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DEPARTMENT OF MINES

MINES BRANCH
N.T. ADMINISTRATION
1 AUG 1962

MI-34
APPLICATION FOR SUBSIDY
SEISMIC REFLECTION SURVEY
OP. 3 NORTHERN TERRITORY

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PR63/041

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R. HARE & ASSOCIATES
Mining and Geological Consultants
6th FLOOR, 20 COLLINS STREET
MELBOURNE

PWR:JS

OIL DEVELOPMENT N. L.
100 Collins Street,
Melbourne, C.1., Victoria.

17th July, 1962.

The Secretary,
Department of National Development,
Administrative Building,
PARKES, CANBERRA,
A. C. T.

Dear Sir,

re: APPLICATION FOR SUBSIDY
SEISMIC REFLECTION SURVEY
OP. 3., NORTHERN TERRITORY

We herewith submit for your consideration our application for subsidy under the terms of the Petroleum Search Subsidy Act 1959 - 1961.

- (i) Name of Applicant: OIL DEVELOPMENT N. L.
- (ii) Registered Address of Applicant: 100 Collins Street,
MELBOURNE C.1.,
Victoria.

(iii) Nominee:

All communications concerning the technical aspects of the seismic operations should be addressed to the Exploration Manager for Oil Development:

Mr. P. W. RAINIER,
C/- R. Hare & Associates,
6th Floor, 20 Collins Street,
MELBOURNE, C.1., Victoria.

Telegraphic Address: ROCKDOC

(iv) Audited Balance Sheet and Certified Statement:

The audited balance sheet as of 30th June, 1961, is attached as Annex 1 to this application. A certified statement of funds available for this project is included also as Annex 1 to this application.

(v) Details of O.P. 3.:

Oil Permit No. 3 is held by Westralian Oil Limited of 44 Parliament Place, West Perth. In an Agreement dated 27th April, 1960, Westralian Oil Limited assigned Oil Development N. L. a one half interest in O.P. 3. In a letter dated 8th September, 1960 the Administrator of the northern Territory gave his consent to that agreement.

PR 63/1041

On 6th September, 1960 the Administrator approved Extension No. 4 of Oil Permit No. 3 to Westralian Oil Ltd. for a period expiring on 23rd June, 1963. The Administrator has since accepted the proposed seismic survey (the subject of this application) as the programme of work for the second year and the first half of the third year of Extension No. 4.

(vi) Location and description of Survey Area:

The survey area is located in the vicinity of the Spirit Hill No. 1 Well in the northwest corner of O. P. 3. as shown on the attached plan, Annex 2. The proposed reflection seismic survey has been plotted on the plan and consists of 22 miles of traverses in an east-west and north-south direction. An additional 18 miles of traverses are included in the programme but are not shown as the exact location of these traverses is dependent on the results of the work in progress. The program includes one month of field work plus two weeks for moving on and off the project area.

The survey will be tied in two places to a proposed seismic survey in the tenement to the north (O. P. 2.) held by Associated Australian Oilfields N. L. who will be conducting their survey at approximately the same time. Their letter approving the proposed tie in is included in this application, Annex 3.

(vii) Copy of Contract Agreement:

The attached Annex 4 is a copy of the Contract Agreement between General Geophysical Company (Bahamas) Limited of P. & O. Building, 113 - 119 Eagle Street, Brisbane, Queensland and the applicant dated 15th February, 1962. This agreement is a general contract for five months, and includes the proposed survey.

(viii) Proposed Productive Work Hours:

The contractor proposes to work an average of 220 hours per month on field survey operations.

(ix) Vehicles and Equipment supplied by Operator:

No vehicles or equipment are to be supplied by Oil Development N. L.

(x) Details of Personnel and Equipment:

The attached Annex 5 is a copy of a summary of the basic crew to be furnished by General Geophysical Company for these operations. The names, qualifications and experience of the key staff personnel are attached as Annex 6. The final report will be prepared by General Geophysical Company and the seismic operation and interpretation of the results will be the responsibility of Mr. Ron Tinline.

D. 6.

In addition to the above a Caterpillar/(or equivalent) bulldozer will be employed on the survey under the direction of General Geophysical Company.

(xi) Detailed Cost Estimate:

The attached Annex 7 shows the detailed cost estimate of the proposed operations. It is estimated that the total cost of the survey

will amount to approximately £27,000.

(xii) Particulars of Proposed Survey:

A continuous reflection seismic survey will be conducted in the Spirit Hill area in the north-west corner of O.P. 3. Survey will consist of approximately 40 miles of shooting using one quarter mile shot point control.

