Department. The Department may withdraw from leasing any specific area of Land whether located within or without any known Geothermal Resource area where it is determined by the State Land Commissioner that such withdrawal is in the best interest of the State.

*Agency*

#### RULE 12

##### COMPETITIVE LEASES - DESIGNATION AND OFFER OF LANDS FOR LEASE

State Lands which are located within a known Geothermal Resource area shall be divided into tracts for leasing purposes. Each such tract shall contain not less than one-half ( $\frac{1}{2}$ ) section of Land, and not more than one (1) section of Land, provided that a tract containing less than one-half ( $\frac{1}{2}$ ) section of Land may be leased if such tract is segregated from other State Lands. All such tracts shall be in as compact a body as possible and shall be offered for lease at a royalty of not less than twelve and one-half per cent ( $12\frac{1}{2}\%$ ) or as otherwise to be specified in the call for sealed bids to the qualified person who offers the highest cash bonus by competitive sealed bids. Such Lands shall be offered upon receipt of an application to lease from one or more qualified persons or when, in the opinion of the Department, there shall be a demand for the purchase of leases on such Lands.

*usual is 10%*

#### RULE 13

##### NOTICE OF COMPETITIVE LEASE OFFER

Notice of the offer of Lands for Geothermal Resources lease shall be by publication in a newspaper of general circulation in the State of Arizona. Such notice shall be published twice and the last publication shall be not less than fifteen (15) days prior to the date fixed for the opening of bids. The notice shall be published at the



expense of the State, but the expenses of publication shall be charged to the person whose bid is accepted. A copy of the notice shall be posted in the office of the Department in Phoenix, Arizona, during the period of publication. Such notice shall set the day and hour at which bids will be opened in the office of the Department in Phoenix, Arizona, and full information shall be given as to how and when bids are to be submitted. On or before December 1st of each year, the Department shall designate by general order the newspaper in which such publication shall be made during the following calendar year. The publication shall contain the description of the Land proposed to be leased, the time when the bids will be received and opened, and SHALL SET FORTH THE FORM OF LEASE which the successful bidder will be required to execute by attaching A FORM OF LEASE IN ITS ENTIRETY, copies of which will be furnished to any person on request. The annual rental in such lease shall be in the amount as specified in the lease.

#### RULE 14

##### QUALIFICATIONS OF SUCCESSFUL BIDDER

Each person shall submit with his sealed bid the following: Certified check for the amount bid by him and proof of citizenship, as required in Rule 2.

#### RULE 15

A. AWARD OF LEASE. Following the opening of the sealed bids, the Department, subject to its right to reject any or all bids, shall award the lease to the highest bidder. Notice of the Department's action shall be forthwith transmitted to the interested parties. The Department shall return forthwith all checks accompanying rejected bids. If the lease be awarded, two copies of the lease will be sent to the successful bidder, and he will be required within thirty (30) days from receipt thereof to execute and return them to the Department, pay the first year's rental, the cost of publication, and the reasonable expenses of the sale. If a bidder, after having been awarded a lease, fails to execute it or otherwise comply with the applicable regulations, his deposit will be forfeited. If two or more tracts are awarded to any bidder where the acreage does not exceed more than two sections contiguous and/or adjacent Land, such tracts may, if not otherwise prohibited by law be included in a single lease.

B. TIE BIDS. In the case of acceptable tie bids, amended applications, in accordance with Rule 13, shall be submitted by those tied applicants, and preference will be given to the highest resulting bonus bid, but still subject to the Department's right to reject any and all bids.

#### RULE 16

##### SURFACE USE

Geothermal Resources Lessees shall have the right to use so much of the surface of the Lands as may be reasonably necessary for the conduct of their operations under the leases.

#### SURFACE RIGHTS TO INCLUDE:

1. Prospecting exploration drilling and production.
2. Right to construct and maintain all works, buildings, plants for processing or generating, waterways, roads, communication lines, pipelines, reservoirs, storage tanks, pumping stations, or other structures reasonably necessary to the full utilization thereof, to the extent such construction is compatible with existing and future surface use of the Land, as determined by the State Land Commissioner.

However, the Lessee shall be liable for unnecessary or excessive damage caused by Lessee, in the judgment of the Department, to the State's interest in the surface, or to the interest of a surface Lessee, if any, and the Department may require the Lessee at any time to execute a bond in a reasonable principal amount as determined by the Department conditioned upon payment for all such damage. If the Lessee and a surface Lessee cannot agree upon the amount of damages caused by Lessee, such damages shall be appraised by the Department or its agent and appeal from the judgment of the Department may be taken as provided in Section 11-210 and 11-211 of the Arizona Code of 1939.

#### RULE 17

##### CONDUCT OF OPERATIONS

All Lessees and operators shall comply with all applicable Arizona Statutes as now in effect or as hereafter enacted and/or amended, and all applicable Rules and Regulations.

#### RULE 18

##### COOPERATIVE AND UNIT AGREEMENTS

Commitment of leases of State Lands to cooperative or unit agreements shall be conditioned on the following procedure and requirements which shall be submitted at time of application.

- (A) That there be submitted to the Department two copies of a plat showing the area to be unitized, together with such geophysical and geological information as will tend to support the delineation of a Geothermal Resource area. The information so furnished shall be held confidential by the Department until released by the applicant or applicants.
- (B) That there be submitted to the Department two preliminary drafts of the agreement for approval as to form where the amount of Federal Land predominates in any area, the standard form of unit agreement of the United States should be followed.
- (C) After determination by the Department that it is for the best interest of the State to permit a Lessee to participate in a cooperative or unit agreement for the development and operation of a Geothermal Resource area, the De-

partment may grant approval therefore when a request for such approval is submitted.

(D) A cooperative or unit agreement shall not affect the leasehold of any leased State Lands lying outside of the unit area, and shall not be effective as to the leaseholds lying within the unit area unless the Lessees thereof and the then approved operating interests shall subscribe to such an agreement.

(E) The terms and conditions of leases covering State Lands will be modified and changed to the extent necessary to conform the same to the terms and conditions of the agreement.

#### RULE 19

##### ASSIGNMENTS

A Lessee may assign a lease as to all or part of the leased Land or any interest in the leasehold rights to any person, firm, association, or corporation qualified to hold the same, provided that any assignment of a part of a lease shall cover not less than a quarter of a quarter of a section, or approximate equivalent thereof. If a portion of a lease is assigned as a divided interest of the Lands covered thereby, the rental payment attributable to each new divided interest shall be the sole responsibility of the new assignee, and default in rental payment by one shall not affect the rights or other leasehold interests under the original lease. If an undivided interest in a leasehold is assigned, then the rental payments are attributable to the lease as a whole and the original Lessee is solely responsible for the payments thereof. All assignments shall be on forms prescribed by the Department and shall be filed with the Department within thirty (30) days from the date thereof by depositing a duplicate executed original or certified copy by a notary public. No such assignment shall cover more than one lease or a portion thereof. The Department shall retain in its files executed duplicate originals of all issued leases and all assignments deposited with it, and all such leases and assignments shall be recorded in tract books for such purposes to be considered a valid assignment by the Department. All assignments deposited with the Department must be accompanied by the prescribed fee.

#### RULE 20

##### SURRENDER

A lease or any part thereof, but not less than a quarter of a quarter section, or the approximate equivalent thereof, may be surrendered at any time by the record title holder thereof to the Lessor upon payment to the Department of all amounts then due as to the Lands so surrendered. No refund of any part of the cash consideration or rental theretofore paid shall be made to the Lessee or record title holder upon any such surrender. Such surrender shall be made by depositing with the Department one copy of the instrument of surrender, together with the prescribed surrender fee and thereafter the Lessee or record title holder shall incur no further liability under said lease as to the Land so surrendered.

#### RULE 21

##### RENTAL

All rentals shall be due and payable at the Department on or before the anniversary due date of the primary term of the lease. Failure to submit rental payments in compliance herewith shall be considered cause for cancellation.

#### RULE 22

##### MONTHLY STATEMENTS

Monthly statements of production and other statements required of the Lessee under the lease shall be made in triplicate and shall be filed with the Department no later than the 25th day of the calendar month following the calendar month of production.

#### RULE 23

##### ROYALTY

Lessee shall pay to the Lessor as royalty not less than twelve and one-half per cent ( $12\frac{1}{2}\%$ ) or as otherwise specified in the lease of the market value at the well of all Geothermal Resources and associated by-products; which market value shall be established by submitting to the Department every ninety (90) days properly metered and calibrated volume charts and chemical analysis reports in a manner approved by the Department. These charts and analyses shall be collected and sampled by an approved, qualified and bonded engineering company. Royalty for the succeeding ninety (90) days is to be based on the reports taken at the beginning of each ninety (90) day period at the point of delivery to the purchaser. The market value of the Geothermal Resources shall be determined by posted prices paid industry-wise for each marketable constituent thereof, and shall be due and payable not later than the 25th day of the calendar month following the calendar month of production. If Lessor elects to take its royalty Geothermal Resources in kind, Lessee shall, upon Lessor's request and at Lessor's sole risk, furnish free of cost to Lessor, Lessor's percent of royalty to an acceptable metering point on the lease.

#### RULE 24

##### LOGS - REPORTS - RECORDS

The State Land Commissioner or his designated representative shall have the right to inspect all records, books or accounts pertaining to Geothermal Resources taken from leased State Lands, and at the request of the State Land Commissioner the holder of the lease shall furnish such reports, logs, assays, or cores, as he may deem necessary for the proper administration of the State Lands under lease. Lessee shall file production and royalty reports upon forms as may be prescribed by the State Land Commissioner.

RULE 25

FEES

The following fees are imposed and shall be paid:

(1) For Filing Each Application For Non-Competitive Lease	<del>\$10.00</del> <sup>\$25.00</sup>
(2) For Lease Issuance	1.50
(3) For Transfer Or Assignment Of Lease	10.00
(4) For Filing Surrender Of Each Lease	10.00
(5) For Filing And Recording Operating Agreement Or Options	10.00
(6) For Filing And Recording A Unit Agreement	25.00

Lease No. \_\_\_\_\_

IMPORTANT

2500

1. This application MUST be accompanied by \$10.00 filing fee, \$1.50 lease issuance fee and the 1st years rental. THE RENTAL FOR THE LEASE SHALL BE PAID EACH YEAR IN ADVANCE.
2. Not more than 2,560 acres, confined to an area 6 miles square, shall be included in one lease as provided by the Rules and Regulations.

