

SPUR PETROLEUMS LTD.

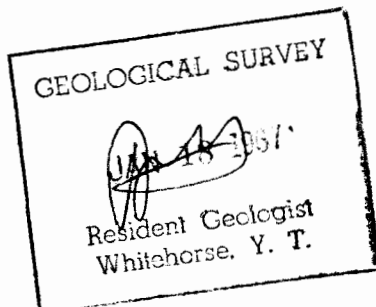
REPORT ON JO AND ANNE CLAIMS

VANCOUVER CREEK AREA

WHITCHORSE M.D. - Y. T.

by

P.H. SEVENEMA, Ph.D., F. Eng.
Vancouver, B.C.



This report has been examined by
the Geological Evaluation Unit.
Approved as to technical worth by:

P. C. Findlay
RESIDENT GEOLOGIST

Approved as to cost in the amount
of \$ 1569.38

P. G. Redden
RESIDENT GEOLOGIST

Accepted as satisfaction work
under Section 55(4) Yukon Quartz
Mining Act.

[Signature]
COMMISSIONER OF MINES

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Figure 2 Property map, 1" = 1500'.

1. INTRODUCTION

The 36-claim Jo group of Spur Petroleum Ltd. located East of Swim Lakes in the Vangorda Creek area, has been surveyed both by members of the writer's organization and by personnel of Macdonald Consultants during the summer of 1966.

The purpose of this survey was to relate geological features to the claim boundaries. This entailed cutting out location lines and locating outcrop areas.

The location lines were chained and surveyed and tied in to outstanding topographical features. Open ground discovered between the two main rows of claims was staked later in the season. All Jo claims have been tagged.

Average claim-length along both main location lines was found to be about 1200'.

More detailed exploration of the claim group is recommended.

2. PROPERTY AND ACCESS

The property consists of the following claims:

	<u>Date Staked</u>	<u>Date Recorded</u>
Jo 1 - 18	November 13, 1965	December 3, 1965
Jo 25 - 40	November 14, 1965	December 3, 1965
Jo 41 - 42	November 15, 1965	December 3, 1965
Ann 1 - 5 fr.	October 26, 1966	November 9, 1966

Grant numbers are as follows:

Jo 1 - 18	94844 - 94861
Jo 25 - 42	94868 - 94885
Ann 1 - 5 fr.	Y10945 - Y10949

A search of title has been made on October 26, 1966 of the Jo claims, which have all been duly transferred by the stakers to Mr. D. Hall, who is holding these claims on behalf of Spur Petroleum Ltd.

The Ann 1 - 5 fractions have been duly transferred by the staker to Spur Petroleum Ltd. as evidenced by Registered Document No. 7306.

For assessment purposes, the claims have been grouped as follows:

Jo 3 - 18	Group I
Jo 27 - 42	Group II
Jo 1, 2, 25 & 26	Group III
Ann 1 - 5 fr.	

It is planned to bring all the claims up to the same due date in March 1968.

The claims are located 17 airmiles NNW of Ross River Post, at Latitude 62°11'North and Longitude 132°40'West, between elevations of 2900' and 3700' on claim sheet 105-K-2 in the Whitehorse Mining District.

This is approximately 130 airmiles NE of Whitehorse.

By road the North boundary of the group can be reached via a winter road leaving the Blind Creek all-weather road about 1½ miles NE of the ferry location over the Felly River.

The all-weather road distance from Whitehorse is the same as from Watson Lake at about 250 miles, followed by 25 miles of winter road along the Swim Lakes. This road has recently been improved and is usable by a Bombardier tracked vehicle in summer.

The North boundary of the property lies about 2½ miles SSE of a 2 mile long lake suitable for float or ski equipped aircraft landings, locally called Cub Lake.

3. HISTORY

The Jo claims were staked South of, and immediately adjoining, the Cub group of claims of Dynasty, shortly after the latter organization had made a major discovery in this camp in the fall of 1965.

The first discovery in the area had been made by Prospector's Airways on Vangerda Creek in the fall of 1953. Further exploration in the area started in 1962-1963, when Kerr Addison Mines acquired ground, followed by Dynasty Explorations in 1964.

There are now well over 50 million tons of about 10% combined zinc-lead-copper ore with 1-2 oz/t silver outlined in about 5 bodies of significant size in the area, which now rates as a major base metal camp.

No work has been carried out before 1966 on the ground now covered by Spar Petroleum's Jo claims except some reconnaissance prospecting and possibly minor airborne magnetic work by the Dynasty organization in 1964-1965.

4. REGIONAL GEOLOGY

Only 1" = 4 mile regional reconnaissance mapping by the G.S.C. is available, mostly obtained by mapping by helicopter.

The Vangorda Creek area is underlain by a NW trending anticline of quartz-sericite schists with varying amounts of chloritic schists, limy schists, graphitic schists and occasional hornfelses, generally referred to by the G.S.C. as Unit 7.

These formations are believed to be of Mississippian age, and are overlain by a series of andesitic volcanics associated with minor argillites and quartzites (G.S.C. Unit 8) which, in turn, are covered by a series of argillaceous quartzites and conglomerates (G.S.C. Unit 9). Of the latter, only a few remnants remain in the area.

