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	O'BRIEN ENERGY AND	RESOURCES INC.		
	Report and Op	inion on		
	PARTICIPATION IN AMAX' Mc	COY GEOTHERMAL LEASE,		
	Lander and Churchill	Counties, Nevada		
	June 4,	1979		
	Andrew E. Nevin,	Ph.D., P.Eng.		
NEVIN SADLIER-BROWN GOODBRAND LTD				
	. ,			

Suite 503 - 134 Abbott St., Vancouver, B.C. Canada V6B 2K4 (604) 683-8271

June 4, 1979

Mr. Dale Corman O'Brien Energy and Resources Ltd. Ste. 916 111 Richmond Street Toronto, Ontario

Dear Sir:

Re: Report and Opinion on Participation in Amax' McCoy Geothermal Lease, Nevada June 4, 1979

It is our understanding that your Company wishes to finance work on the Amax McCoy geothermal lease by means of a rights offering or a private placement of shares.

This letter authorizes you to use the above-named report in a Prospectus to be submitted to the Toronto Stock Exchange, to the Ontario Securities Commission, and to distribute all or parts to shareholders or other interested parties, provided the meaning is not changed by partial quotes, and provided that new and additional field work has not progressed to the point so as to make this report obsolete in certain aspects of description.

The report is a description and a set of recommendations respecting a mineral property essentially in the exploration stage and is not a statement of its commercial viability. Our terms of reference at the present time are limited to the preparation of the report, and neither extend into management of the Company's affairs not into execution of recommendations.

Very truly yours

NEVIN SADLIER-BROWN GOODBRAND LID.

All.

Andrew E. Nevin, P.Eng.

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1.0 SUMMARY

1.1 General Thermal Features

The McCoy geothermal prospect lies at the junction of the Clan Alpine, Augusta, and New Pass Mountain. Ranges in central Nevada, immediately east of the well-known Dixie Valley geothermal area (Drawing 1). The prospect was a "blind" discovery resulting from systematic geological and geochemical work by Amax personnel within the past two years. Thermal features have been confirmed by 45 shallow (50 - 150 metres) wells having temperature gradients up to 300°C per kilometre (about 10 times crustal average) and heat flows anomalies up to 13 - 23 microcalories/cm² - sec (Drawings 5-7). Rocks are a Tertiary rhyolite tuff pile, unconformable on Permian and Triassic carbonates and clastics; the whole block-faulted (Drawing 4).

The magnitudes and distribution of thermal measurements and the geologic setting combine to make the McCoy prospect attractive for further exploration and production test drilling.

1.2 Terms of Participation

Amax Exploration, Inc. holds by lease application some 25 selected sections (about 16,000 acres) on their area of interest; and O'Brien holds 20 sections (about 12,800 acres) contiguous to Amax' lease (Drawing 2). Amax has offered O'Brien the right to earn an interest in Amax ground by partially funding exploration on that ground. Amax proposes to manage the program in a series of phases aimed at drilling up to three production test wells. At various points, either partner has the opportunity to continue or decline (Drawing 3A and B).

O'Brien may earn as much as 75% interest in the Amax lease by the commitment, in phases, of an estimated U.S. \$1.6-million; or, a 50% interest for either \$1.1-million or \$1.6-million, depending on the exercising of alternatives by the two partners.

1.3 Opinion on Participation

Amax' preliminary design for further work is sound and consists of 2-3 deeper temperature gradient wells for Phase I.

The prospect, by normal standards of subjective evaluation of geothermal properties, is excellent and warrants continued testing.

O'Brien's adjacent acreage would probably benefit from a successful outcome of work on Amax' lease (one alternative open to Amax is to earn a 50% interest in O'Brien's lease).

O'Brien has opportunities to decline at three points prior to committing funds, and accordingly can continue to review the attractiveness of the venture.

Our opinion is that participation according to the terms offered by Amax offers O'Brien a fair opportunity in the geothermal exploration business.

Respectfully submitted

MEVIN SADLIER-BROWN GOODDRAND LTD.

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Andrew E. Nevin, Ph.