ARIZONA STATE LAND DEPARTMENT  
1624 West Adams  
Phoenix, Arizona 85007

APPLICATION FOR ~~THE~~ COMPETITIVE LEASE FOR GEOTHERMAL RESOURCES ON  
STATE LANDS

THE STATE LAND COMMISSIONER, Phoenix, Arizona:

I, \_\_\_\_\_  
of \_\_\_\_\_, County of \_\_\_\_\_, State of \_\_\_\_\_  
not being in arrears or default of rentals or fees upon leases for State lands, do hereby  
make application for a lease in the State of Arizona, on the State lands hereinafter des-  
cribed for a Geothermal Resource lease for a term of five years, or as long thereafter  
as Geothermal Resources are procured and produced therefrom in commercial quantities  
for which I agree to pay rental in accordance with the terms of the lease and the Rules  
and Regulations.

Subdivision	Sec.	Twp.	Rge.	Acreage	County

1. If an individual, are you a citizen of the United States? \_\_\_\_\_  
If not, have you declared your intention to become a citizen of the United States? \_\_\_\_\_  
Age \_\_\_\_\_ Married or Single? \_\_\_\_\_ Address \_\_\_\_\_

2. If a corporation: Name \_\_\_\_\_  
State Incorporated \_\_\_\_\_  
Business Address \_\_\_\_\_  
Authorized to do business in Arizona \_\_\_\_\_  
Name and address of officers: \_\_\_\_\_

Name of officers authorized to sign applications and leases for Geothermal Resources

Names and address of any one holding in excess of 50% of issued stock, if any \_\_\_\_\_

Percent of such issued stock so held % \_\_\_\_\_

3. Association or Partnership:

Names and addresses of officers, members or partners, with interest held by each:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

If recorded, recording information \_\_\_\_\_

I hereby certify under the penalty of perjury, that the information contained and statements herein made are, to the best of my knowledge and belief, true, correct, and complete.

Dated this \_\_\_\_\_ day of \_\_\_\_\_, A.D., 19\_\_\_\_.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

THE FOLLOWING IS NOT TO BE FILLED IN BY APPLICANT

Fees received: \$ \_\_\_\_\_ Rental Received: \$ \_\_\_\_\_ Receipt No. \_\_\_\_\_

Amount: \$ \_\_\_\_\_ Date of Lease: \_\_\_\_\_ Recorded by \_\_\_\_\_

Cause of Denial \_\_\_\_\_ All, or as follows \_\_\_\_\_

Fees Refunded: \$ \_\_\_\_\_ Vo. Ck. No. \_\_\_\_\_

Approved or denied by \_\_\_\_\_ Date \_\_\_\_\_

Remarks: \_\_\_\_\_



ARIZONA STATE LAND DEPARTMENT  
1624 West Adams St.  
Phoenix, Arizona  
85007

OFFER OF GEOTHERMAL LEASE  
CALL FOR SEALED BIDS

Pursuant to Title 27, A.R.S., Notice is hereby given that the State of Arizona, through its State Land Department, will offer for geothermal leasing to the highest qualified bidder submitting the highest cash bonus for the privilege of leasing each of the following \_\_\_\_\_ tracts of lands, totaling \_\_\_\_\_ acres within the Graham County Known Geothermal Resource

Area to wit:

<u>Tract No.</u>	<u>Subdivision</u>	<u>Section</u>	<u>Twp.</u>	<u>Rge.</u>	<u>Acres</u>
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Sealed bids will be received until \_\_\_\_\_ A.M. \_\_\_\_\_, 1974, in Room \_\_\_\_\_, Arizona State Office Building, 1624 West Adams Street, Phoenix, Arizona, 85007, at which time, all bids submitted will be publicly opened and read aloud by the State Land Commissioner. No bid received after the hour indicated will be considered. No bid may be withdrawn for a period of thirty (30) days after the date of bid opening.

Each bid must be submitted in a sealed envelope bearing the bidder's name and address and the tract number. Separate bids must be submitted for each tract. Each bid shall be accompanied by a certified check, cashier's check, bank draft or money order payable to the Arizona State Land Department in the amount of the cash bonus offered for each tract as a bid deposit. In addition to the bid, the envelope shall contain a certification that the bidder is of the age of eighteen years or over, a citizen of the United States or has declared his intention to become a citizen of the United States or is representing a firm, association or corporation fully qualified to transact business in Arizona.

The lease provides for a term of five years and as long thereafter as geothermal resources are being produced in paying quantities from the lands covered. The royalty is fixed at twelve and one-half per cent (12½%) of the market value of all geothermal resources removed from the land, and the annual rental at one dollar per acre, payable in advance, which amount shall be credited on the royalty payments each year.

Copies of the lease forms, special conditions and bid forms may be obtained from the Arizona State Land Department, Arizona State Office Building, 1624 West Adams Street, Phoenix, Arizona.. Copies of the geology surrounding and including the block offered as prepared by the Mineral and Energy Division of the Arizona State Land Department may be obtained upon request for a fee of \$\_\_\_\_\_ at the above address. The Arizona State Land Department and the Arizona State Land Commissioner make no representation or warranties as to the accuracy or completeness of any such geological data so furnished.

The Department reserves the right to reject any and all bids and to establish to its satisfaction the responsibility of any bidder.

If the lease be awarded, the successful bidder, within thirty days of tender, will be required to execute the lease, pay the first year's rental, <sup>his or its</sup> prorata share of the cost of publication of this notice and the reasonable expenses of the sale. Failure on the part of the successful bidder to execute the lease or otherwise comply will result in forfeiture of his bid deposit.

The Department shall return forthwith all checks accompanying rejected bids.

Further information regarding this offering may be obtained from the Arizona State Land Department at the above mentioned address.

ANDREW L. BETTWY  
ARIZONA STATE LAND COMMISSIONER

APPROVED AS TO FORM

*[Signature]*  
Assistant Attorney General

Date *[Signature]*, 1977

GRAHAM COUNTY

T8S - R30E

<u>TRACTS</u>	<u>SECTION</u>	<u>AMOUNT OF ACREAGE</u>
1.	31	624.24
2.	32	640.00
3.	33	640.00
4.	34	640.00
5.	35	640.00
6.	36	640.00
T9S R30E		
7.	2	641.04
8.	3	639.28
9.	4	639.08
10.	5	639.12
11.	6	583.43
12.	7	625.84
13.	8	640.00
14.	9	640.00
15.	10	640.00
16.	11	640.00
17.	15	640.00
18.	16	640.00
19.	17	640.00
20.	18	626.96
21.	19	628.20
22.	20	560.00
23.	21	640.00
24.	22	640.00
25.	27	640.00
26.	28	640.00
27.	29	640.00
28.	30	629.68
29.	31	631.68
30.	32	640.00
31.	33	640.00

GRAHAM COUNTY

T9S - R30E

<u>TRACTS</u>	<u>SECTION</u>	<u>AMOUNT OF ACREAGE</u>
32.	34	640.00
33.	36	640.00
	T10S R30E	
34.	1	640.00
35.	2	640.00
36.	3	640.00
37.	4	640.00
38.	5	640.00
39.	6	633.04
40.	7	633.52
41.	8	640.00
42.	9	640.00
43.	10	640.00
44.	12	520.00
45.	15	640.00
46.	16	640.00
47.	17	640.00
48.	18	634.08
49.	19	634.80
50.	20	630.00
51.	21	640.00
52.	22	480.00
53.	24	241.71
54.	25	446.90
55.	26	280.00
56.	27	480.00
57.	28	640.00
58.	29	640.00
59.	30	635.76
60.	31	617.63
61.	32	623.42
62.	33	622.78
63.	34	466.89
64.	35	623.68

<u>TRACTS</u>	<u>SECTION</u>	<u>AMOUNT OF ACREAGE</u>
	T10S R30E	
65.	36	624.48

GREENLEE COUNTY

T10S - R30E

<u>TRACTS</u>	<u>SECTION</u>	<u>AMOUNT OF ACREAGE</u>
66	24	118.29
67	25	193.10



DEPARTMENT OF ADMINISTRATION  
PERSONNEL DIVISION

1331 WEST JEFFERSON  
PHOENIX, ARIZONA 85007

STATE OF ARIZONA

RECEIVED

JAN 29 1975

O & G CONS. COMM.

RAUL H. CASTRO, GOVERNOR  
RAYMOND S. LONG, DIRECTOR  
HAROLD C. BENNETT,  
ASSISTANT DIRECTOR

Mr. John Bannister  
Oil and Gas Conservation Commission  
4515 North 7th Avenue  
Phoenix, Arizona 85013

Dear Public Manager:

In accordance with your recommendation, the following employees have been granted extensions of employment for the periods indicated below, by the Arizona State Personnel Board at its meeting on January 7, 1975.

Jack Conley

7-1-75 to 6-30-76

Please submit all future recommendations on Form PC 202 which is available through Mr. Max Power, General Services, Stock Room, 1645 West Jefferson Street, Phoenix, 85007; telephone 271-3107.

Sincerely,

Harold C. Bennett  
Assistant Director for Personnel



AN EQUAL OPPORTUNITY EMPLOYER

## GS drops bombshell on Rocky Mountain oilmen; Requires that all pits on federal lands be lined

Rocky Mountain oil and gas operators are still trying to determine what the latest set of U.S. Geological Survey regulations will cost them.

There were no hearings, and no comments were invited from the industry, so there was little or no advance warning. The problem suddenly appeared in the form of a nationwide directive operators received in the mail. By now it is familiar to most. It begins:

"From and after July 5, 1975, no unlined earthen pit shall be used for handling, storing or disposing of water produced from oil and gas wells, except by approved waiver."

The directive goes on to spell out how certain water produced from oil and gas wells on Federal or Indian lands must be handled, and how pits must be prepared to comply with regulations if water is sub-standard. It calls for inspections, written reports, permits or waivers.

Non-compliance will mean shutting in a well after July 5, 1975, until the necessary work has been done or a waiver is issued.

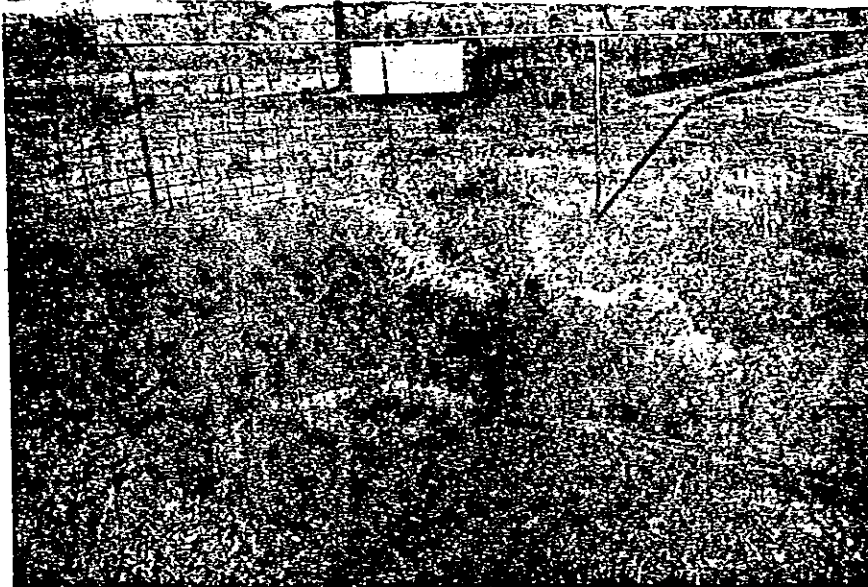
If an operator has complied with the requirements, the results may not satisfy USGS standards and they must still be met. In any case, there will be additional paperwork.