The older Devonian, comprising cherts, quartzites and limestones, appears to the Northeast, as shown by the attached 1" = 4 mile map.

Intrusives of varying composition and age occur in the district; a granodioritic character predominates, and their age, based on isotope dating, is believed to lie in the Cretaceous to Tertiary range.

Tertiary basic flows occur both to the NE and the SW of the general district, but none are exposed on the map area covered by the attached location map.

Strong faulting took place in the Cretaceous and Tertiary with good evidence of a total right-lateral movement of about 250 miles along the Tintina Trench (G.S.C. Paper 63-2, p. 57).

Significant NE trending faults are indicated across the NW striking anticlinal belt.

The presently known sulphide bodies, essentially pyritic-pyrrhotite bodies carrying significant base-metal values in something like 50% of their mass, occur in the schists and are generally conformable to the bedding.

Personal observations of various occurrences east of the Tintina Trench have indicated to the writer that recumbent folding and imbricated structures are present and may be important factors in determining the shape of the above-mentioned sulphide masses.

These considerations on age of the formations, on type of ore and on the tectonic style suggest considerable remobilization of sulphides, regardless of their first mode of deposition.

Field evidence also suggests that skarnified contacts of intrusives, breccia zones (possible breccia pipes), shears, shear-zone intersections and possibly other geological features could be significant controls of cross-cutting ore deposits of either the high grade bonanza type or of the large low-grade type in this area.

It is significant, for example, that recent staking has extended into the Devonian in the NE corner of the attached location map, i.e. in a formation which is believed to be older than the "favourable" schist unit. About half of this staking is above timberline, i.e. in a relatively well exposed area.

5. PERSONNEL AND COSTS

Personnel and costs of the 1966 program on Spur Petroleum's ground are listed on Appendix A.

6. GEOLOGY OF THE CLAIMS

A number of granite outcrops were mapped by geologist Koster van Groos, as shown on the attached map.

These outcrops are parts of East-West trending hills or ridges, separated by wide depressions without any outcrops or float.

These East-West depressions may be due to faults trending in this direction or to the presence of a softer rock formation like schists.

In the latter case, it is quite possible that the granite forms one or more interbedded sheets; this type of occurrence has been observed in this area a short distance to the West.

Future work on this property should be directed towards establishing whether the favourable schists do extend as far as this property by mapping the granite in greater detail and by a thorough examination of the depressions lying between the granitic ridges. This work should be supplemented by soil sampling at 200' intervals along the location lines leaving out the major granite outcrop areas.

An EM survey with a Crone or a Ronka instrument along the location lines may be a valuable adjunct to visual mapping if insufficient outcrop is found.

It is recommended to use a bulldozer to cut the location lines and trench along these lines where they cut the depressions; this would provide good soil sample locations.

In addition, lines should be cut at right angles to the location lines across the full width of the property at distances about 1200' apart, and geological mapping and soil sampling carried out along these lines as well.

The results of this work will indicate where ground electromagnetic and/or magnetic work is to be of value, or alternatively, whether an airborne EM-AM survey of the claim area is more desirable.

7. PROPOSED PROGRAM

The proposed program is essentially one of geological mapping and of prospecting by soil sampling, followed by geophysical work over selected areas of interest.

Any combination of interesting geochemical anomalies coincident with one or more geophysical anomalies will be worth following up either by gravity surveying or deep EM surveying and core-drilling, or by core-drilling alone.

Estimated cost of this program is as follows:

Stage 1

Bulldozer work, 60 hours @ \$35.00	\$ 2,100	
Geological mapping, 1 man-month	1,500	
Soil Sampling, 1 man-week, 200 samples	800	
Geophysical survey, 10 line miles	1,200	
Assaying	500	
Transportation	<u>1,200</u>	
	\$ 7,300	
Contingencies, 25%	<u>1,700</u>	
Total		\$ <u>9,000</u>

Stage 2

Detailed geophysics, as indicated by stage 1, EM or gravity		3,000
1000' of core drilling @ \$25.00 per foot		<u>25,000</u>
Total Stage 1 & 2		\$ <u>37,000</u>

In addition, an allowance should be made for further ground acquisition if and where necessary. This allowance is set at about 25% of the total finances available -

\$ 13,000

Total funds recommended

\$ 30,000

If and when success is obtained in these two first stages, the third, or follow-up stage may lead to a much more extensive drill program, the cost of which is likely to be of the order of \$30,000 to \$100,000.

8. SUMMARY AND RECOMMENDATION

The 41-claim Jo and Ann Group of Spur Petroleum is located in an area where granite intrudes the favourable Vangorda Creek schist formation.

The granitic rocks appear to form sheet-like intrusions in the area, and preliminary exploration has suggested that this is the case on the ground covered by the Jo and Ann claims.

On this property, geological mapping and reconnaissance soil sampling are expected to provide reliable guides for a proper assessment of the chances to discover a Vangorda type sulphide body.

Further work, to cost a maximum of \$50,000, is recommended both to explore this ground in detail and to provide an allowance for further ground acquisition if and where necessary.

Respectfully submitted,

P.H. SEVENEMA CONSULTANTS LTD.



P.H. Sevenema, Ph.D., P. Eng.

