

GENERAL LEGEND

- RES RESERVATION BOUNDARY
- GEOLOGICAL BOUNDARY
- FAULT
- ANTICLINAL AXIS
- SYNCLINAL AXIS
- TRAIL
- Location of Drilling Well
- ◇ Abandoned Well

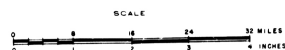
GEOLOGICAL RECONNAISSANCE

8

INDEX MAP

GREAT SLAVE LAKE - LIARD RIVER AREA, N.W.T.

(SHOWING RECONNAISSANCE GEOLOGY
 COMPILATION AND PERMITS HELD BY KELCAM OILS)
 REGIONAL GEOLOGICAL INFORMATION AS OF FEBRUARY 1954.



FORT LIARD AREA

MESOZOIC

CRETACEOUS
 UPPER CRETACEOUS

K

Kv KOTANEELEE

Kfa FORT NELSON

KfaJ LOWER CRETACEOUS
 FORT ST JOHN

PALEOZOIC

CARBONIFEROUS
 PENNSYLVANIAN 8/9 MISSISSIPPIAN

PM

M MISSISSIPPIAN

DEVONIAN

D UPPER DEVONIAN

MIDDLE DEVONIAN

Dm NANAIMI

S SILURIAN

GREAT SLAVE LAKE AREA

K CRETACEOUS

UPPER DEVONIAN

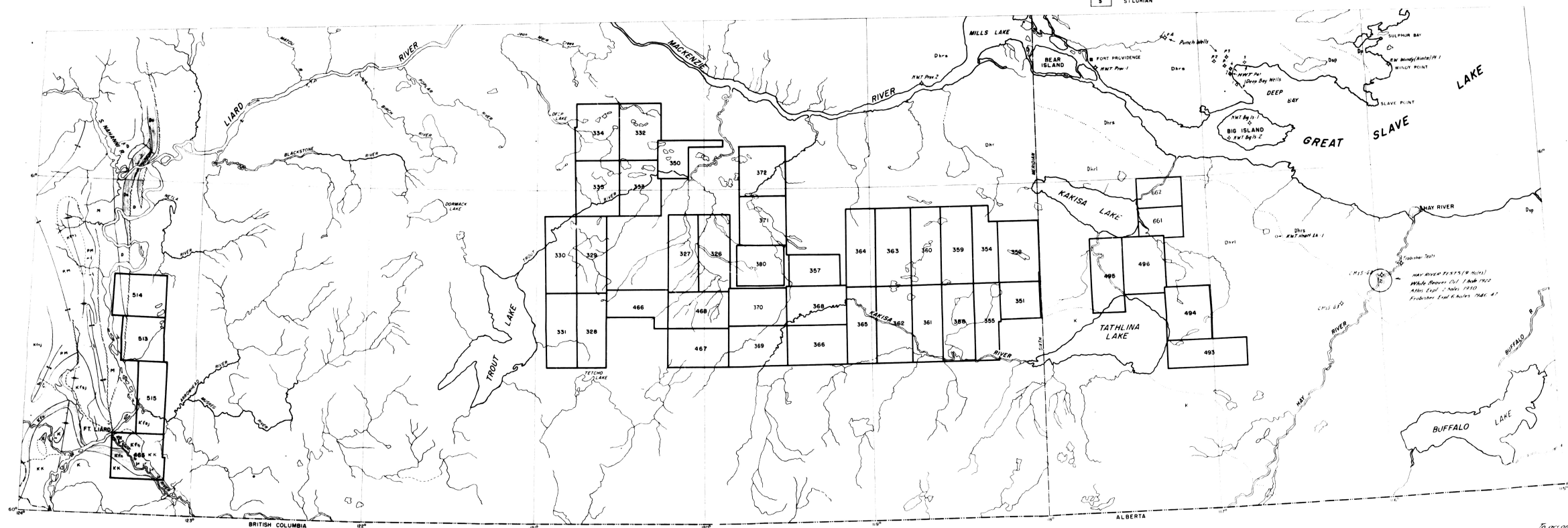
DmH HAY RIVER Ls

DmS HAY RIVER Sh

DmP SLAVE POINT Ls

Dm MIDDLE DEVONIAN
 PRESQU'ILE DOLOMITE

DmP PINE POINT Ls



LETTER REPORT

BUDGET FOR EXPLORATION PROGRAM

GRIFFITH, CAMPBELL, ET AL HOLDINGS, NORTHWEST TERRITORIES

J. C. SPROULE & ASSOCIATES

GEOLOGICAL & EXPLORATION CONSULTANTS

901 EIGHTH AVENUE WEST
CALGARY - ALBERTA

1316 MARINE BLDG
VANCOUVER B.C.

CLERK NO. 2428
2434

TELEPHONE MARINE 8736

CALGARY
J. C. SPROULE
M. B. CROCKFORD
O. D. ROGGE
S. M. HARDING

VANCOUVER
R. H. LAURENCE

ASSOCIATED WITH VICTOR DELMAGE
ENGINEERING & MINING CONSULTANTS
VANCOUVER

J. C. SPROULE & ASSOCIATES
GEOLOGICAL & EXPLORATION CONSULTANTS

301 EIGHTH AVENUE WEST
CALGARY - ALBERTA

1315 MARINE BLDG
VANCOUVER B. C.

TELEPHONE
CALGARY 24 28
24374
VANCOUVER
MARINE 9736

Calgary, Alberta,
March 12th, 1954.

Mr. Robert Campbell,
c/o Canadian Prospect Ltd.,
309 - 7th Ave. West,
Calgary, Alberta.


Re: Letter Report on Exploration Program
Griffith, Campbell, et al Holdings,
Northwest Territories