The directive does not set definite standards for produced water. The standards may be dependent on the interpretation of USGS district offices — at least that is the present indication.

The Wyoming office says that a pit need not be lined if the produced water contains fewer than 5,000 parts per million total dissolved solids. In the event that water is currently being used beneficially — for livestock, wild game, etc. — the allowable is higher. It can then contain as much as 10,000 ppm total dissolved solids.

The Roswell, New Mexico office says the standards set will depend upon the quality of the surface water in the area of an oil or gas well and other factors — but that it wants to have a look at all produced water. Apparently that holds true whether a well produces two gallons, two barrels, or two hundred bbl of water per day.

Neither office would attempt an estimate of the effect of the directive — how many pits would qualify for waivers — how many would have to



Will this pit require a liner? That question is being asked by operators throughout the Rockies. This particular pit is for a gas well in the San Juan Basin. It, and about 10,000 more like it in the Basin, produce only a few gallons of relatively fresh water a day.

be lined — how much the regulations might cost the petroleum industry. It is clear that no one yet has any idea of the amount of work that will have to be done.

It is significant that both the Wyoming and New Mexico offices requested an extension of the deadline even before the directive was sent out. Washington denied the extension, taking the attitude that operators would wait until the last minute to comply no matter when the deadline was set.

The first reaction of many operators is not quotable, but in general it expresses concern about additional expense, additional paperwork and additional demands on time.

There are a lot of questions left unanswered.

There are thousands of wells in the Rocky Mountain region, some lined and a great many unlined — more than ten thousand in the San Juan Basin alone. Will the USGS check general areas, or each well? It's doubtful they could check each well before the deadline.

If there are thousands of pits to be lined, and there could be — depending on the standards set, where will the men and material come from to complete the work on time?

The Roswell office has said that under certain conditions, such as a

material shortage, an extension could be granted on a company or operator basis. Would a budget shortage qualify for an extension? That's a question that occurs to small companies operating marginal wells.

One question leads to another. If it is not economical to line a pit for a marginal well, how many will be shut in for keeps — and how much production will be lost? How much production will be lost temporarily by companies who cannot meet the deadline for any number of valid reasons.

The new regulations probably didn't surprise many operators — nothing surprises them anymore. But there is concern; concern that the industry was not given an opportunity to take part in hearings, or to make suggestions.

There is also considerable growing concern with the increasing number of new regulations, and that each one adds to the cost and reduces the capability to produce oil and gas.

The new regulations are designed to protect the environment. The petroleum industry knows and understands that. Maybe they are needed, but when will there be a regulation that is favorable to the solution of two more, very serious problems — the energy problem and the problem of inflation?



RECEIVED

DEC 30 1974

O & G CONS. COMM.

STATEMENT OF POLICY

The Interstate Oil Compact Commission, an association of state governments of all thirty of the oil producing states, enjoys a unique position to comment on energy development in the United States. Based upon knowledge obtained from nearly forty years of regulatory experience in the prevention of waste of oil and gas, the IOCC has repeatedly issued Statements of Policy, commenting on the status of the energy segment of our economy. We have called attention to the shortsighted practices of fixing the wellhead price of natural gas at a level well below its replacement value and of permitting an ever-increasing dependence on what was then "cheap foreign oil," all in the name of protecting the consuming American public. It is the consensus of the IOCC that the American consumer's interest is best served by a policy of developing long-term, dependable domestic energy sources rather than discouraging their development by artificially fixing the price of petroleum energy supplies below the level of their energy content, below the level of their replacement costs, and below the level necessary to develop competitive alternative sources. Experience clearly demonstrates that artificially low prices create an inordinately high demand for energy, resulting in wasteful consumption of this Nation's limited depletable natural resources.

Fortunately, over a year ago, the federal government's Project Independence focused attention of the Nation to problems repeatedly identified by this Compact for more than twenty years. Unfortunately, with the exception of authorizing the construction of the long-delayed Alaskan pipeline, no significant progress towards the goal of energy self-sufficiency has been achieved. The IOCC again makes the following recommendations towards achieving this essential goal:

1. (a) The wellhead price of natural gas should be deregulated in order to encourage the maximum domestic exploration and development of this superior fuel.
- (b) The price of U. S. produced crude oil should be allowed to rise to the economic level necessary not only to encourage the discovery and development of new domestic oil reserves, but also to permit expanded use of secondary and tertiary recovery techniques on already discovered oil fields.

(c) The price of natural gas liquids, such as propane and butane, must be sufficient to encourage the recovery of these products from the natural gas stream.

Inadequate pricing of any of these vital fuels inevitably leads to wasteful consumption practices and is adverse to the interests of the American consumer by failing to encourage their replacement, and further discouraging the development of alternative fuels.

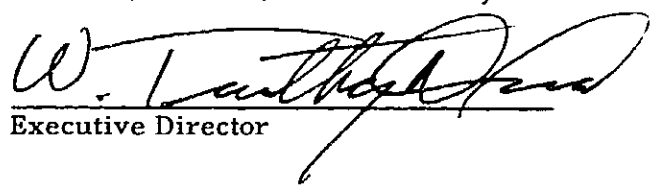
2. The Outer Continental Shelf should be opened to leasing and exploration in geologically attractive areas, regardless of their location.
3. Development of alternative new fuel sources, such as oil shale, coal gasification and liquefaction, tar sands, and any other potential source of usable energy, should be further encouraged by the federal government. The ultimate protection of the consumer is achieved by the development of these dependable alternative fuels.

The above recommended steps would help expand the supply of energy sources which are necessary to achieve the goal of energy self-sufficiency. At the same time, we would encourage conservation steps in the consumption of oil and gas to help relieve the present imbalance between domestic supply and demand.

The IOCC has, on earlier occasions, expressed our faith in the American people to respond to the problems created by the present energy shortages if properly apprised of the facts. The officers, committees, and staff of the IOCC, drawing upon their many years of experience in the field of regulating the development and production of oil and gas and the prevention of waste, are eager to assist both the Congress and the Administration in achieving these goals.

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I, W. Timothy Dowd, Executive Director of the Interstate Oil Compact Commission, do hereby certify that the above and foregoing is a true and correct copy of a Statement of Policy unanimously adopted by the Interstate Oil Compact Commission, in meeting duly assembled at Phoenix, Arizona, on the 11th day of December, 1974.

  
Executive Director

24  
82  
1928  
1965

Copies of these  
are in the Comm.  
folders.



OFFICE OF

Oil and Gas Conservation Commission

STATE OF ARIZONA

4515 NORTH 7TH AVE.  
PHOENIX, ARIZONA 85013

PHONE: (602) 271-5161

A G E N D A

Meeting

January 17, 1975

4515 N. 7th Avenue, Phoenix, Arizona

10:00 a.m.

Call to order

- 1✓ Approval of minutes of meeting of December 11, 1974
- 2✓ Report of Executive Secretary
- 3✓ Report of Enforcement Section
- 4✓ Report of Geology Section
5. Old Business - THE PLAN
6. New Business
7. Adjourn

BUILDING RENTAL  
April meeting

- April meeting - April 21st

IF YOU ARE UNABLE TO ATTEND THIS MEETING, PLEASE NOTIFY  
THIS OFFICE AS SOON AS POSSIBLE.

OIL AND GAS CONSERVATION COMMISSION  
4515 N. 7th Avenue  
Phoenix, Arizona 85013

Minutes of Meeting  
December 11, 1974

Present:

Mr. Ralph W. Bilby, Chairman  
Mr. W. Roger Hafford, Vice Chairman  
Mr. Robert A. Bledsoe, Member  
Mr. F. Keith Benton, Member  
Dr. G. E. H. Ballard, Member

The regular Commission meeting for the month of December was called to order by Chairman Ralph Bilby at 12:30 p.m.

Minutes of the meeting of November 15, 1974 were approved as written.

Reports of Executive Secretary, Enforcement Section and Geology Section were accepted.

The 1974 Annual Meeting of the Interstate Oil Compact Commission, which ended December 11, 1974 at 12 noon, was discussed.

Executive Secretary advised that Eastern Petroleum Company had not started plugging operations as ordered by the Commission, however the final commencement date was December 25, 1974 and no action could be taken until that date.

It was moved and passed that the staff prepare an overall plan of operations, including allocation of available resources with which to accomplish the same.

Mr. A. K. Doss of the State Land Department reported that the State Land Commissioner ordered leasing of State geothermal resources held up pending the outcome of a Federal geothermal lease sale scheduled for January, 1975. Executive Secretary was instructed to contact the State Land Commissioner in order that the Commission's concern as to geothermal leasing could be expressed.

Meeting adjourned at 2:00 p.m.

APPROVED January 17, 1975

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Also present:

Mr. A. K. Doss  
State Land Department



OFFICE OF

**Oil and Gas Conservation Commission**

STATE OF ARIZONA

4515 NORTH 7TH AVE.

PHOENIX, ARIZONA 85013

PHONE: (602) 271-5161

January 7, 1975

Memo: Commissioners  
From: John Bannister

State Land Commissioner Andrew Bettwy has indicated he will be with us at our regular meeting on Friday, January 17, 1975 at 10:00 a.m. to discuss the geothermal leasing of state lands. Mr. Bettwy had requested that we comment on the rules and regulations adopted for leasing state lands by the State Land Department and attached to this report are the staff's comments.

Also attached to this report you will find the beginning of the overall Commission's plans as discussed with the full Commission at the meeting of December 11, 1974. Following the last meeting of the Commission, I had a lengthy discussion with Dr. Ballard concerning the method and form the plans to be developed by the staff should take. Dr. Ballard's approach to this problem is most innovative and I think, when completed, will set forth an excellent guideline for future activities of this Commission.

In developing the guideline suggested by Dr. Ballard, it will be necessary to proceed in steps and the first step of the plan is attached for your consideration. It will take from three to five months to develop the full and complete plan, as contemplated by Dr. Ballard. I would like to report that Dr. Ballard agreed to meet with the staff prior to the regular meeting of the Commission to help us develop the overall plan.

You will notice I have attached a copy of Bulletin dated December 30, 1974 from the Arizona Environmental Planning Commission, together with a suggested law relating to resource development. I have suggested that the Oil and Gas Conservation Commission should be one of the agencies to be a part of the Resource Administration Coordinating Council.