FHS/lz

December 28, 1966

CERTIFICATE

I, PETER H. SEVENEMA, of Vancouver, B.C. do hereby
certify that:

1. I am a graduate of the University of Geneva, Switzerland (Physics and Chemistry, 1937, Geology and Mineralogy 1937) where I obtained my Ph.D. in Geological and Mineralogical Sciences in 1941.
2. I am a consulting Geological Engineer and a registered member of the Association of Professional Engineers of British Columbia and of the Association of Professional Engineers of Yukon Territory.
3. From February 1948 until December 1965 I have been engaged continuously in mining and exploration geology in the employ of Cominco Ltd. As a Senior Exploration Geologist, I have worked extensively both in Eastern and Western Canada.
4. I have personally visited the property which is the subject of this report.
5. I have not received, nor do I expect to receive any interest, directly or indirectly, either in the properties or securities of Esso Petroleum Ltd.

Respectfully submitted,

P.H. SEVENEMA CONSULTANTS LTD.



P.H. Sevenema, Ph.D., P. Eng.

December 28, 1966

APPENDIX A

LIST OF FIRMS AND INDIVIDUALS ENGAGED IN WORK PROGRAM
ON JO AND ANN CLAIMS FOR SPUR PETROLEUMS LIMITED

Linecutting and Surveying:
August 1 - 8, 1966

A. MacDonald Consultants Ltd.
A.J. MacDonald, Consultant
F.P. Thode, fieldman
K.C. Turnbull, assistant

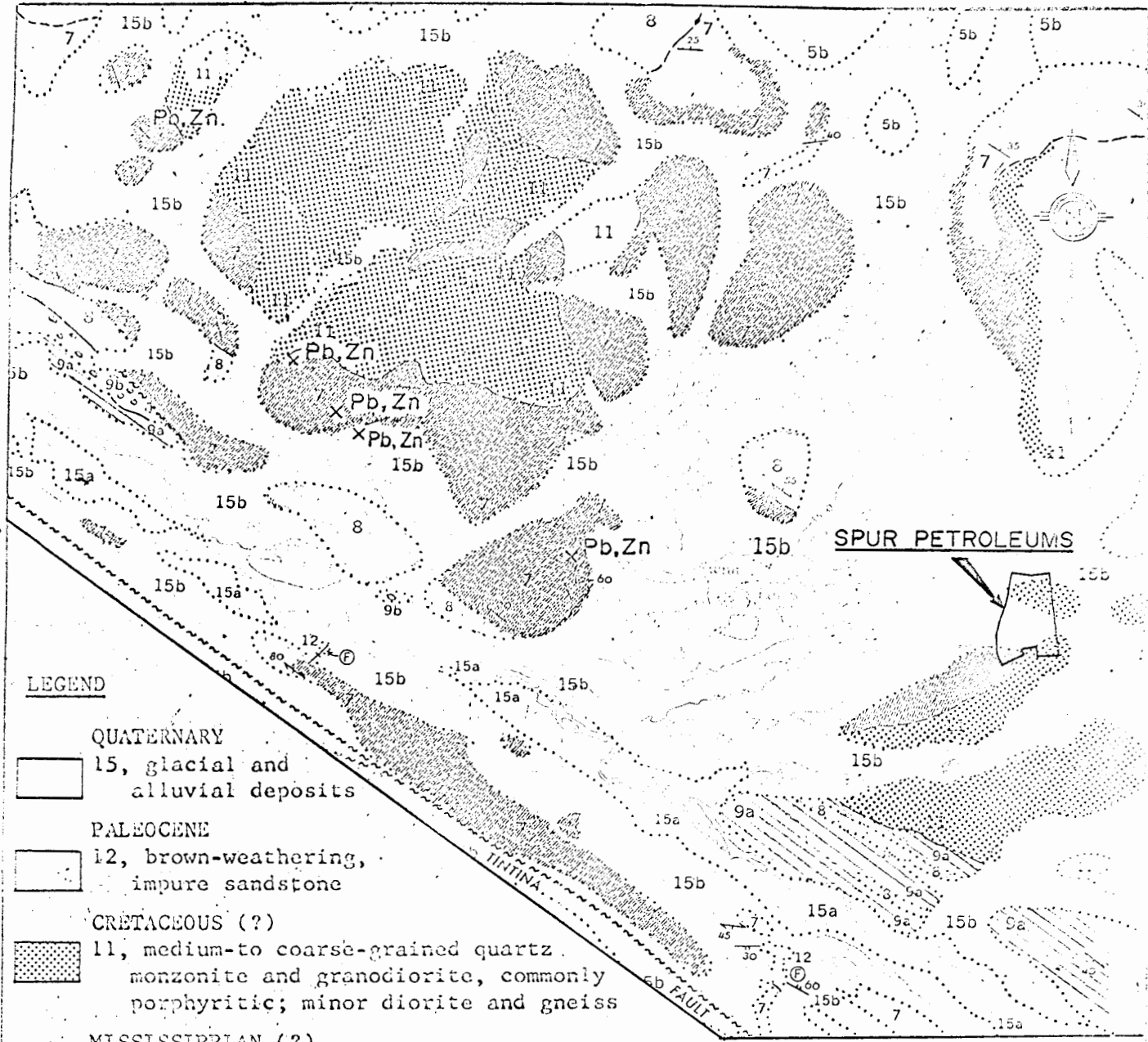
Geological Survey:
August 1 - 8, 1966 and
October 25 - 27, 1966