June 4, 1979

2.0 REPORT

2.1 Terms of Reference

Nevin Sadlier-Brown Goodbrnad Ltd. has been engaged by O'Brien Energy and Resources Ltd., Toronto, to examine data on the McGoy Geothermal Lease and to prepare a summary report on the lease. We were also asked to provide an opinion on a buy-in by O'Brien wherein the present leaseholder, Amax Exploration, Inc., continues to act as operator throughout the exploration stages.

Accordingly on May 21, 1979 I visited the Amax office in Denver and on May 23 made a low level acrial reconnaissance of the property by fixed wing aircraft, in both instances conferring with Mr. Frank Dellechaic, senior project geochemist with Amax.

Materials supplied by Amax include a geologic map maps of thermal features in about 45 shallow temperature gradient wells, internal memoranda on water geochemistry, and correspondence outlining the offer to O'Brien. Other background material has come from conversations with Mr. Dellechaie, our own experience in the western U.S., and our own experience in geothermal exploration.

This report concerns a property still in the early stage of exploration and comments only on the attract-iveness of continuing exploration. We make no statement as to its ultimate viability. Moreover we have been engaged solely for our review of the property and the proposed venture and preparation of this report. We have no on-going responsibility towards management of O'Brien's affairs nor toward application of any funds raised for work on this property.

2.2 <u>Definition of Leases</u>

de a

The McCoy prospect held by Amax Exploration, Inc. consists of 25 sections, totalling 16,000 acres more or less, located in Lander and Churchill counties, Nevada (see Drawing 1, Location Map). At the time of this writing we understand that the title to geothermal rights consists of priority lease applications made by Amax to the U.S. Government.

The sections listed below make up the Amax-McCoy lease.

T24N, R40E, Section 33. T 23N, R40E, Sections 4, 6, 7, 8, 9, 16, 17, 19, 20, 29, 30, 31, 32, 33. T22N, R40E, Sections 5, 6, 7, 8, 9, 16, 17, 18. T23N, R39E, Sections 1, 12 (Mount Diablo Meridian).

Adjacent to the Amax lease are about 20 sections, totalling 12,800 acres more or less, already held by O'Brien. These are presumably lease applications as well and comprise a secondary subject property of this report. O'Brien's lease holdings are listed below.

T24N, R40E, Sections 27, 28, 29, 32, 34
T23N, R40E, Sections 3, 5, 10, 15, 18, 21, 28
T22N, R40E, Section 4
T23N, R39E, Sections 13, 24, 25, 36
T22N, R39E, Section 1, 12, 13 (Mount Diablo Meridian).

Both tracts are shown on the land status map, Drawing 2 of this report. In no case did we examine any title documents, lease applications, or talk to federal government officers. As a consequence, we express no opinion on the Amax or O'Brien titles.

2.3 Access

The leases can be reached on the ground via County dirt roads from U.S. Highway 50.

2.4 Recent History of Leases

In 1977 Amax undertook a regional geological and geochemical reconnaissance which lead to acquisition of the McCoy leases on several grounds:

a) location immediately east of the well-known Dixie Valley geothermal area, where some successful wells were drilled (and several more as of May 1979);

- b) location more or less at the intersection of several regional range-front faults;
- c) high regional seismicity;
- d) thick record of Tertiary volcanism, extensive in the range of less than 30 million years;
- e) presence of two old mercury mines within the lease area -- both having produced small amounts from hydrothermally silicified carbonate rocks;
- f) presence of some opaline silica in Quaternary alluvium;
- g) trace element geochemistry of water from the shaft of one of the mercury mines consistent with diluted geothermal water.

All these features appeared to the Amax staff to fit the indirect signs typical of a geothermal prospect.

2.5 Work Completed

Following lease application Amax drilled, in two stages, about 45 shallow test wells. Following general practice a rotary drill was used with air as the circulating medium. Depths were from 50 metres to 150 metres. All wells were dry, i.e. terminated above the water table.

Geology was taken from state and county maps, and revised slightly by Amax field staff.

No surface geophysical methods were used on the McCoy prospect.

2.6 Geology

The lease area lies at the "Y"-shaped intersection of the Clan Alpine, Augusta, and New Pass Mountains, respectively to the southwest, north, and south. As shown on the generalized geologic map, Drawing 4, the terrain is a mosaic of blocks separated by high-angle

faults. These are probably mainly normal in sense of movement, and have displacements from a few tens to a few thousand feet.