Eastern Petroleum Company is now engaged in the plugging of the wells subject to the Commission's Order following the Commission hearing. Craig Musel, who is representing the Commission from

Memo: Commissioners  
January 7, 1975  
Page Two

the Attorney General's staff, has been on vacation during the Christmas holidays. In an earlier conference with Mr. Musel, he indicated that the Attorney General's Office would take no action one way or another until after he returned. Consequently, when Henry Fullop of Eastern contacted this office on December 24th and advised us that he was unable to begin compliance with our order for approximately ten days, we felt free to grant Mr. Fullop the additional time requested. Mr. Fullop said his father had become critically ill and was placed in a hospital on Christmas Eve. At that time, some equipment had been dispatched and was then in Albuquerque. We did verify his father's hospitalization on December 24th and his critical condition and, further, that the equipment had been dispatched and was in Albuquerque waiting for Mr. Fullop's orders.

Mr. Allen is now working out of Chambers, verifying the plugging of each of these wells. Prior to the date of the Commission's meeting, we should have a detailed report on the progress. In my opinion, Eastern is satisfying the purpose of the hearing, i.e., accomplishing plugging of the wells in question. Mr. Fullop further indicated that, with the equipment on location, he would plug out all of the wells drilled by Eastern, whether or not subject to our order.

Jack Conley will reach retirement age this month and this office is in the process of working with the Personnel Division so that he may continue in his present capacity for an additional period. The State Personnel Commission is evolving rules to cover the situation of an employee who has reached retirement age and does not wish to retire and who is capable of still performing his duties. While the situation is somewhat in a matter of flux, no official action will be taken by the Personnel Division until at least July of 1975. I will keep you advised of the situation.

As earlier advised, I have discussed the tax incentive bill which the Commission will seek to have enacted with Senator Stan Turney. He has suggested that we work through Senator Ed Sawyer of Safford. Senator Sawyer has been contacted and has agreed to sponsor our bill as cosponsor with Senator Turley. The Legislature goes into session on January 13th.





OFFICE OF  
**Oil and Gas Conservation Commission**  
STATE OF ARIZONA  
4515 NORTH 7TH AVE.  
PHOENIX, ARIZONA 85013  
PHONE: (602) 271-5161

January 7, 1975

Memo: Commissioners  
From: John Bannister  
Subject: Planning Report

Pursuant to instructions from the Commissioners on December 11, 1974, the staff is preparing overall plans for Commission action. Following the meeting, a lengthy discussion was had with Dr. Geoffrey Ballard concerning the form the plan should take and the manner in which it should be prepared.

Dr. Ballard advised that a plan such as he envisioned would take some time to complete and, to be successful, must have concurrence of the Commissioners each step of the way. He suggested that the first step in our plan be to determine exactly what the Commission is supposed to do and what it is doing, what resources are available for these purposes, and how they should be allocated.

Consequently, I directed a memorandum to Mr. Bill Allen and Mr. Jack Conley (copy of which was furnished you) which requested answers to questions:

1. What is the Commission's real business?
2. What resources are available for the accomplishment of this business?
3. How should these resources be allocated?

ARS 27-502 and ARS 27-652 set forth the policies under which this Commission is operating. These policies pertain to oil, natural gas, helium and geothermal energy and provide it shall be the policy of the Commission to conserve these natural resources, to prevent waste of these natural resources, protect the correlative rights of the land owners and resource owners, to encourage development of the resources, encourage economic supply and demand

Memo: Commissioners  
Subject: Planning Report  
1-7-75  
Page 2

for resources, safeguard the health, property and welfare of the citizens of Arizona. Pursuant to this policy, the Commission has adopted rules and regulations covering the specific points spelled out by the statutes.

Conservation, waste prevention, protection of rights, safeguarding of health and welfare of the citizens, is being accomplished through the rules and regulations adopted by the Commission and the Enforcement Section thereof, while encouragement of the development of resources and encouragement of the economic supply thereof is being done by the Geology Section. I might mention that no effort is being made to encourage the demand for the resources under the jurisdiction of this Commission, inasmuch as demand now far exceeds supply.

The enforcement activities of this Commission are subject to forces beyond the control of this Commission, i.e., as the number of drilling wells increases, so do the enforcement activities. The Enforcement Section has no control over how many wells will be drilled in the State at any given time or how many applications for permits will be made at any given time. Consequently, the Enforcement Section is operating with one man and one secretary and it is the feeling of the staff that this is sufficient personnel under the existing circumstances and certainly until such time as approximately one half of the enforcement effort is involved in field activities. As of now, no additional personnel should be hired. The main effort of the Enforcement Section at this time is keeping the well records updated, in order and available for inspection, as well as handling the normal office supplies.

The principal effort of the Geology Section has been consistently directed toward the goal of encouraging exploration for and exploitation of the State's energy resources. The primary objective to accomplish this is the development of geologic maps, reports, and other material designed to areally define those areas warranting exploration for oil, natural gas, and geothermal resources. Current emphasis is being placed on defining the potentially productive areas that would be attractive to small companies and independent operators with small or no geological/geophysical staffs. Most of the wildcat discoveries in frontier areas in the United States, including the largest field (East Texas), have been made by small companies or independent operators.

For specific information as to the miscellaneous resources available currently to the Geology Section, and the priorities

Memo: Commissioners  
Subject: Planning Report  
1-7-75  
Page 3

assigned to investigative projects, I refer you to Mr. Conley's attached memorandum.

To accomplish the purposes of this Commission, we have available five Commissioners, who are appointed by the Governor for five year terms. These terms are staggered so that a new Commissioner should be appointed in January of each year, with the term of one Commissioner expiring in December of each year. In the Commissioners rests the entire authority of the statutes and rules and regulations. The Commissioners set the policy of the Commission and this policy is carried out by the staff.

The staff consists of five men, three of whom are geologists, one titled "Oil and Gas Specialist", and the Executive Secretary. These men have had many years of experience in most phases of the oil and gas industry and are well suited for the positions they occupy. In addition, the staff has three secretaries, one each in the Geology and Enforcement Sections and one working for the Executive Secretary.

In addition to personnel, the Legislature budgets money from the General Fund for the Commission's activities each year. The Commission's fiscal year runs from July 1 through June 30. In the 1974-75 fiscal year, the Commission is operating on a budget of \$187,900. The Commission is seeking \$199,000 for the 1975-76 fiscal year. The 1975-76 budget which is being sought is allocated in the following manner: Salaries, including Commissioners - \$119,000±; Employee Related - \$17,000±; Professional - \$4,500±; Travel, In-State - \$10,000±; Travel, Out-of-State - \$7,000±; Operating Expenditures - \$41,000±, and Capital outlay - \$500±. At this time, no attempt will be made to further allocate funds until such time as a planning stage of our efforts becomes more specific.

In brief, at this time the Commission's main effort is being directed toward encouraging exploration for our energy resources. The record keeping and enforcement functions of the Commission at this time demand the least effort. As the planning effort progresses, the resources of the Commission will be directed to specific projects for the fiscal year 1975-76.

INNER-OFFICE MEMORANDUM

January 3, 1975

TO: John Bannister  
FROM: J. N. Conley  
SUBJECT: Answers to questions posed in your memorandum of December 17, 1974

All answers have relevance to the Geology Section only.

Question 1. What is our real business?

Answer: I consider that the principal function of my section is set forth explicitly in A-4 and A-5, Section 27-502, Declaration of Policy, Article 1, Production and Conservation, Title 27, Chapter 4, of Arizona Revised Statutes. These two policy stipulations read as follows:

- A-4. Encourage development of natural resources of oil and gas and their products.
- A-5. Encourage continuous and economic supply thereof and demand therefore.

Although not specifically so stated in a subsequent amendment adding Article 4 pertaining to geothermal resources, I'm sure that the intent was to charge this Commission with the same policy requirements regarding these potential resources.

Subsidiary functions, involving varying degrees of geological investigations from time to time, are set forth in A-1, A-2, A-3, and A-4 of Section 27-502.

Question 2. What resource do we have to accomplish our business?

Answer: Part I -- In-House Resources' Items

A. Physical plant

Office space -- adequate  
Storage space -- adequate for present volume of well samples

B. Specialized equipment -- adequate (includes such items as binocular microscope and light, microfilm viewer and printout machine, copying machine, etc.)

C. Well records -- Very poor for wells drilled prior to 1955, particularly so for those located in the Basin and Range province; poor to good for wells drilled subsequently

D. Wire-line logs -- very few electric or radioactivity logs for wells drilled prior to 1955, particularly so for those located in the Basin and Range province; fair to good suites of logs for wells drilled subsequently. Extremely few temperature logs.

John Bannister  
January 3, 1975  
Page 2

E. Lithologic logs

Wells drilled for oil, gas, helium, and geothermal resources, plus a few deep stratigraphic test holes:

Extremely poor for wells drilled prior to 1955, particularly so in the Basin and Range province; fair to good for wildcat wells drilled subsequently (approximately 275 strip logs issued by American Stratigraphic Company).

Wells drilled mostly for water:

Manuscript lithologic logs -- 160+

Most of these logs are of water wells drilled on the Navajo Indian Reservation. Fortunately, most of the wells drilled around the southwest, south, and east flanks of the Black Mesa basin penetrated the Permian Coconino Sandstone or older Paleozoic rocks.

F. Drillers' logs

Non-water wells -- Operators of most of the wells drilled prior to 1955 kept drillers' logs, highly generalized as to lithology and mostly useless for correlative purposes.

Water wells -- Approximately 166 logs of wells drilled on the Navajo Indian Reservation and logs of some wells drilled in southern Apache County.

- G. "Scout tickets" -- rough data sheets for most of the wells drilled for oil and gas in the State and many of the water wells (1420+). Data presented on these sheets gathered from numerous sources, such as our own records, miscellaneous State and Federal publications, and geologic literature. For Apache County we also have many scout tickets of wells obtained from a major oil company.

Arizona Well Information, Arizona Bureau of Mines, Bull. 195, by Peirce of the Bureau of Mines and Scurlock of this Commission, is a "glorified" type of scout book published in 1972. We subsequently published a supplement (Report of Investigation No. 5) in November, 1973.

- H. Completion cards -- fairly complete set of cards issued by Petroleum Information Corporation, and an incomplete set of cards of water wells drilled on the Navajo Indian Reservation prepared by the Museum of Northern Arizona.

I. Measured and described stratigraphic sections

Navajo-Hopi Indian Reservation (Arizona, Utah, and New Mexico) - 76\*  
(\* Most of these sections are post-Permian in age.)