F.H. Sevensma Consultants Ltd.
F.H. Sevensma, Consultant
Dr. A.F. Koster van Groos, field geologist
H.S. Atkins, geologist, field and office work

COST BREAKDOWN FOR ASSESSMENT WORK

<u>Type of Work</u>	<u>Chq. #</u>	<u>Paid to</u>	<u>Amount</u>
<u>I. Jo Claims</u>			
<u>1. Linecutting & Surveying</u>			
Wages and expenses	2	A. MacDonald Cons.	\$ 821.65
Wages and expenses	5	A. MacDonald Cons.	112.12
Bank charge	IM	Bank of Commerce	<u>5.00</u> /
			\$ 938.77
<u>2. Geology</u>			
Expenses	1	Koster van Groos	\$ 15.00
Wages	3	Selwyn Syndicate (vanGroos)	160.00
Consulting fees & expenses	4	F.H. Sevensma Cons.	167.95
Wages and expenses	6	F.H. Sevensma Cons.	65.08
Wages and expenses	8(part)	F.H. Sevensma Cons.	<u>227.58</u>
			\$ 635.61
Total for representation work			\$1,574.38
<u>3. Legal</u>			
Abstract of record	7	Receiver General	57.60 /
<u>II. Ann Claims</u>			
<u>4. Staking</u>			
Staking	8(part)	F.H. Sevensma Cons.	\$ 250.00
Transfer	9	Receiver General	<u>6.50</u> <u>256.50</u> /
			<u>\$1,888.48</u>