The oldest rocks exposed are the Permian Havallab and Pumpernickle formations, shales, sandstones, cherts limestone conglomerates and pyroclastics.

Undifferentiated Triassic rocks are mainly limestones and dolomites, with interbedded sandstones and shales, of the Faveret, Augusta Mountain; Cone Spring, and Osabb formations. In all, the exposures represent about 10,000 feet of thickness in the pre-Tertiary rocks.

The undifferentiated Tertiary rocks shown in Drawing 4 are about six local and distinguishable rhyolitic tuffs and flows in the general age range of 23-29 million years. These form part of an irregular pile several thousand feet in thickness, but subject to pinching and swelling along strike or down-dip.

Quaternary alluvium is not shown, but covers about 25% of the lease and does, in fact, obscure certain important contacts.

2.7 Geothermal Data

Material extracted and summarized from Amax' data are:

- a) most reliable geothermal gradient measurements from 45 wells (Drawing 5);
- b) measured or projected temperature at uniform depth of 100 metres (Drawing 6);
- c) heat flow, calculated from measured gradients and measured rock conductivities (Drawing 7).

Each of these provides a slightly different index of the same fundamental quality of a geothermal prospect: proximity to a subjacent geothermal reservoir or hot rock body.

Values shown reach anomalous highs for each of the three parameters. Geothermal gradients, for example reach a maximum of 308°C/kilometer. (An "average" crustal figure is generally about 25-30°C/km). Heat flow values range up to 23.5 microcalories/cm² - second. (Representative regional values are shown in Drawing 1 in the general range of 1.40 - 3.50 for central Nevada).

The patterns indicated by contouring the various values suggest at least five specific "highs," which we assume would be subject to future investigation by the operator. These are shown in the interpretive map, Drawing 8, labelled as "Section 33," "Section 7," "Section 9," "Section 32," and "Section 8" Anomalies, and are distributed over the 10-mile length of the Amax lease.

Examination of the maps (Drawings 4-8) overlying each other in various combinations further suggests:

- a) a deep NW-trending fault passes between the "Section 32" and "Section 9" Anomalies, perhaps a controlling structure; this fault is not fully recognized on the surface;
- b) The "Section 32" Anomaly may lie at the intersection of the above NW-fault and a NE-trending fault extending toward O'Brien's Section 28 (Drawing 8);
- c) Between the "Section 7" and "Section 9" Anomalies lies a heat-sink, perhaps a northwest-trending fracture carrying cold (non-geothermal)water;
- d) As contoured from existing data the "Section 9" Anomaly appears to be elongate eastward, perhaps owing to an unrecognized deep structure with that orientation.

2.8 Opinion on Merits of Lease

The high values of geothermal parameters, their pattern vis-a-vis the known geology, and the regional setting east of Dixie Valley, define an excellent geothermal prospect; but do not promise commercial success.

Very broadly, a commercially successful property should deliver on the order of 75 tonnes per hour of steam at the well-head at about $170-180^{\circ}\text{C}$ (340 - 360°F) and a flowing pressure of more than 7 atmospheres (100° psig). This product can derive from a steam-dominated reservoir (at about 240°C) or a super-heated water system at a higher temperature, and under high confining pressure.

The anomalies described in part 2.7 (and Drawings 5 - 7) provide bulls-eyes for continued drilling but are ambiguous in that the explorer cannot tell whether the shallow wells are (in the case of the 300°C/km gradient) within a few hundred meters of subcommercial 150°C water, or 1000 metres above a commercial reservoir. If temperatures are found to continue to increase downward in accordance with the anomalous family of gradients, the property would pass its next test toward commercial viability. It is our opinion that the property is worth further testing.