Paleozoic rocks\* - 320+ sections indexed and referenced  
(\* Our publication, Report of Investigation No. 4, Selected Paleozoic Stratigraphic Sections in Arizona; most of these sections are located along the southwest edge of the Colorado

John Bannister  
January 3, 1975  
Page 3

Plateau province, and therefore will be useful in supplementing the sparse subsurface control in most of this province.)

J. Drill-bit cuttings and core chips in sample library

Petroleum, helium, potash, salt, geothermal, and stratigraphic wells 447\*

Water wells 359\*

(\*Our publication, Catalog 1, Index of Well Samples, June, 1971, and updated February, 1973. We also have in the library samples of 500+ wells drilled in Southwestern Colorado, Southeastern Utah, and Northwestern New Mexico -- Catalog 2)

K. Maps

1. Topographic -- complete set of maps (1255) published by the the U. S. Geological Survey (15' and 7½' quads). Much of the State still lacks 15' or 7½' quad sheets.
2. Orthophoto base 7½' quads -- 383 in files or ordered
3. Well location maps, county series

For geologic mapping and other uses we have prepared and published eight maps at a scale of 1:500,000, which cover all of the State except Apache, Coconino, Navajo, and portions of Greenlee and Gila Counties. These maps show the location of all wells drilled for oil, natural gas, helium, and geothermal resources; most of the wells drilled for stratigraphic, structural, halite, potash, and aquifer information; and geologically significant wells drilled for water. A tabulation printed on the map, or on a separate sheet, presents: The Commission's identification number, location, name, elevation, total depth, geologic age or lithology of rock at total depth, and availability of geologic data, such as wire-line logs, drillers' logs, and samples of drill-bit cuttings.

Well location map No. 9, in preparation, will cover the balance of the State (Apache, Coconino, Navajo, and portions of Gila, Greenlee, Yavapai, and Mohave Counties).

4. Well location maps, pool series

For future detailed investigations of productive or depleted pools, we have the following listed maps at scales appreciably larger than the 1:500,000 county series: East Boundary Butte and North Toh-Atin oil and gas pools; Bita Peak, Teec Nos Pos,

John Bannister  
January 3, 1975  
Page 4

and Twin Falls Creek oil and gas pools; Dineh-bi-Keyah oil field; and Pinta Dome-Navajo Springs-East Navajo Springs helium gas pools.

5. Well location maps, area series

- a) Holbrook Area -- This map covers those portions of Apache, Coconino, Gila, and Navajo Counties south of the Navajo Indian Reservation, and north of Township 7 North; scale 1:250,000. It shows the location of all wells drilled for oil, natural gas, helium, and potash resources; most of the wells drilled for stratigraphic information; and geologically significant wells drilled for water. This base, being currently updated, will be used for the presentation of the subsurface and surface structure on top of the Permian Coconino Sandstone. (This sandstone, or the approximately equivalent Permian DeChelly Sandstone, is the shallowest and most widespread Paleozoic marker suitable for subsurface structural mapping purposes.) An accompanying tabulation lists pertinent well data not shown on the map.
- b) Southeastern Arizona -- This map of Cochise County and portions of adjacent counties, scale 1:500,000, encompasses most of the area in this part of the State that was covered by Paleozoic seas. It shows the location of all wells drilled for petroleum and stratigraphic information, and of selected wells drilled for water; plus information pertaining to shows of oil and gas and geologic age of rock at total depth. An accompanying tabulation presents the same information shown on the map plus known information as to depth and geologic age (or lithology) of the rock encountered beneath the valley-fill.

6. Regional base map

We now have a scribe-coat base, at a scale of 1:500,000, of the entire State showing surveyed townships and U. S. Bureau of Land Management protracted diagrams of unsurveyed areas. It is not cluttered with cultural detail and will therefore be very useful for planned regional geologic subsurface maps at scales of 1:500,000 or smaller representative fractions. We also have a plate, which can be printed with the scribe-coat, showing the 15' quad land-net system utilized by the U. S. Geological Survey, the Navajo Tribe, and the U. S. Bureau of Indian Affairs on lands within the Navajo-Hopi Indian Reservations. This latter plate will permit ready township and range identification of geologically significant water wells currently located only by the 15' quad land-net system used on the reservations.



John Bannister  
January 3, 1975  
Page 5

7. Geophysical maps

Seismic -- none

Gravity -- State-wide: Bouguer anomaly, scale 1:1,000,000;  
poor station density

Local Areas:

- 1) Bouguer anomaly of Cochise County and portions of adjacent counties, scale 1:500,000; poor to fair station density
- 2) Limited Bouguer coverage in a few scattered areas; poor to fair station density

Magnetic -- State-wide: Residual and total intensity aeromagnetic; scales, 1:1,000,000

Local areas: Scattered and areally restricted aeromagnetic and ground magnetic coverage

Subsurface Temperature -- State-wide; scale 1:1,000,000  
Shows bottom-hole temperatures recorded by electrical or radioactivity surveys of drill holes; depth, and pertinent other data; also shows location and surface water temperatures of hotter-than-normal springs

8. Areal geologic maps

All quadrangles published by the U. S. Geological Survey, plus state-wide and county maps published by the Arizona Bureau of Mines, and a few published by other agencies or professional organizations

9. General highway maps

Most of the coverage prepared and published by the Photogrammetry and Mapping Services section of the Arizona Department of Transportation, at scales of 1" = 2 miles, for the counties in which we have the most interest, and some of the areal geologic maps prepared on the same bases by the Materials section

10. National Forest maps

Complete set of maps of the major forests in the State published by the U. S. Forest Service

11. General Land Office plats

Most of plats published by the U. S. Department of Interior; some of plats in south-central Apache County are cadastrally incorrect.

John Bannister  
January 3, 1975  
Page 6

12. Manuscript maps

Complete set at scale of 1" = 1 mile covering all of Apache and Navajo Counties

13. Miscellaneous

Numerous, varying scales and types obtained from various sources; largely used only for planimetric purposes

L. Geologic cross-sections

Fifty-one sections covering area from the Mogollon Rim south to the Mexican border, eastward into New Mexico across the Rio Grande River, and westward into California to the Salton Sea and well into the Mohave Desert area; almost 150,000 square miles; scales: horizontal, 1" = 4 miles; and vertical, 1" = 2,000 feet; orientation: approximately N 60° E and parallel one another at intervals of 8 miles

M. Geologic library

Professional bulletins

American Association of Petroleum Geologists ... 1935 to date  
Geological Society of America ..... 1948 to date

Miscellaneous

Geological guidebooks, U. S. Geological Survey and Arizona Bureau of Mines reports, geological glossaries, etc.

Question 2 continued

Answer: Part II -- Non-Commission Resource Items

A. Academic institutions and governmental agencies

1. A few of past and current masters' theses and doctors' dissertations of graduate students at our three principal universities deal with geological or geophysical matters pertinent to some phases of our work. To a limited degree, this Commission has been able in the past to obtain financial grants from Federal governmental agencies for geological or geophysical investigations by graduate students. A current investigation of macro folds in northern Arizona should be completed soon.
2. The Arizona Bureau of Mines and the Geosciences Department of the University of Arizona, the Geology Department of Northern Arizona University, and the Geology Department of Arizona State University maintain good geological libraries that we can use. The Bureau of Mines, which functions on a restricted basis as a State survey, is a useful source of basic geologic information.
3. Office of Arid Lands Studies. This branch of the University of Arizona houses selected NASA aircraft photography and satellite imagery of Arizona that may be viewed on the premises. It also has a terminal tied into a nation-wide telephone scientific and

John Bannister  
January 3, 1975  
Page 7

technical data facility maintained by the Federal government at Oak Ridge, Tenn.

4. Photogrammetry and Mapping Services, Highways Division, Arizona Department of Transportation. This agency is a good source of information pertaining to cartographic and cadastral mapping problems.
5. Arizona Resources Information Systems. This agency has a complete inventory of all aircraft and spacecraft photography and imagery available in the State. It also has a good library of much of the photography and imagery that may be viewed on the premises. Through this agency we have been able to obtain some U. S. Military Department side-looking radar imagery for use by the Geology Department of Northern Arizona University.
6. Arizona Library Archives and Public Records. Useful source for out-of-print publications of State agencies.
7. Arizona Department of Mineral Resources. This agency has an excellent library containing current and many out-of-print publications pertaining to the geology of mining districts in the State.
8. U. S. Geological Survey. Best source of geological data pertaining to water wells drilled in the State. Also, we have a publication exchange agreement with the Survey whereby we can get copies of maps and reports at no cost to us.
9. Other Federal agencies. Such agencies as the Bureau of Reclamation, Bureau of Land Management, and Bureau of Indian Affairs are occasionally sources of geologic information of value to us.

B. Other

1. Museum of Northern Arizona. This museum has an excellent library, performs miscellaneous geological investigations independently and in cooperation with the U. S. Geological Survey and State academic institutions. It sponsors a symposium once a year on the geology of northern Arizona that is attended by geologists representing many different disciplines, including petroleum exploration. It offers us an opportunity to learn about various investigations being conducted in the State, some of which are frequently of interest to us.
2. Oil and Mining Companies. Generally these companies do not release exploration data. Occasionally, however, we have been able to get some data of exploratory value.

Question 2 continued

Answer: Part III -- Personnel, Geologists

1. J. N. Conley. B.S. degree in Mine Engineering, Petroleum Option, Missouri School of Mines & Metallurgy, University of Missouri at

John Bannister  
January 3, 1975  
Page 8

Rolla, Missouri, 1931.

Geological experience: Primarily subsurface, in such provinces as: Mid-Continent, Gulf Coast, Louisiana and Texas; Southwest Texas; Eastern Shelf, Texas; Permian Basin, West Texas and Southeast New Mexico; Rocky Mountains, all states except Idaho; San Joaquin and Sacramento Valley, California; Western Canada, British Columbia, Alberta, and Saskatchewan; and Eastern and Southeastern Australia.

Employers: Phillips Petroleum Company, U. S. Geological Survey, Airolene Gasoline Co., Shell Oil Co., Amerada Petroleum Corp. (9 years), Seaboard Oil Co. (14 years), Kilroy Company of Texas, Inc. (4 years), Southern Minerals Corp. (7 years), and Arizona Oil and Gas Conservation Commission (4+ years)

Positions of Administrative Responsibility:

Seaboard Oil Co.: District Geologist, Abilene, Texas (4 years); Supervisor, Southern Oklahoma and West-Central Texas Districts, Dallas, Texas (1+ years); Exploration Specialist, West-Central Texas District (1 year); Chief Geologist, Western Division (Alaska, Northern Arizona, California, Colorado, Western Kansas, Montana, Nebraska, North and South Dakota, Western New Mexico, and Utah in the United States. For 1½ years this Division included Western Canada. Denver, Colorado, headquarters. Staff: 21 geologists and geophysicists.