F.H. Sevensma



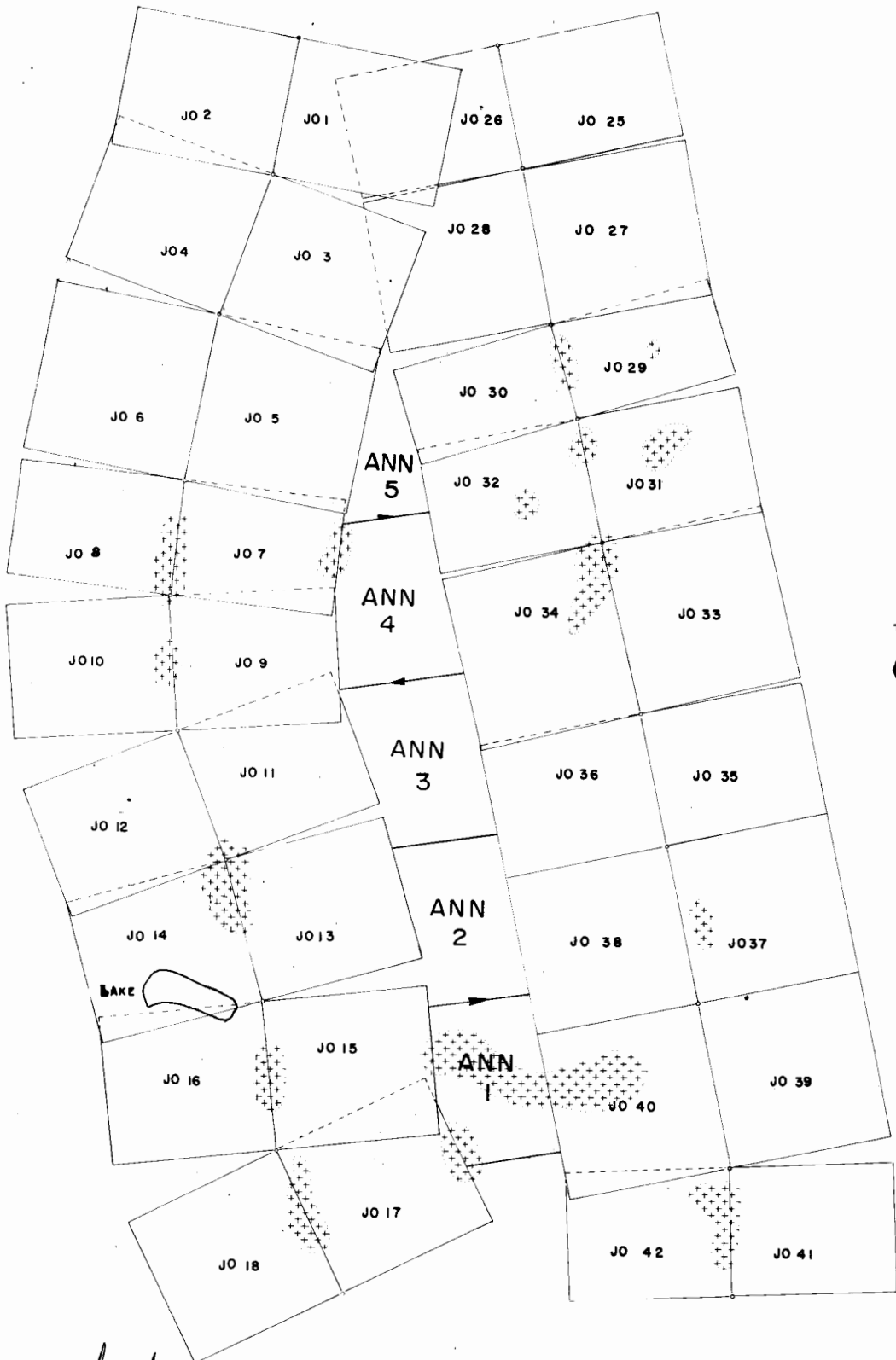
LEGEND

- QUATERNARY**
- 15, glacial and alluvial deposits
- PALEOCENE**
- 12, brown-weathering, impure sandstone
- CRETACEOUS (?)**
- 11, medium-to coarse-grained quartz monzonite and granodiorite, commonly porphyritic; minor diorite and gneiss
- MISSISSIPPIAN (?)**
- 9, 9a greenish grey quartzite, commonly thin-bedded; micaceous and silvery graphitic schists; and silty limestone
- 9b conglomerate
- 8, altered, dark green andesite and basalt flows and tuffs, minor sediments
- 7, banded quartzose granulite, green and purplish banded skarn, quartz-sericite schist, hornfels and phyllite; chlorite schist and thin altered andesite.
- DEVONIAN/MISSISSIPPIAN**
- 5, 5a chert-pebble conglomerate
- 5b chert, shale, quartzite; minor conglomerate and limestone
- 5c slate, shales, sandstone, greywacke, phyllite; minor conglomerate

P. H. Sevensma

FIG. 1

SPUR PETROLEUMS LTD.		
PROPERTY LOCATION AND REGIONAL GEOLOGY		
Whitehorse M.D.		105 K-2
P. H. SEVEN SMA CONSULTANTS LTD.		
715 - 850 WEST HASTINGS		VANCOUVER, B.C.
REF: N.T.S.	DATE: DEC. 1966	SCALE: (miles) 0 1 2



T. H. Severson

FIG. 2

LEGEND		PH SEVEN SMA CONSULTANTS LTD	
+	+	SPUR PETROLEUMS LTD	SPUR PETROLEUMS LTD
+	+	105-R-2	F. P. PRELIMINARY
+	+	WHITEHORSE M.D.	19/966 CLAIM LOCATION
+	+	Field Examination by	1:4500 SURVEY
+	+	A. J. Koster Van Rouse Ph.D.	212
+	+	July 1966	
+	+	Endorsed:	

SPUR PETROLEUMS LTD.

D GRUBE

YANCOUDA CREEK AREA

109-X-2, 62°11'N, 132°40'W

Whitehorse N.W., Y.T.

Interim Report On

FIELD WORK PROGRAMMES

COMPLETED UP TO FEB. 24, 1967

by

H.S. AIKINS

FOR P.M. SEVENIMA CONSULTANTS LTD.

*This report on
"physical work"
allowed at
\$3000*
[Signature]

February 24, 1967

GEOLOGICAL SURVEY
MAY 12 1967
Resident Geologist
Whitehorse, Y. T.

This report has been examined by
the Geological Evaluation Unit.
Approved as to technical worth by:

D.C. Findlay
RESIDENT GEOLOGIST

Approved as to cost in the amount
of \$

RESIDENT MINING ENGINEER

Accepted as representation work
under Section 53(4) Yukon Quartz
Mining Act.

COMMISSIONER OF YUKON

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- A. LIST OF FIRMS AND INDIVIDUALS
- B. BREAKDOWN OF COSTS INCURRED

ILLUSTRATIONS

- Fig. 1 Property location and access, 1" = 4 miles.
- Fig. 2 Claim map showing work done, 1" = 1500 feet

SPUR PETROLEUMS LTD.

JO GROUP

Interim Report on
FIELD WORK PROGRAMMES
COMPLETED UP TO FEB. 24, 1967

1. INTRODUCTION

This report is a supplement to the previously issued report by P.H. Sevensma dated December 28th, 1966. It is intended to summarize briefly the salient points of interest and deal at somewhat greater lengths with the objectives and results of the recently completed programme.

2. PROPERTY

The property is located approximately 130 air miles NE of Whitehorse and about 17 air miles NNE of the community of Ross River. Surveying and the subsequent staking of all open fractions has confirmed the location and boundary as closely conformable with that shown in figure 2.

The property consists of the following claims:

<u>Claim Name</u>	<u>Record Nos.</u>	<u>Record Date</u>
Jo 1 to Jo 18	94844 - 94861	December 3, 1965
Jo 25 to Jo 42	94868 - 94885	December 3, 1965
Ann 1 fr. to Ann 5 fr.	Y10945 - Y10949	November 9, 1966

Assessment work has been registered as follows:

<u>Claim Name</u>	<u>Grouping Certificate Number</u>	<u>Certificate of Work Number</u>	<u>Due Date</u>
Jo 1, 2, 25 & 26	1534Q	Q5504 - Q5507	March 3, 1968
Jo 3 - Jo 18	1535Q	Q5508 - Q5523	March 3, 1967
Jo 27 - Jo 42	1536Q	Q5524 - Q5539	March 3, 1967

3. HISTORY

As the known and potential wealth of the mineral belt in which this property is located has been previously described, only a brief review of previous work on the claims in this group will be made.