2.9 Opinion of Merits of Buy-In

Amax' proposal to O'Brien is outlined in Drawings 3A and B, which provides for several decision-making points for O'Brien (early in the venture) and for Amax (later in the exploratory stages). There are three paths toward defining the proportion of ownership prior to undertaking developmental drilling if O'Brien continues with Phase I and II options, as shown in the following table:

Table: Summary of Contribution and Final Proportions of Ownership

Completion through Phase	O'Brien's contribution thousands U.S. \$	Propor OB Prop. OB AMAX	tion of Ownership AMAX Prop. OB AMAX
IV ,	1600	100 0	50 50
III	1600	100 0	75 25
IIIA	1100	50 50	50 50

Following definition of the proportion of ownership, the operator can assess the other partner for developmental work, or dilute the other partners interest accordingly.

The following points are noteworthy on the venture:

- a) Amax is the operator, and O'Brien is subject to their wishes as to design, execution and timing (within limits) of exploration;
- b) Amax will bill O'Brien for O'Brien's share of costs, all of which are only estimated at this time, thus a liability might exist in excess of the amounts stated herein;
- c) O'Brien has three opportunities to decline further participation prior to start of the second production test well (and after the commitment of an estimated U.S. \$600,000) should O'Brien lose confidence in either the property or Amax' management;
- d) Certain funds and encouragement are believed to be available from the U.S. Department of Energy, for early exploration and later as loan guarantees for development;

e) O'Brien's buy-in and support of exploration on the Amax lease will, if successful, enhance the value of their own holdings; Drawing 8 shows several areas where current data suggest that Amax anomalies project un-closed onto O'Brien lease applications.

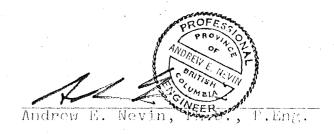
In summary we submit that the proposed buy-in is a worthwhile venture, subject to review as Phases I and II are completed.

There is no reason to lack confidence in Amax' ability to manage the program. Mr. Dellachaie has advised that the preliminary design for Phase I calls for 2 - 3 deep gradient holes (say to 500 metres) in the leading anomalies (say, "Section 9" and in the vicinity of "Section 32" or "Section 8"), perhaps preceded by one or two of the standard geophysical methods used in geothermal work. This program appears to us to be the most workmanlike manner for proceeding.

At the same time we urge O'Brien to maintain title to their present lease applications, particularly those sections indicated in Drawing 8 (Sections 27, 28, 32, T23N, R40E; 10, 15, 18, 28, T23N, R40E; and 4, T22N, R40E).

Respectfully submitted

NEVIN SADLIER-BROWN GOODBRAND LTD.



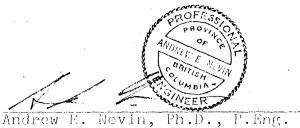
PART 3 - REFERENCES

- 1. Amax Exploration, Inc., files:
 - a) geologic map
 - b) land maps
 - c) drill hole maps, showing temperature gradients, temperatures at depth, heat flows.
 - d) William M. Dolan, May 15, 1979, letter to Dale Corman
 - e) Frank Dellachaie, December 21, 1977, Interoffice memo, and April 6, 1973, Inter-office memo
- 2. National Oceanic and Atmospheric Administration, 1977, Geothermal Energy Resources of the Western U.S. (map)

PART 4 - CERTIFICATE

I, Andrew E. Nevin, hereby certify that:

- 1. My residence address is 402-1905 Robson Street, Vancouver, B.C., my office address is 5th floor-134 Abbott Street, Vancouver, B.C. V6B 2K4; and that I am a Geologist by occupation.
- 2. I hold a B.Sc. in Geophysics from St. Lawrence University, an M.A. in Geology from University of California, Berkeley, and a Ph.D. in Geology from University of Idaho. I have been practicing my profession since 1961, and I am a member of the Association of Professional Engineers (Geological) of the Province of British Columbia, and a Registered Professional Geologist in the State of Idaho.
- 3. I have examined the McCoy lease as stated in the report and reviewed the data thereon personally.
- 4. I hold no direct or indirect beneficial interest in the above property nor in the securities of O'Brien Energy and Resources Ltd. or Amax Exploration, Inc., or to the best of my knowledge any affiliate of either company.



June 4, 1979

PART 5 - QUALIFICATIONS OF NEVIN SADLIER-BROWN GOODBRAND LTD.

Following is an updated summary of the firm's experience in geothermal resource exploration.