Kilroy Company of Texas, Inc.: Exploration Manager, Rocky Mountain province, including Western Canada (2 years); and Vice President, Geological Department, Rocky Mountain, West Texas, and Gulf Coast provinces (2 years). Staff: Varied from 4 to 10 geologists and geophysicists - relied largely on consultants.

Southern Minerals Corp.: District Geologist, Permian Basin, New Mexico and West Texas, West-Central Texas, and Rocky Mountain, including Alberta, Canada, provinces (7 years). Staff: 2 geologists - used consultants extensively.

2. James R. Scurlock. B.S. degree in Geology, Yale University, 1949.

Geological experience: Surface (field and photo structure mapping) and subsurface in Permian Basin and Rocky Mountain provinces. Since 1958 experience has been exclusively in Arizona and adjacent states in the Four Corners region. Prior to 1958 bulk of experience was as a well-site geologist. Subsequently, most of experience has been in subsurface mapping and general geology.

Employers: Lario, Globe, and Atlantic, Midland, Texas (4 years); Superior Oil, Denver, Colorado, Albuquerque and Farmington, New Mexico (9+ years); and Arizona Oil and Gas Conservation Commission (10+ years)

Positions of Administrative Responsibility:

Arizona Oil & Gas Conservation Commission: Geologist, 1964-October, 1970; no geological staff; Director of Geology Section, November, 1970-January, 1972, 2 staff geologists; Staff Geologist, February, 1972 to present date

John Bannister  
January 3, 1975  
Page 8

Rolla, Missouri, 1931.

Geological experience: Primarily subsurface, in such provinces as: Mid-Continent, Gulf Coast, Louisiana and Texas; Southwest Texas; Eastern Shelf, Texas; Permian Basin, West Texas and Southeast New Mexico; Rocky Mountains, all states except Idaho; San Joaquin and Sacramento Valley, California; Western Canada, British Columbia, Alberta, and Saskatchewan; and Eastern and Southeastern Australia.

Employers: Phillips Petroleum Company, U. S. Geological Survey, Airolene Gasoline Co., Shell Oil Co., Amerada Petroleum Corp. (9 years), Seaboard Oil Co. (14 years), Kilroy Company of Texas, Inc. (4 years), Southern Minerals Corp. (7 years), and Arizona Oil and Gas Conservation Commission (4+ years)

Positions of Administrative Responsibility:

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Arizona Oil & Gas Conservation Commission: Geologist, 1964-October, 1970; no geological staff; Director of Geology Section, November, 1970-January, 1972, 2 staff geologists; Staff Geologist, February, 1972 to present date

John Bannister  
January 3, 1975  
Page 9

3. Charles E. Druitt. B.S. degree in Geology, University of Kentucky, 1951; M.S. degree in Geology, University of Oklahoma, 1958

Geological experience: Primarily subsurface in such provinces as Mid-Continent, Oklahoma, Arkansas, and North Texas; and Rocky Mountains, Montana, Wyoming, South Dakota, Colorado, Utah, and Arizona; and primarily surface in such areas as Venezuela, Bolivia, Turkey, Indonesia, Cameroon, Equatorial Guinea, and Saharan Africa.

Employers: Creole Petroleum Corporation (2 years), Gulf Oil Corp. (16 years), FUGRO-US, Inc. (1 year), Arizona Oil & Gas Conservation Commission (10 months)

Positions of Administrative Responsibility:

Gulf Oil Corp.: Field Party Chief, Turkey (6 years), and Bolivia (4 years); Senior Surface Geologist, Cameroon (1+ years), and Indonesia (1+ years). Staff: 1 - 2 geologists, 1 - 2 geological trainees, immediate technical and logistic supervision of contract geological and geophysical crews. Company liaison with government of Equatorial Guinea (1+ years).

FUGRO-US, Inc.: Project Geologist and Field Coordinator, Central Arizona (1 year). Staff: 20+ geologists and geological engineers - also used consultants extensively.

4. Secretary: OEnone Stacey. B.S. degree in Mathematics, Central Missouri University, 1937.

Experience: Teacher of mathematics, general science, biology; various secretarial positions; supervisor of ALCOA Spectrographic Laboratory; supervisor of Comparison Shopping, Macy's Kansas City; mathematics technician-engineering aide, AiResearch Manufacturing Co. of Phoenix

Arizona Oil & Gas Conservation Commission (1+ years)

Question 3. How should our resource be allocated?

Answer: For the balance of FY75 our manpower resource should be allocated to completing current projects which I consider to have the highest priority. In order to produce a variety of geologic maps and cross-sections designed to semi-isolate or isolate those areas in the State warranting geophysical and drilling exploration by industry, basic well and geologic data must be assembled, interpreted, and presented in readily usable formats. As such projects are completed, we publish the results so that the information is available for current use by industry, governmental agencies, academic institutions, and interested persons. Base maps are indispensable to the exploration geologist. Therefore, we have produced well location base maps suitable for subsurface geologic mapping purposes covering all of the State except Apache, Coconino, and Navajo Counties.

Highest priority projects:

1. Completion of Well Location Map No. 9 and accompanying data tabulation. This map, scale 1:500,000, will cover all of Apache, Coconino, and Navajo Counties, and portions of adjacent counties. This will be the last of our 1:500,000 county well location maps. High priority is assigned for these reasons:

John Bannister  
January 3, 1975  
Page 10

- a) The area covered currently appears to offer the best potential for structurally and stratigraphically controlled petroleum accumulations in Paleozoic reservoirs, and possibly in Triassic reservoirs
  - b) Completion of our county well location map series
  - c) Completion of the base map of area covered will furnish a base also suitable for a series of planned subsurface structure and isopachous maps
  - d) The southeastern portion of the map encompasses the "Holbrook" basin, where a Denver-based company has announced plans to drill 7 exploratory wells in 1975
  - e) The gross area of the map encompasses the area in which Dr. George Davis and two graduate students at the University of Arizona are completing a field and ERTS imagery investigation of macrofolds
  - f) The gross area of the map encompasses the area in which two graduate students at Northern Arizona University are making detailed facies studies of the Devonian and Mississippian rocks
2. Completion of a structure contour map on top of the Permian Coconino Sandstone in the "Holbrook" basin. Locally high well density necessitates a scale of 1:250,000. High priority is assigned for essentially the same reasons specified in the preceding paragraph.
3. Completion of a preliminary top of basement map of the Colorado Plateau province of Arizona. Map will also show lithology of the basement surface. Among the reasons for assigning a high priority to this project are:
- a) Two major company geologists have suggested that such a map be prepared
  - b) It will furnish information as to the gross thicknesses of overlying sedimentary rocks
  - c) In conjunction with gravity, magnetic, subsurface and surface geological information, better define ancestral lines of folding which have affected structure in the overlying sedimentary rocks, and better define those areas possibly offering unconformity and paleogeomorphic traps in onlapping Paleozoic rocks
  - d) Be of value, in conjunction with magnetic, gravity, and geologic structure and isopachous maps of the overlying Paleozoic rocks, in solving some of the complex faulting and structural patterns indicated by existing maps on the east flank of the overall Black Mesa basin.

Lower priority projects:

Complete partially prepared Special Publications SP-2 (Pinta Dome-Navajo Springs-East Navajo Springs helium gas pools) and SP-3 (Dineh-bi-Keyah oil field)

John Bannister  
January 3, 1975  
Page 11

GENERAL

Geographic and geologic information systems and automated mapping are enormously useful tools for exploration geology. The feasibility of utilizing these tools economically is being investigated currently with the assistance of Arizona Resources Information Systems personnel. Some information will be available later this month as to the cost of digitizing our geographic and geologic data, and the cost of production of various types of maps.

JNC:os

*JNC*  
J.N.C.





OFFICE OF

**Oil and Gas Conservation Commission**

STATE OF ARIZONA

4515 NORTH 7TH AVE.  
PHOENIX, ARIZONA 85013

PHONE: (602) 271-5161

DATE: January 2, 1975

TO: John Bannister, Executive Secretary

FROM: W. E. Allen, Director - Enforcement Section

The following ideas are submitted in response to your memo dated December 17, 1974.

I. What is our real business?

1. Regulatory - oil, gas, helium and geothermal resources
  - A. Conserve the natural resources of oil, gas helium and geothermal resources
  - B. Prevent waste
  - C. Provide for the protection and adjustment of correlative rights
  - D. Protect the environment
2. Issuance of drilling permits following approval of application to drill.
3. Encourage the development of oil, gas helium and geothermal resources.
4. Gather and maintain reports, well records and all pertinent information.

II. What resources do we have to accomplish our business?

1. Personnel
2. Approved operational funds
3. Well records
4. Geologic, engineering and geographic knowledge of the state and the producing fields within the state
5. Knowledge of the rules, regulations and statutes
6. Ability to assist operators with various problems, sometimes eliminating costly delays in operational procedures and preventing errors in the filing of required information and reports.
7. A good general knowledge of all phases of operations and locations of all service companies and contractors required to perform the necessary operations.

III. How should our resources be allocated?

1. Efficient regulation of drilling and production practices.
  - A. Assistance and cooperation whenever and wherever possible to ensure prompt and continuous operation without excessive operational time and expense.
  - B. On site inspections at regular intervals or where required.

Page 2

2. Maintaining good and complete records, logs, etc.,
  - A. Efficient retrieval of these records for interested parties
  - B. Promptly furnish information as requested by interested parties
3. Deal fairly and equitably with all operators.
4. Efficient use of available funds and personnel in order to provide the most informative information possible with our limited means.



OFFICE OF  
**Oil and Gas Conservation Commission**

STATE OF ARIZONA  
4515 NORTH 7TH AVE.  
PHOENIX, ARIZONA 85013  
PHONE: (602) 271-5161

January 8, 1975

ACTIVITY REPORT

J. N. Conley  
Director, Geology Section

**PUBLICATIONS**

Publication sales dropped this past month to a low figure of \$54.75. Most of the sales were to engineering and geological consultant firms and consultant geologists. Several public libraries and governmental agencies inquired as to the availability of publications.

\*\*\*\*\*

**Well Location Map No. 9**

Barring unforeseen delays, we expect to have copy-ready material completed for the lithographer and printer for this map and the accompanying well data tabulation sometime next month. This map covers all of Apache, Coconino, and Navajo Counties; scale 1:500,000 (1 inch = 8 miles). When published, we will have a set of nine maps covering the entire State except for the mountainous portions of Gila and Greenlee Counties.

\*\*\*\*\*

**Basement Structure Map**

Considerable progress has been made in assembling data for this map and preparing a suitable base map for presentation of data and contours. It will encompass areally all of the Colorado Plateau province of northern Arizona.

\*\*\*\*\*

**Holbrook Area - Top of Permian Coconino Structure Map**

All data for this map has been assembled. The drafting necessary to post onto the base map the supplementary water wells reaching the Coconino Sandstone will be commenced this week.