Between August 1st, 1966 and October 27th, 1966 a programme of surveying, linecutting and reconnaissance geology was carried out to establish property bounds and examine outcrops. During this period five

fractions were staked to create a contiguous block of claims.

Geological evidence favoring the occurrence of schistose rocks of a similar facies to those of the host formation in the known base-metal deposits of this camp was a major factor in the recommendation for further work.

4. ACCESS

A good winter road has been constructed to within about one mile of this property by other parties active in this area. This road connects with the Faro highway at a point about one mile north of the Pelly River ferry crossing. Total distance from the highway is approximately 22 miles. Other roads, suitable for bombardier type vehicles, connect the north end of the property with Cab Lake. A Beaver aircraft equipped with ski-wheels has been landed on the largest of the three lakes at the head of Moose Creek near the southeast corner of the property. Summer access by road would require only minor improvements to the existing routes. Figure 1 shows the position of existing roads in relation to the property.

5. LINECUTTING AND TRENCHING

Preliminary work on this property together with experience elsewhere in the area had indicated the need for a system of gridlines as a prerequisite to further work. Such lines when clearly visible from the air provide accurate fiducial control as well as serving an essential role in any ground follow-up.

The ready availability of a D7E Caterpillar tractor equipped with a parallelogram ripper provided a convenient opportunity to complete this work in advance of the regular field season.

A base line closely coincident with the location line used for the claims JO 25 to 40 was established. This line, approximately 10,500 feet in length is on a bearing of N 12° W and thus sub-parallel to the inferred formational contact. An attempt to extend the line another 1500 feet to the south was unsuccessful due to the very rough terrain, a trail and some shallow trenching was however completed. Several shallow cuts were made along the main base line to expose the bedrock.

Ten cross lines, spaced at equal intervals, as shown diagrammatically on fig. 2 were established at right angles to the base line. A total of about thirteen lines-miles was completed but has not as yet been measured or accurately picketed.

Several areas were trenched to expose the nature and, where possible, depth of the surficial deposits as a guide in planning a geochemical program. A trench on claims JO 32 involved removal of an estimated 225 yds. of material about one-half of which was frozen and required ripping.

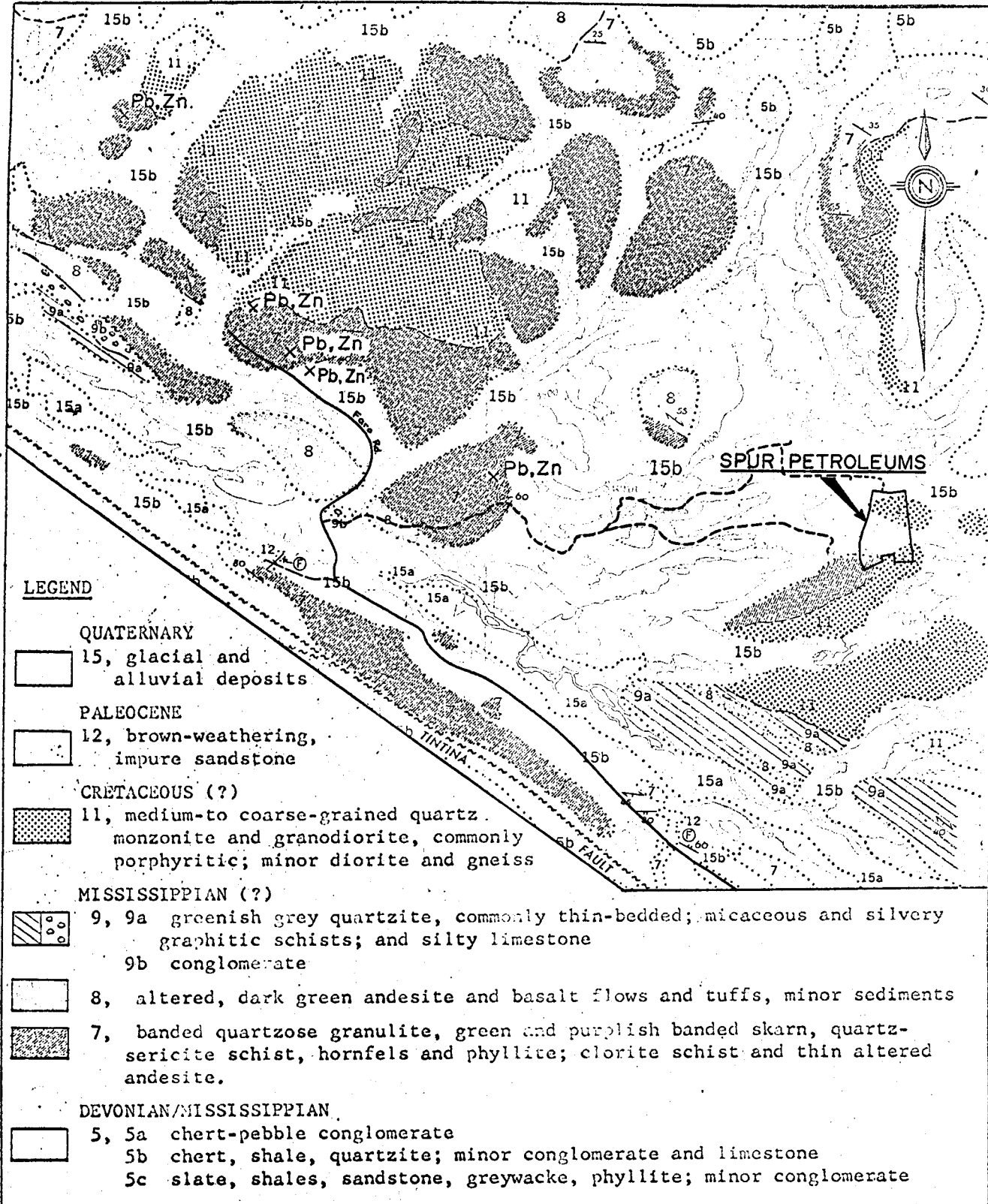
SUMMARY:

A grid suitable for reconnaissance geochemical and geophysical work has been established. Airborne surveys will be greatly facilitated and can be confined to accurate boundary limits. Further work as recommended in the report of December 28, 1966 may now be implemented at any time that weather suited to the nature of work prevails.

APPENDIX A.

LIST OF FIRMS AND INDIVIDUALS ENGAGED IN WORK PROGRAMS ON THE
JO GROUP OF MINERAL CLAIMS FOR SPUR PETROLEUMS LTD.

Geological Consultants	P. H. Sevensma Consultants Ltd.
Office Studies and Supervision Nov. 1 to Dec. 31, 1966	P. H. Sevensma, Consultant H. S. Aikins, Senior Technician
Full Work and Supervision Feb. 1 to Feb. 15, 1967	H. S. Aikins, Senior Technician C. E. Allen, Field Assistant
Equipment Contractor Feb. 6 to Feb. 14, 1967	Liard Construction Ltd. J. Christofferson, Supervisor J. Yanisiu, Equipment Operator
Truck Rental	Yukon Motors Ltd.
Summary and Report Feb. 20 to Feb. 24, 1967	P. H. Sevensma Consultants Ltd. P. H. Sevensma H. S. Aikins



LEGEND

QUATERNARY

15, glacial and alluvial deposits

PALEOCENE

12, brown-weathering, impure sandstone

CRETACEOUS (?)

11, medium-to coarse-grained quartz monzonite and granodiorite, commonly porphyritic; minor diorite and gneiss

MISSISSIPPIAN (?)

9, 9a greenish grey quartzite, commonly thin-bedded; micaceous and silvery graphitic schists; and silty limestone
 9b conglomerate

8, altered, dark green andesite and basalt flows and tuffs, minor sediments

7, banded quartzose granulite, green and purplish banded skarn, quartz-sericite schist, hornfels and phyllite; chlorite schist and thin altered andesite.

DEVONIAN/MISSISSIPPIAN

5, 5a chert-pebble conglomerate
 5b chert, shale, quartzite; minor conglomerate and limestone
 5c slate, shales, sandstone, greywacke, phyllite; minor conglomerate

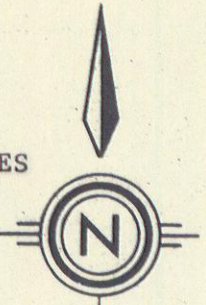
Watson Lake-Carmacks Road

Winter Roads

SPUR PETROLEUMS LTD.		
PROPERTY LOCATION AND REGIONAL GEOLOGY		
Whitehorse M.D.		105 K-2
P. H. SEVENSMA CONSULTANTS LTD.		
715 - 850 WEST HASTINGS		VANCOUVER, B.C.
REF: N.T.S.	DATE: DEC. 1966	SCALE: (miles) 0 1 2 4

FIG. 1

ANVIL MNG. (Cub Grp.)