INFORMATION ON THE FIRM

Nevin Sadlier-Brown Goodbrand Ltd. is a firm of consulting geologists and geological engineers incorporated under the laws of British Columbia on March 1, 1971, under the former name of Andrew E. Nevin Consultants Ltd. The name was changed on December 6, 1973, upon consolidation with the consulting practice of Timothy L. Sadlier-Brown and Douglas W. Goodbrand's entry into the firm.

Our principal fields of endeavour are exploration and development of mineral resources, including metals, geothermal resources, uranium and aggregates. Projects have been conducted over most of North America, particularly in British Columbia, the Yukon Territory, Alberta, Ontario, Colorado, Utah, Wyoming, Arizona, Nevada, and northern and central Mexico. We have also worked in Spain, Tanzania, and Indonesia.

The firm has undertaken projects specifically directed towards geothermal exploration in western and northern Canada, Tanzania, and Indonesia. These are briefly described as follows:

Client: Science Council of Canada

Date: 1973

Project: Advice on goothermal resource character-

istics and potential, for National

Energy Report.

Duration: One week.

Client: British Columbia Hydro and Power Authority

A. Dates: 1973-74

Project: Reconnaissance of lower mainland B.C.

for geothermal steam prospects.

Duration: One year.

B. Dates: 1974-75

Project: Reconnaissance of western Vancouver

Island for geothermal steam prospects.

Duration: 3 months.

C. Dates: 1974-77

Project: Detailed geological and geophysical

studies and heat flow drilling at the

Meager Creek Geothermal Area, near Pember-

ton, B.C. (Phases II-IV).

Duration: 4 years.

Acres International Ltd. on behalf of the Canadian Client: International Development Agency

Α. Date: 1977

Project:

Power Sector Source Studies in Tanzania,

Geothermal Resources

Duration:

6 weeks

В. Date: 1978

Project:

Power Study, Sulawesi, Indonesia,

Geothermal Assessment.

Duration:

3 months.

Client:

Department of Energy, Mines and Resources/Department of Supply and Services

Date:

1976

Project:

Data on Geothermal Areas, Cordilleran

Yukon, NWT, and Northernmost B.C.,

Contract No. 1SQ5-0136.

Duration:

3 months.

Client:

Department of Fisheries and Environment/Department of Supply and Services

Date:

July-October, 1977

Project:

Study of the potential for fish culture of geothermal springs in the Pacific

drainage of British Columbia, Contract

No. 03877-08096.

Duration:

3 months.

Client:

Operating metal mine in northwestern Canada, not to be identified

Α.

Date:

July-August, 1977

Project:

Design and management of geological and geophysical study to delineate geothermal

reservoir and select drill targets

(Phase I) for space and heating project.

Duration:

3 weeks.

В.

Date:

June, 1978

Project:

Drilling 200 m test well (Phase II).

Duration: 4 weeks.

Client:

B.C. Hydro and Power Authority - Energy, Mines and Resources Canada, 1978-79 Joint Venture

Dates:

1978-79

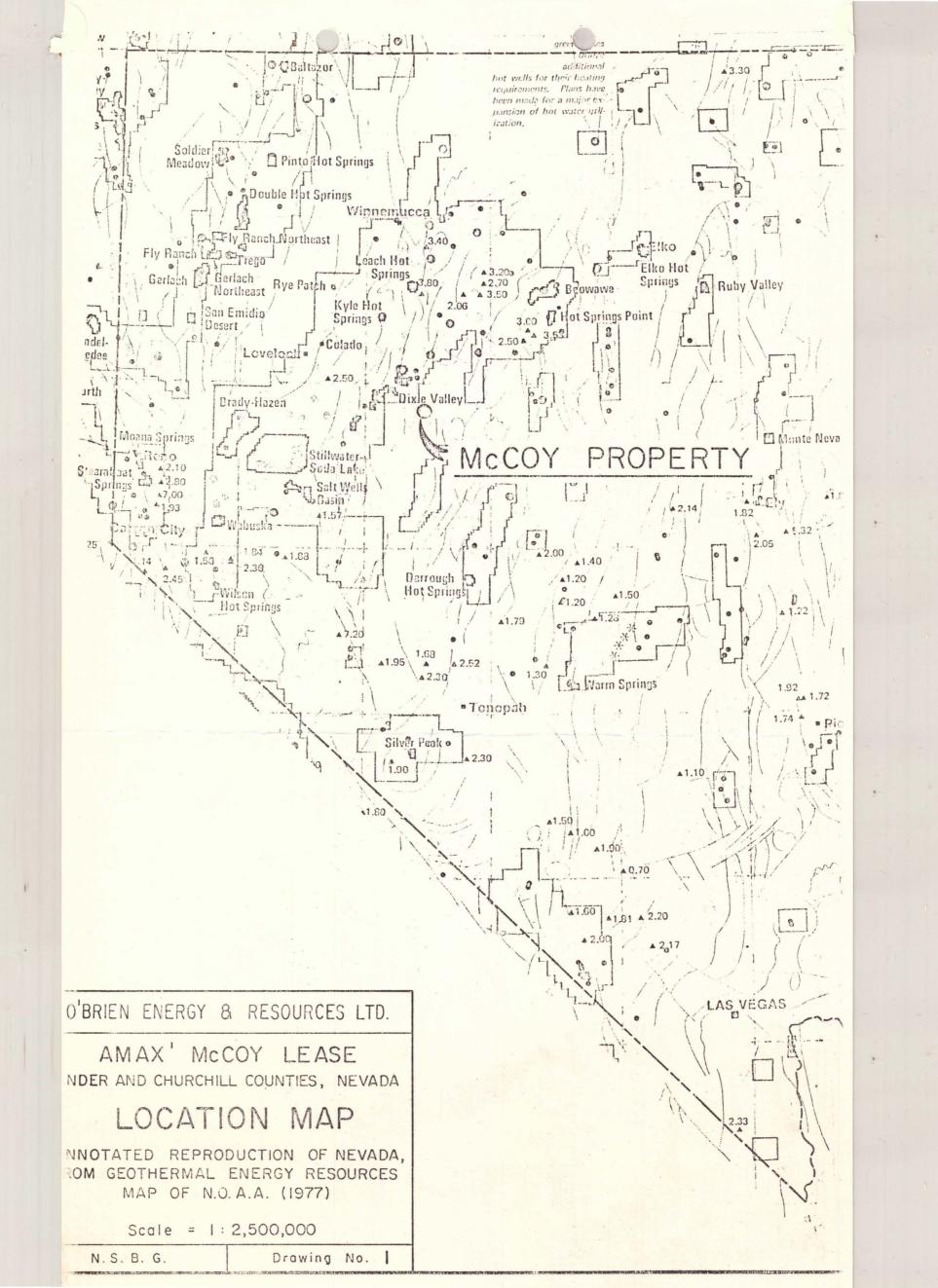
Project:

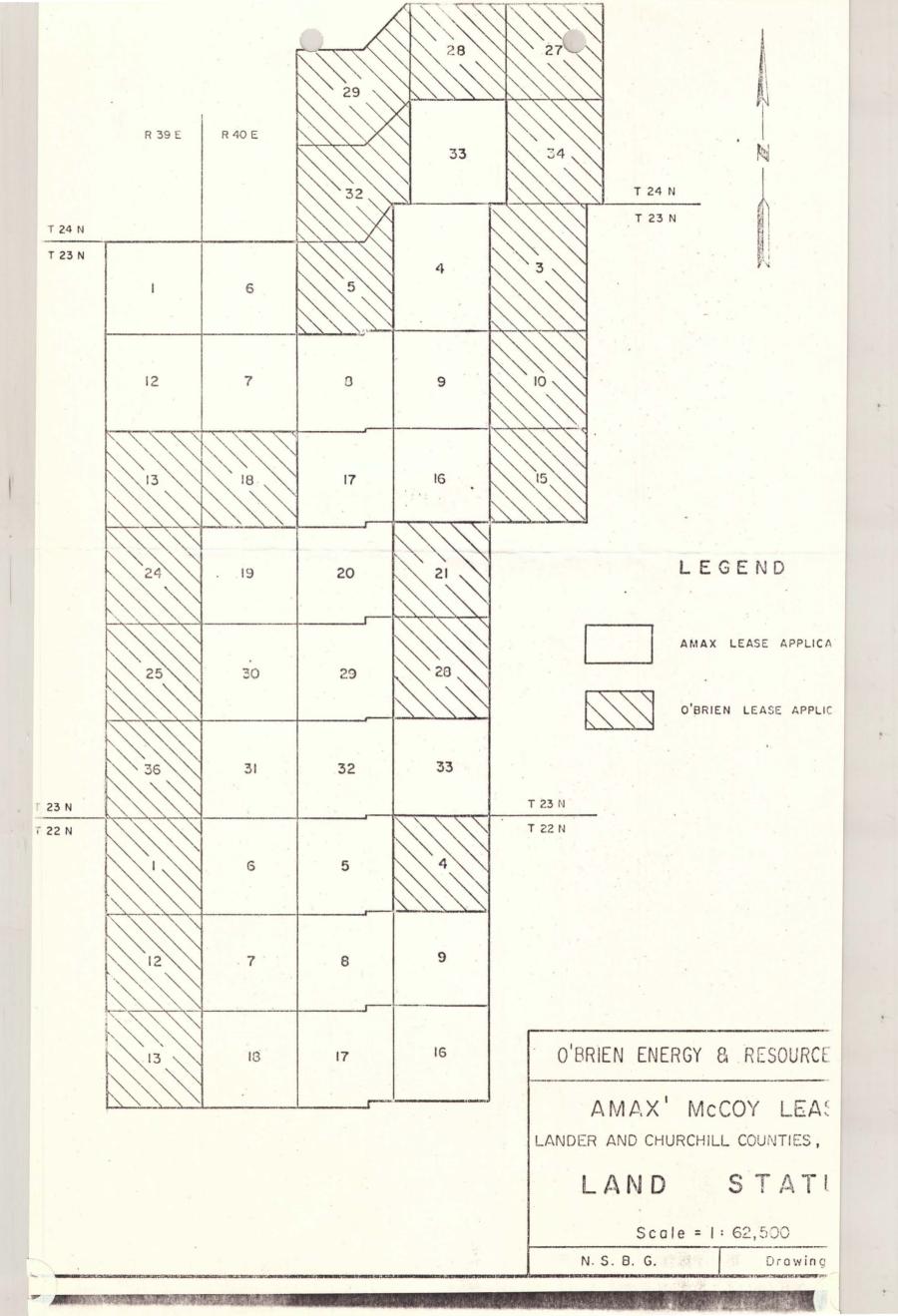
Meager Creek Goothermal Area, Resistivity and Drilling to 500 m (Phase V).

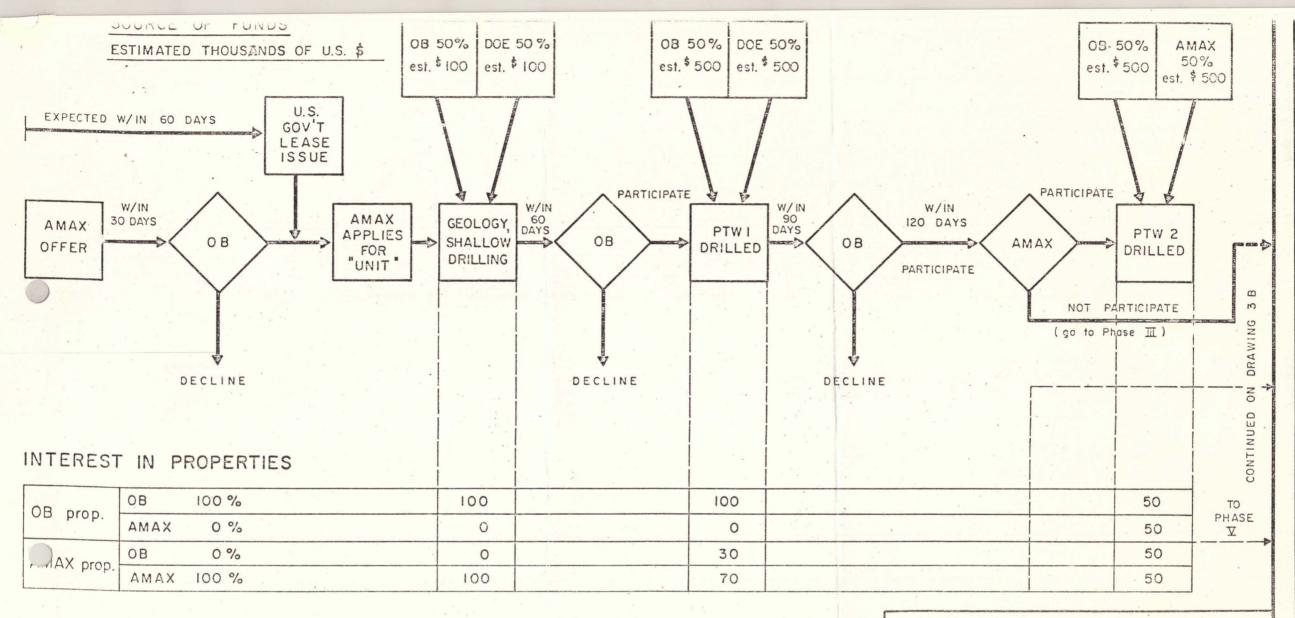
Duration:

1 year.

April, 1979







NOTES:

1. AMAX is operator throughout

2. DOE = U.S. Department of Energy

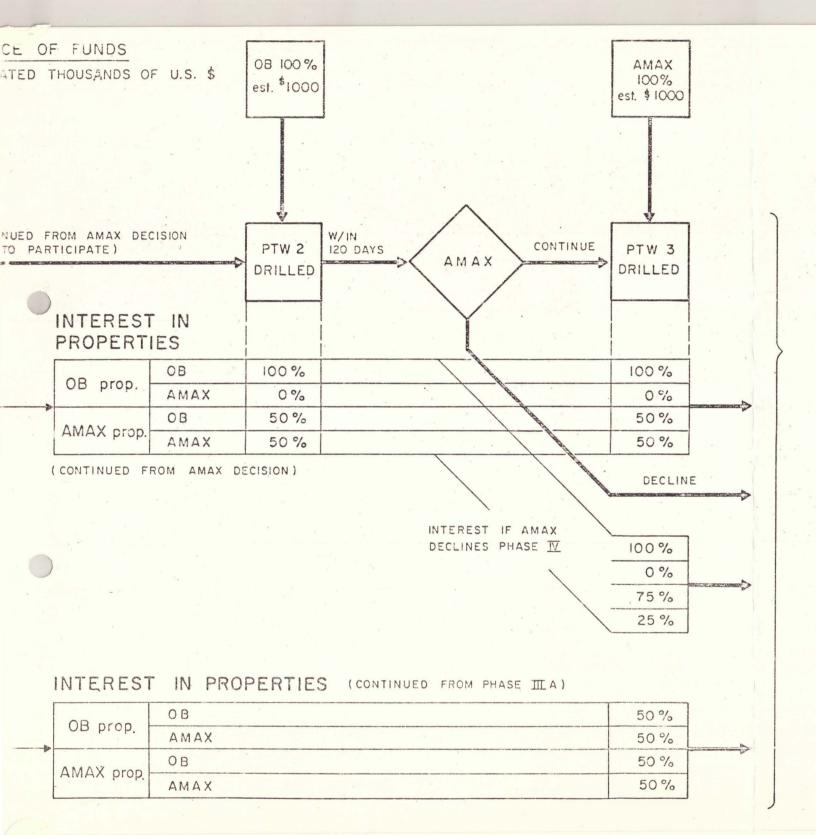
3. OB = O'Brien Energy and Resources

O'BRIEN ENERGY & RESOURCES LTD.

AMAX' McCOY LEASE

LANDER AND CHURCHILL COUNTIES, NEVADA

PROPOSED TERMS



Operator (AMAX) continues work on AMAX property; and OB pays prorata share shown to left, or OB's interest in AMAX property dilutes to minimum 15%; 15% interest is deemed 5% net profits interest; operating agreement to be negotiated; DOE 75% loan available.

O'BRIEN ENERGY & RESOURCES LTD.

AMAX' McCOY LEASE
LANDER AND CHURCHILL COUNTIES, NEVADA

PROPOSED TERMS