**A.A.P.G. "COMMUNICATORS"**

As mentioned at our November meeting, the American Association of Petroleum Geologists is embarking on a public affairs program. One phase of the program is to have two knowledgeable members from each state who would be able and willing to communicate to their respective U. S. Senators on factual matters relating to the energy supply picture -- as particularly seen from the standpoint of the professional petroleum geologist. There is certainly a need for better communications, despite the fact that some governmental agencies and senators are beginning to make requests about facets of the petroleum industry from the Association. Some of the requests received this past year were:

Activity Report  
January 8, 1975  
Page 2

The Environmental Protection Agency requested that the Association sponsor for their group a symposium on offshore drilling operations.

The Treasury Department contacted the Association about incentives for exploration.

The Federal Energy Office requested estimates of potential resources pertaining to certain federally controlled areas.

The U. S. Senate Commerce Committee requested a statement on the future potential oil and gas reserves in the United States.

I am pleased to report that two capable and knowledgeable petroleum geologists have agreed to serve as "Communicators." They are:

Dr. Jerome J. Wright for Senator Barry Goldwater, and  
Allan Cree for Senator Paul Fannin.

You are fully aware of Wright's qualifications. Allan Cree is a retired Cities Service Oil Company geologist and executive living in West Sedona. He is still very active, however, as a Rocky Mountain and international petroleum consultant. For the past several years, on his own time and at his own expense, he endeavored to alert civic groups in Northern Arizona, industry, and government of the energy crisis that hit the country in 1973.

We should perhaps consider requesting Wright and Cree to serve as Communicators to key Arizona State Senators or Representatives. Here in Arizona it seems to me our government is creating a large bureaucracy to handle energy shortages but doing nothing constructive to further knowledge of potential energy resources in the State that could possibly alleviate some of the shortages.

#### GENERAL

Strip Country. In previous Activity Reports and at monthly meetings mention has been made of the leasing activity in the area and that Home Oil Company may be planning some geophysical exploration. Another owner of a lease block in the area is Jack Grynberg of Denver, Colorado. His office recently requested information as to the publications of this Commission.

Northwest Pipeline Company. In the past few months this company has purchased some of our publications. Apparently the exploration department is investigating the oil possibilities of northern Apache County currently, as we had a telephone call today relative to the quality of some oil shows reported in a wildcat well in the area. The recently established exploration department of this company is headed by a geologist who has had extensive experience in southwestern Colorado and southeastern Utah.

Northern Arizona Investigative Projects. The two graduate students at Northern Arizona University recently visited our office to obtain more well data for their facies studies of the Mississippian and Devonian Systems.

A progress report of the NASA-funded ERTS imagery and surface mapping project under the supervision of Dr. George Davis is being mailed to this office today. Dr. Kenneth Foster, Office of Arid Lands Studies, informs me that NASA has indicated that funds may be available for additional investigations if the results of this particular investigation are deemed worthwhile.

Activity Report  
January 8, 1975  
Page 3

Costly wildcats. The general public and few persons in government have little concept of the costs involved in developing drillable prospects and the subsequent cost of testing prospects with the drill bit. For an example of high onshore drilling costs in Alaska, Amoco Production Company spent \$10.8 million on its recent dry hole near the tip of the Alaska Peninsula. This was the fourth dry hole drilled by the company on the peninsula to test geologic structures from 8,000 to more than 14,000 feet deep. The total cost of the recent dry hole was more than the \$3.5 million the United States paid Russia for the entire state of Alaska. In the lower 48 states an onshore dry hole to the same depth would average about \$750,000. Test holes below 14,000 feet, however, can sometimes be very costly. The world's deepest hole to date, drilled in western Oklahoma to a depth of 30,050 feet by Lone Star Producing Company, cost \$13.0 million.

Gasification plants. Western Gasification (Wesco) has released a draft environmental impact statement to build four coal gasification plants southwest of Farmington, New Mexico. If all necessary approvals from federal, state, and local agencies, and the Navajo Tribe are obtained within a reasonable length of time, Wesco could put the first plant on stream by late 1977.

Computerized Information Retrieval System. Attached to this report is a news item published in Volume 1, Number 2, of the ARIES DIGEST (Arizona Research and Information Exchange System). It describes a system, named RECON, designed for a quick search of large files of document citations. The assessment of the current information bases, with the exception of the Energy Data Base, is of little direct interest to us at this time; but some of the new files to be developed may be of considerable interest.

Unit Formed for Aerial Scanning. Motorola, Inc., has announced (ARIZONA REPUBLIC, November 14, 1974) the formation of a subsidiary company here for aerial geological resources, to be known as Motorola Aerial Remote Sensing, Inc. (MARS). The firm's mission is described as providing "an integrated data management geological remote sensing capability for resources exploration and engineering structures." It will utilize an aircraft with specially adapted side-looking airborne radar (SLAR) surveillance equipment. This equipment is integrated with five major types of sensors: a thermal infrared scanner, tandem-mounted metric cameras, a multiband camera, an airborne magnetometer with analog and digital readouts, and a 35mm tracking camera.

This suite of sensors is excellently designed for preliminary exploration for oil, gas, geothermal, and mineral resources.

JNC:os

*JNC*  
J.N.C.

#### RECON AT THE U OF A

Beginning October, 1974, the University of Arizona is tied into RECON. RECON is a computerized information retrieval system designed to allow the user to search large files of document citations. Information such as titles, authors, keywords, and abstracts for literature, articles and research projects can be accessed from the Atomic Energy Commission's Oak Ridge National Laboratory computer facility. Retrievals will be made in real-time with a local printing capability for rapid user access to the information.

RECON accesses a variety of information bases, including Nuclear Science Abstracts, Energy Data Base, Energy R & D Projects, Power Reactor Dockets, Coal Gasification Research, Water Resources Abstracts, Toxic Materials Data Base, Mercury Data Base, and Nuclear Safety Information.

New files, other than those briefly described above, will be developed for RECON.

Initially, there will be no charge per retrieval; however, after some experience with use, costs, and other operational contingencies, a charge per unit retrieved or flat rate to be determined at a later date may be added.

Inquiries may be telephoned (602-884-2816) or sent by mail to the Water Information Section, University of Arizona, Tucson, Arizona 85721, in care of Dr. Kenneth E. Foster, Office of Arid Lands Studies, or Dr. Kenneth J. DeCook, Water Resources Research Center.



OFFICE OF

**Oil and Gas Conservation Commission**

STATE OF ARIZONA

4515 NORTH 7TH AVE.

PHOENIX, ARIZONA 85013

PHONE: (602) 271-5161

January 7, 1975

Memo: Commissioners  
From: John Bannister

As earlier advised, State Land Commissioner Andrew Bettwy will meet with the Commission at its regular meeting on January 17, 1975 at 10:00 a.m. When I contacted Mr. Bettwy, he requested that we review the rules and regulations adopted by the State Land Department concerning geothermal development and at this time I wish to present you with the staff's comments on the material furnished to us. (A copy of this material was previously sent to you.)

Mr. Allen commented that he felt the State Land Department Rule 18 referring to a cooperative or unit agreement might be in conflict with ARS 27-665 wherein the legislature provides this Commission with authority to force pool and area after the record owners of 63% of the working interest have agreed to unitization or pooling. The State Land Department's rule, here referred to, says in part that the agreement "... shall not be effective as to the leaseholds lying within the unit area unless the Lessees thereof and the then approved operating interests shall subscribe to such an agreement."

Mr. Allen also referred to Rule 23, Royalty, wherein the rule states in part: "These charts and analyses shall be collected and sampled by an approved, qualified and bonded engineering company." Mr. Allen feels many of the operators drilling geothermal tests will have in-house capabilities to accomplish this requirement and that the rule, as it stands, could place an additional financial burden on the companies. It is my feeling that it should be pointed out that this Commission calls for the charts and records to be furnished to us, also.

Mr. Conley feels that the establishment and the use of the KGRA is perhaps a bit premature at this point.

It is my feeling that Rule 11, wherein the State Land Department may refuse to lease any state land if such land is being used by



Memo: Commission  
January 7, 1974  
Page Two

the state or any state department, the term "state department" should be changed to "state agency" as being more descriptive and all-inclusive.

Rule 12 provides for a royalty of 12½% reserved to the state. I have no particular quarrel with this figure but do point out that, generally speaking, 10% has become the accepted amount of royalty reserved to the lessors of geothermal resources.

Rule 15 provides that the State Land Department shall return all checks accompanying rejected bids after it has determined the winners of competitive leases. Page 10 of the material furnished to you sets forth the fact that a non-competitive bid lease shall be accompanied by a \$25 filing fee. The suggested lease form for a competitive lease calls for a \$10 filing fee. Consequently, it is my opinion that Rule 15 is not clear as to whether or not a filing fee of \$10 or \$25 is called for and, if so, if this filing fee is to be considered earned or to be returned as indicated in the rule.

It should be noted that the form supplied us for a competitive lease is the regular non-competitive lease form with the word "non" struck in the title. This application, as above stated, does call for a \$10 filing fee and when it is determined what the fee should be, the lease form should be corrected.



OFFICE OF  
**Oil and Gas Conservation Commission**  
STATE OF ARIZONA  
4515 NORTH 7TH AVE.  
PHOENIX, ARIZONA 85013  
PHONE: (602) 271-5161

DATE: January 2, 1975  
TO: John Bannister, Executive Secretary  
FROM: W. E. Allen, Director - Enforcement Section  
SUBJECT: Rules and Regulations Governing Geothermal Resources  
Leases - - State Land Department

Please refer to Rule 18, Paragraph D of subject regulations.  
The rule states:

A cooperative or unit agreement shall not affect the leasehold of any leased State Lands lying outside of the unit area, and shall not be effective as to the leaseholds lying within the unit area unless the Lessees thereof and the then approved operating interests shall subscribe to such an agreement.

It seems to me that the underlined portion of the above rule conflicts with ARS 27-665 Unitization; Requirements. If my interpretation of this statute is correct, there can be no exclusion from an approved unit where 63 percent of owners of record approve the unit agreement.

Your attention is also called to Rule 23, Royalty.

The rule states in part "These charts and analyses shall be collected and sampled by an approved, qualified and bonded engineering company". This could be a burdensome and needless expense to the operators that had the expertise to interpret the charts and make the required analyses.

INNER-OFFICE MEMORANDUM

January 8, 1975

TO: John Bannister  
FROM: J. N. Conley  
SUBJECT: Competitive Lease Offers in State Land Department's  
Known Geothermal Resource Areas (KGRA)

I note that the Land Department has the right to reject any and all bids.

Has the Department determined what it considers an acceptable bid for tracts within the defined KGRA?