Twenty-two miles of the proposed survey are plotted on Annex 2. These lines are shown as a guide only and will be varied depending on field conditions, i. e. surface topography, record quality, etc. It is important to maintain flexibility in petroleum exploration to control costs and eliminate useless work. The remaining 18 miles of seismic lines will be used to delineate any anomolous conditions that might develop during the survey. If none develop, this part of the programme will be cancelled. Bulldozing will be required on most traverses. Work will commence before the end of July and will be completed in one month. The final report will be submitted not later than three months after completion of the seismic survey.

All levelling will be carried out using a Zeiss or Wild automatic level with 'E' type stadia rods. The elevation of each shot point will be established to within the accuracy of ± 5 feet, and all traverses will be closed to an accuracy of ± 3 feet. It is planned to make ties with the previous seismic work in the tenement and all elevations will be reduced to the levels established on that survey.

The horizontal survey control will be carried out using an Alidade or Kern transit. The survey will be tied to previous work, border pegs, and to the proposed survey by Associated Australian Oilfields N. L. in the adjoining tenement O. P. 2. Single traverses will be surveyed at least twice to avoid errors.

Progress reports on the field operations will be submitted directly to Canberra by General Geophysical Company at the end of each fortnight during the period of the field operations. The final report on the project will be prepared by General Geophysical Company and submitted by the applicant within three months after the completion of field operations.

General Geophysical Company are establishing a camp near the Legune track crossing of the Keep River. The interpretation for the survey will be carried out in the field at the camp.

The results of the reflection survey will be presented in cross-sectional form as a magnetically played back, full envelope or regular type section, to which both static and dynamic corrections have been applied. Such sections will have been corrected for elevation, weathering and normal move-out during the course of production. Prints of these sections will be used as a graphic medium but all interpretation will be based on hand plotted cross-sections.

Hand plotted cross-sections constructed to represent the lines of traverse will be used for the basic interpretation. The reflections plotted on these sections will be graded by the interpreter. The records used for this interpretation will be the play-backs unless

record quality is such that the optimum results can be obtained using the monitor records which will be unmixed and with a minimum of filtering. All of the information so plotted will be of fully corrected nature.

In addition record cross-sections using the variable area system will also be produced and used as an aid to interpretation and display of the results.

Both types of these magnetically reproduced cross-sections will be comprised of 3-inch seismograms with 24 channels of data on each, joined together along the traverse lines. All basic data such as directions, thickness of weathering, hole depth, surface elevation etc. will be shown along the top of the full envelope section.

All first arrivals or refraction breaks will be plotted on standard cross-section paper along the lines of traverse. The information derived from this will be used in conjunction with the observed up hole times in determining the applicable weathering corrections. If necessary, phantom horizons will be constructed using the available dip information from immediately above or below the horizon being mapped, provided that this horizon is not an angular unconformity.

In addition to the play back cross-sections a standard seismogram, 6 inches wide and containing 24 channels of recorded information, will be run at the same time as the results are taped. This monitor record will be unfiltered and un-mixed provided that there are no unusual circumstances that preclude the use of this procedure. Immediately following the simultaneous recording of the monitor record and the tape, a play back will be made on 6-inch paper to check the quality of the data recorded on the magnetic medium.

Periodic instrument checks will be conducted to ensure that all units are functioning fully and properly. These checks will be recorded on the final report. A 100 c. p. s. signal will be recorded on an auxiliary channel and reproduced on all play backs to ensure that no error in timing exists.

All recording and play back work will be carried out using the broadest possible filter and a minimum of over-lap. Whenever mixing is considered advisable, it will be done on the playbacks only and then using a 20% bi-lateral system.

(xiii) Objective of the survey:

The purpose of the proposed reflection survey is to discover, confirm, and delineate anomalies suitable for drilling for oil or gas. Previous seismic suggests a possible structure in the area. This survey will delineate this structure if it is present.

(xiv) Regional Geology of the Survey Area:

The Bonaparte Gulf Basin is considered to be in the nature of a half-graben, bounded on the east by the N. N. E. trending Cockatoo zone of faulting. A thick sequence of Palaeozoic sediments and

Proterozoic basement plunge northward beneath the sea in the area. The Palaeozoic section is of interest as it is the main oil prospect in the Spirit Hill area of the Burt Range Embayment. Annex 10 shows the stratigraphic correlation in the Burt Range Embayment. The geological map (Annex 8) geologic cross section (Annex 9) and the stratigraphic cross section (Annex 10) have been extracted from the well completion report on the Spirit Hill Well No.1, which contains a comprehensive summary of the geology of the area.