GRID LINES

+08 S

+16 S

+24 S

+32 S

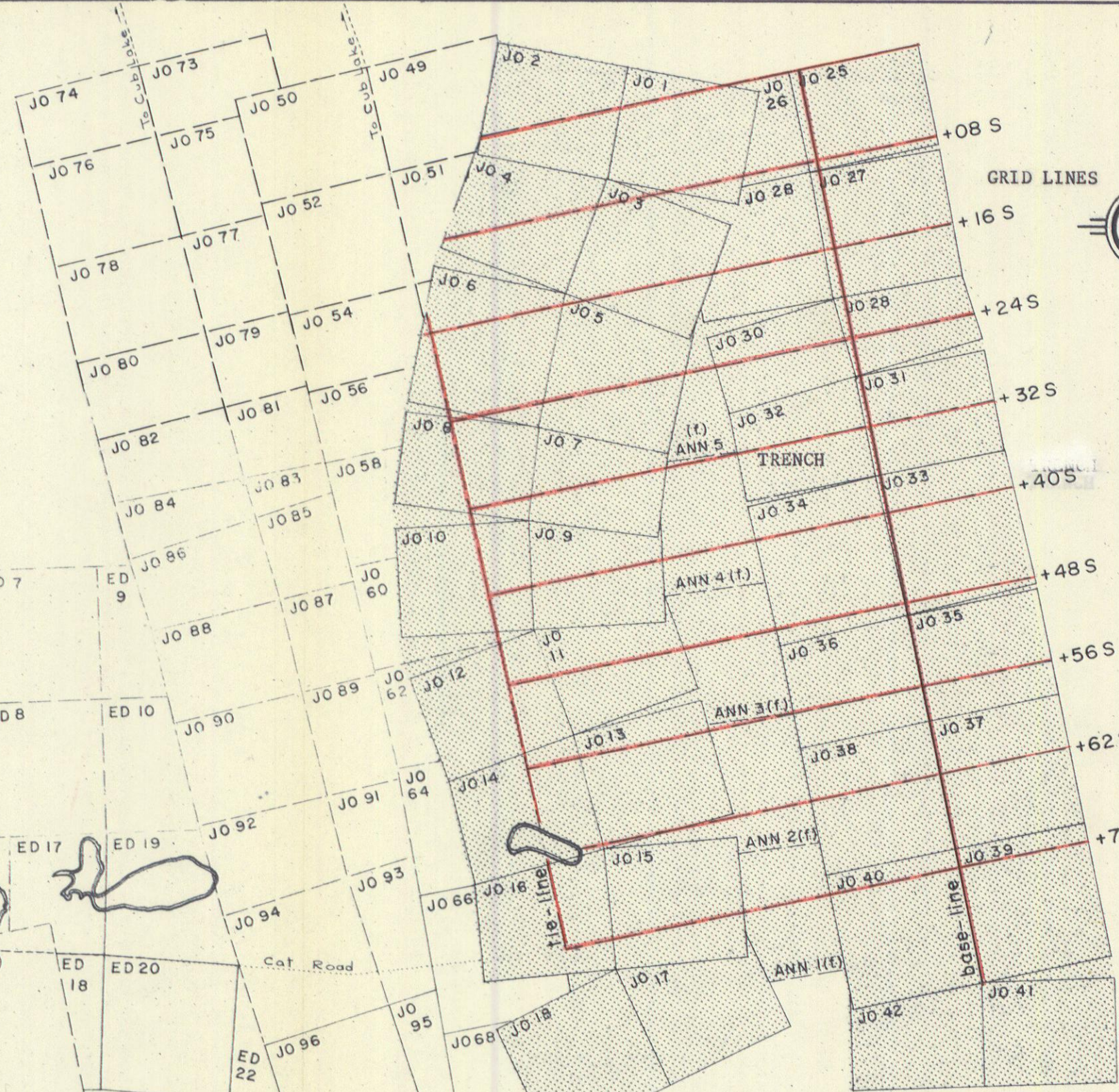
+40 S

+48 S

+56 S

+62 S

+70 S

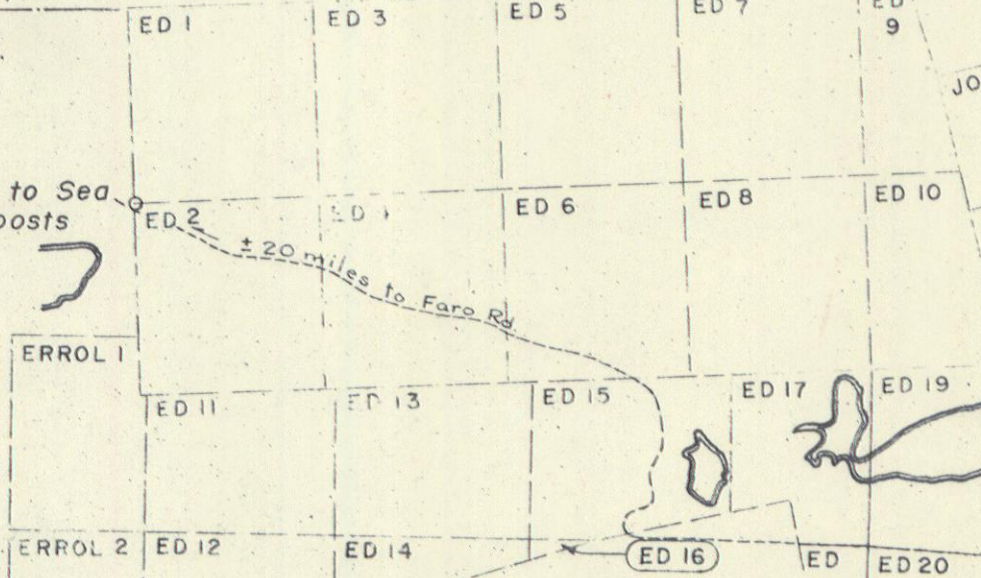


(Luv Grp.)

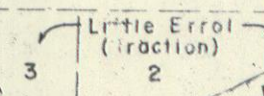
ANVIL MNG.
(Sea Grp.)

Tie in to Sea
No. 2 posts

± 20 miles to Faro Rd.



SULMAC (Sock Grp.)



GOLDEN GATE

RECENTLY COMPLETED WORK

SPUR PETROLEUMS LTD.

CLAIM MAP

Whitehorse M.D.

105 K-2

P.H. Sevensma Consultants Ltd. - Vancouver, B.C.

FIG. 2

Dec. 1966