Reason for question: As of last March, none of the Western States had any KGRA requiring competitive bids. Many thousands of acres of state-owned lands as of then had been leased via the non-competitive route, generally at \$1.00 per acre per year. I anticipate that the bids submitted at Arizona's first geothermal lease sale will be at disappointingly low figures unless some of the bidding companies know considerably more about the area than is generally known. I hope I'm wrong; but if not, is the Department going to: 1) stick by predetermined minimum acceptable bids, 2) accept highest bids regardless of amount per acre, or 3) forget about KGRA and lease State lands via the non-competitive route?

I understand that the KGRA defined have been based primarily on "geothermal gradient" maps, residual aeromagnetics, Bouguer gravity, and photographically discernible Quaternary faults. I do not consider the information presented by these maps to be sufficiently diagnostic of potentially productive geothermal steam or hot water to warrant high bids, for the following reasons:

1. "Geothermal gradient" maps -- these are pseudo-geothermal gradient maps, as they are not actually based on the rate of increase in temperature with depth within earth. They are of value, however, in defining these areas with the highest produced water temperatures.

2. The residual aeromagnetic map is based on data obtained from flight lines spaced at three miles. I question whether such data is adequate to define lows over thermal areas. From Studdt, 1961 and 1959: "Ground surveys have revealed such lows over thermal areas due to hydrothermal alteration of magnetite to pyrite. If ground magnetic surveys can be interpreted in the light of subsurface information, including lithology, alteration, and fluid movement, it may be possible to locate areas in which thermal fluid is being fed into a reservoir. These areas seem to be characterized by more intense alteration of magnetite to pyrite than the parts of the reservoir, and consequently produce near-surface negative anomalies." The loose residual aeromagnetic control and absence of subsurface information are adverse factors against defining accurately thermal anomalies in Arizona.

3. The usefulness of gravity in searching for thermal areas is largely limited to helping delineate major depressions in which such areas occur, as

John Bannister  
January 8, 1975  
Page 2


well as structures in basement underlying volcanic and sedimentary rocks filling the basin. I do not have the location of any of the Department's KGRA except for the one in Whitlock Valley, Graham County. At Casa Diablo and Salton Sea thermal areas positive gravity anomalies, areally small within a large negative depression, correspond to positive aeromagnetic anomalies. The interpretation here might be buried volcanic or intrusive rock. In the Whitlock Valley KGRA on geophysical maps show a positive residual aeromagnetic anomaly but no corresponding positive Bouguer gravity anomaly. Regionally, the KGRA is not located within a major gravity low.

The data upon which the KGRA have been delineated, in my opinion, is sufficient to warrant additional investigation but not sufficient to justify any high per acre bids.

At the Geothermal Short Course sponsored by the Geothermal Resource Council in Boise, Idaho, this past Fall, Magma Power Company's representative expressed disappointment with all of the known scientific methods presently in use in exploring for geothermal resources. This company is the pioneer in such exploration in the United States and is the only company to find a thermal reservoir that is being utilized to generate electricity.

If the Whitlock Valley KGRA fails to get any bids of economic significance, I would like to recommend that the State Land Department shelve its current competitive bidding program until the exploration state-of-art is more effective and more information obtained as to the potentialities of commercial thermal areas in the State. Pending that time, perhaps an appreciable volume of annual delay rentals could accrue to the Department from non-competitive leases.

JNC:os

  
J.N.C.

# MONTHLY FINANCIAL REPORT

RECEIPTS MONTH OF Dec. 1974	CLASSIFICATION	RECEIPTS	APPROPRIATED RECEIPTS	UNAPPROPRIATED RECEIPTS	TOTAL ALL RECEIPTS YEAR TO DATE
25 00	1 Permits to Drill			25 00	350 06
	2				
	3				
	4				
	5				
	6				
	7				
	8				
	9				
	10				
	11				
	12				
	13				
	14				
	15				
	16				
	17				
25 00	TOTAL CURRENT MONTH RECEIPTS			25 00	XXXXXX
XXXXXX	TRANSFERS IN				
XXXXXX	BALANCES BROUGHT FORWARD			3,601 83	XXXXXX
25 00	TOTALS - MONTH AND YEAR TO DATE			3,626 83	3,626 83

CLAIMS PAID MONTH OF 19	FUND TITLES	TOTAL AMOUNT AVAILABLE YEAR TO DATE	CLAIMS PAID YEAR TO DATE	OUTSTANDING ENCUMBRANCES	UNENCUMBERED BALANCE
9,287 16	1 Personal Services	58,350 00	55,241 25		3,108 75
817 35	2 Emp. Related Exp.	7,600 00	6,434 94		1,165 06
2,714 11	3 Other Operating Exp.	29,322 02	20,075 67	7,691 40	1,554 95
175 50	4 Prof. & Outside Serv.	2,435 85	1,182 25		1,253 60
1,215 51	5 Travel - State	4,950 00	4,300 33	877 01	1,227 34
-0-	6 Travel - Out of St.	3,200 00	2,310 83	-0-	889 67
-0-	7 Cap. Outlay - Equip.	4,100 00	3,722 83	-0-	377 17
	8				
	9				
	10				
	11				
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	25				
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	27				
	28				
	29				
	30				
	TOTALS	109,957 87	93,267 60	8,568 41	8,121 86

AGENCY Oil & Gas Conservation Comm.

DIVISION \_\_\_\_\_ IDENTIFICATION CODE NO. \_\_\_\_\_

1	2	3	4
CLAIMS PAID YEAR TO DATE	OBJECT CODE NO.	DISTRIBUTION OF EXPENDITURES CLASSIFICATION	CLAIMS PAID MONTH OF <u>Dec.</u> 1974
1,470 00	7111	1 Per Diem: Commission Members	1 600 00
53,771 25	7112	2 Salaries: Employees	2 8,687 16
		3	3
101 41	7151	4 Industrial Insurance	4 8 13
59 08	7152	5 Unemployment Insurance	5
2,439 01	7153	6 F.I.C.A.	6 214 30
3,086 69	7155	7 Retirement	7 498 68
652 50	7156	8 Health Insurance	8 112 50
96 25	7159	9 Personnel Comm.	9
		10	10
	7215	11 Professional Services: Engineer	11
1,182 25	7219	12 Professional Services: Other	12 175 50
		13	13
882 90	7221	14 Travel-State: Mileage	14 189 90
1,697 00	7222	15 Subsistence	15 626 00
60 00	7223	16 Public Transportation	16
1,269 43	7224	17 Vehicle Expense	17 106 61
391 00	7225	18 Reg. Fees; Parking; etc.	18 293 00
		19	19
787 60	7232	20 Travel-Out of State: Subsistence	20
1,197 86	7233	21 Public Transportation	21
1 02	7234	22 Airport Parking	22
324 45	7235	23 Reg. Fees; Telephone; etc.	23
		24	24
14,795 68	7251	25 Occupancy: Office Rent	25 1,849 46
	7261	26 Warehouse Rent	26
	7263	27 Maintenance & Repairs	27
475 00	7272	28 Mtn. & Repairs: Furniture & Equipment	28 225 00
1,669 66	7280	29 Office Supplies	29 354 02
399 50	7280.1	30 Orthophoto Quads.	30
197 21	7300	31 Field Supplies: Film; Am.Strat; P.I.; etc.	31 20 00
208 76	7331	32 Printing: Reports; Large Maps; etc.	32 146 76
379 47	7332	33 Legal Advertisement	33
46 25	7333	34 Court Reporter	34 46 25
305 60	7334	35 Postage	35
1,220 24	7335	36 Telephone	36 72 62
	7337	37 Drayage; Express; etc.	37
61 80	7339	38 Rental, Misc.	38
66 50	7360	39 Dues & Subscriptions	39
		40	40
189 32	7431	41 Capital Outlay: Office Equip.	41
	7434	42 Spec. Equip. (Geol.)	42
3,533 51	7436	43 Automobile	43
		44	44
250 00	7913	45 Revolving Fund	45
		46	46
		47	47
		48	48
		49	49
		50	50
		51	51
		52	52
		53	53
		54	54
		55	55
93,267 60		TOTAL	17,209 63

OFFICE

DO NOT WRITE BELOW THIS LINE

FIELD



OFFICE OF  
**Oil and Gas Conservation Commission**  
STATE OF ARIZONA  
4515 NORTH 7TH AVE.  
PHOENIX, ARIZONA 85013  
PHONE: (602) 271-5161

December 18, 1974

Memo: Ralph W. Bilby  
W. Roger Hafford  
Robert A. Bledsoe  
F. Keith Benton  
G. E. H. Ballard

From: John Bannister, Executive Secretary

Attached is the material furnished by the State Land Department as I mentioned in my recent letter.

Please review this and be ready to make any comments you might wish to Mr. Bettwy when we meet with him in January.



OFFICE OF

**Oil and Gas Conservation Commission**

STATE OF ARIZONA

4515 NORTH 7TH AVE.  
PHOENIX, ARIZONA 85013

PHONE: (602) 271-5161

DATE: December 17, 1974

TO: Ralph W. Bilby  
W. Roger Hafford  
Robert A. Bledsoe  
F. Keith Benton  
Geoffrey E. H. Ballard

FROM: John Bannister, Executive Secretary

Pursuant to your instructions at the Commission Meeting of December 11, 1974, I have contacted Mr. Andy Bettwy, Commissioner of the State Land Department, concerning the leasing of state lands for geothermal exploration. Mr. Bettwy was pleased with the Commission's interest in this leasing problem and said he would meet with the Commission at our next meeting, which should be January 17, 1975.

Mr. Bettwy further indicated that he would like our opinions as to his department's rules, regulations and leasing procedures as to geothermal energy. This information will be forwarded to you as soon as it is made available to this office. The staff's comments will be sent to you as soon as practical.

Consequently, there will be no special meeting with Mr. Bettwy.





OFFICE OF

**Oil and Gas Conservation Commission**

STATE OF ARIZONA

4515 NORTH 7TH AVE.

PHOENIX, ARIZONA 85013

PHONE: (602) 271-5161

DATE: December 17, 1974

TO: William E. Allen, Director, Enforcement Section  
Jack N. Conley, Director, Geology Section

FROM: John Bannister, Executive Secretary

Following the Commission Meeting of December 11, I had a lengthy discussion with Dr. Jeff Ballard concerning his desire for project planning by this Commission. Dr. Ballard, in this discussion, outlined a step by step planning procedure which he uses and which he feels will be of great use to this Commission.

At the first available opportunity I will discuss in detail with you the procedure Dr. Ballard outlined and which will be used by this Commission. In preparing for the first session on this procedure, please consider an answer to the following questions.

1. What is our real business?
2. What resource do we have to accomplish our business?  
(please make a list)
3. How should our resource be allocated?

These questions need not be answered prior to our first session, however, consideration should be given to their answers now.