(xv) Previous Geophysical Work in the Area:

Reconnaissance gravity and seismic reflection traverses were made by the Bureau of Mineral Resources in the Bonaparte Gulf Basin, including O.P. 3. during 1956, and gravity surveys were made by Westralian Oil Limited both in the 1955 and 1957 field seasons. In the 1960 field season, a detailed seismic reflection survey was carried out by Oil Development N. L. in the northwest corner of O.P. 3. in the vicinity of the Spirit Hill area. This survey revealed the presence of a possible anomaly along the Legune track traverse. The proposed seismic program will delineate this structure.

Yours faithfully,
OIL DEVELOPMENT N. L.

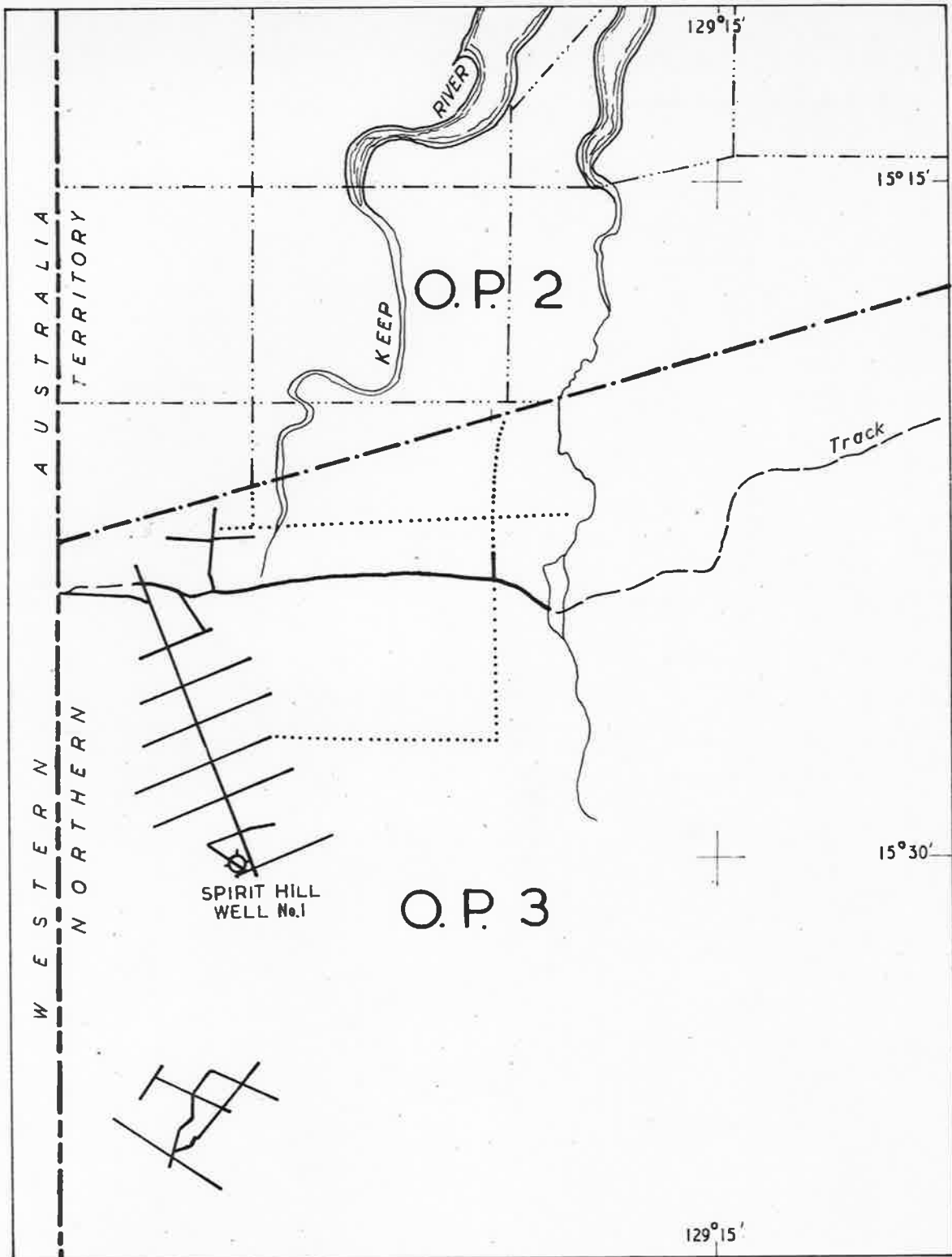
(A. T. Molloy)

Secretary

Encls.

ANNEX 1.

A Certified Statement of funds available for
this Project will be forwarded at a later date.



OIL DEVELOPMENT N. L.
OIL PERMIT No. 3 N. T.

LOCALITY MAP, SPIRIT HILL PROJECT

Showing proposed seismic traverses

O.D.N.L. previous seismic survey ———

A.A.O. proposed seismic survey - - - - -

SCALE OF MILES



ASSOCIATED AUSTRALIAN OILFIELDS

NO LIABILITY

CABLES AND TELEGRAMS
"ASTOIL"
BRISBANE MELBOURNE ROMA
TELEPHONE BRISBANE 2 1366

31 CHARLOTTE STREET
BRISBANE
G.P.O. Box 880 L

Registered Office
360 COLLINS STREET MELBOURNE
Field Office
c/- P.O. Box 130, ROMA

13th July, 1962.

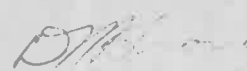
The Exploration Manager,
Oil Development N.L.,
100 Collins St.,
Melbourne.

Dear Sir,

Ref: EXCHANGE OF SEISMIC DATA

At the request of Mr. Rainier on 12th July 1962, we authorize your company to carry out seismic work on O.P.2 N.T. joined to the lines of the present programme of seismic work in that Permit.

Yours faithfully,
ASSOCIATED AUSTRALIAN OILFIELDS N.L.



(D.M. TRAVES)
Exploration Manager.

ANNEX 4.

**Contract Agreement between General Geophysical
Company (Bahamas) Limited and Oil Development
N.L. will be forwarded at a later date.**

SUMMARY OF BASIC CREW:A. Personnel:1. Expatriate:

One Party Chief - Seismologist
 One Assistant Party Chief
 One Party Manager - Observer
 One Observer
 One Assistant Observer

2. Australian:

One Computer
 One Surveyor
 One Driller - Mechanic
 One Surveyors Helper
 One Recording Helper
 Four Drillers Helpers

B. Field Office:

Complete field office equipment for interpretation of seismic data and the preparation of maps, cross-sections and reports, including a small ammonia type reproduction unit for the reproduction of record sections and other data.

C. Field Equipment:

1. One complete set of 24 trace "General" 'JM' type Recording instruments, including oscillograph, power and control unit, amplifiers, four complete reflection recording cables, 600 reflection geophones, telephone for observer-shooter communications supplies and spare parts.
2. One "General" Portable Geopac Magnetic Recorder.
3. Complete shooting equipment with spare parts, but not including explosives.
4. Surveying equipment, including Transists, Stadia rods and spare parts.

D. Vehicles:

1. One Recording Truck (International B-160 or comparable type), equipped with four-wheel drive, winch and spare parts.
2. One Failing C F D - 1 Drilling unit mounted on International R - 190, 4 x 4 Truck equipped with winches, hand tools, operating supplies, air compressor, normal accessories and spare parts.
3. Two Landrovers 4 x 4 Vehicles
4. Two Dodge 4 x 4 Power Waggon

General Geophysical Company (Bahamas) Limited

P & O Building,
113 - 119 Eagle Street,
Brisbane, Queensland

Summary of Qualifications and Experience Key Staff
Personnel of Basic Crew Proposed Bathurst Island

Seismic Survey

Party Chief

Ronald J. TINLINE Age 25, Single, Canadian

Education High School Graduate with
2½ years College (Geology and
Engineering)

Experience Computer Trainee - 1 year;
Computer 3½ years.

Assistant Party Chief

John FIFE Age 42, Single

Education B.S. Degree, Mining Engineering,
University of Alberta

Experience 12 years Computer; Seismologist
and Assistant Party Chief;
2½ years refraction experience.

Areas of Work Experience Canada and Libya.

Party Manager

Reginald ULMER Age 32, Single

Education High School

Experience 2 years Assistant Observer;
9 years Observer and Party Manager

Areas of Work Experience Canada, Colombia, S.A., and Libya.

Observer

Floyd P. PRESTENBACK Age 35, Married

Education High School

Experience Observer's Helper, Shooter,
Assistant Observer, 2 years, Observer,
12 years.

Areas of Work Experience Louisiana, Texas, Arkansas, Bolivia, S.A.,
Offshore Louisiana and Texas.

Assistant Observer

Thomas R. JONES

Age 21, Single

Education

High School

Experience

**Observer's Helper, 1 year;
Observer, 1 year.**

Areas of Work Experience Canada

ANNEX 7.

Detailed cost estimate of Proposed Seismic Survey:

Based on an anticipated period of one and one half month's work including positioning and de-positioning time.

Basic Crew	1½ months @ £10,500 per month	£ 15,750
Magnetic Recorder		1,050
Camp		1,500
Explosives		3,500
Bits, mud, casing, etc.		500
Additional Surveyor		440
Oil Development Supervision		1,000
Transportation - men and materials from America		1,500
(Transportation from Brisbane included in basic crew rate)		
Native Labour		260
Bulldozer Costs		1,500
		<hr/>
		£ 27,000
		<hr/>