Dear Sir:

In our letter report "Budget for Exploration Program Griffith, Campbell, et al Holdings, Northwest Territories" dated March 9th, 1954, we described preliminary plans that had already been made to conduct the exploration program described, but made no mention of the authorization for our having made such plans. Mention of this was omitted from our report because White and Lloyd, for whom the program was prepared, could not be sure that they could give full authorization until they knew whether or not the agreement between Griffith, Campbell, et al and White and Lloyd would be signed. It is, however, my present understanding that we do have a firm commitment to conduct this program as described, and that if White and Lloyd and Associates do not assume responsibility for expenditures currently being made, then Griffith, Campbell, et al will take such responsibility.

If this is your understanding of the situation, please sign and return to us one copy of this letter, as approved for Griffith, Campbell, et al.

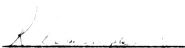
Yours very truly,


J. C. Sproule

JCS:SI

cc: A. M. Lloyd
Gail Moulton

APPROVED:


For Griffith, Campbell, et al



LETTER REPORT

SUBJECT FOR EXPLORATION PROGRAM

GRIFFITH, CAMPBELL, ET AL, HOLDINGS, NORTHWEST TERRITORIES

J.C. SPROULE & ASSOCIATES
GEOLOGICAL & EXPLORATION CONSULTANTS

801 EIGHTH AVENUE WEST
CALGARY - ALBERTA

1308 MARINE BLVD
VANCOUVER B.C.

TELEPHONE 2428
24374

EX-10000 MAR 51 9736

CALGARY:

J. C. SPROULE
M. B. CROCKFORD
O. B. BOGGS
S. H. HARDING

VANCOUVER:
R. H. LAURENCE

AFFILIATED WITH VICTOR DOLMAGE
ENGINEERING & MINING GEOLOGIST
VANCOUVER

J. C. SPROULE & ASSOCIATES

GEOLOGICAL & EXPLORATION CONSULTANTS

301 EIGHTH AVENUE WEST
CALGARY - ALBERTA

1318 MARINE BLDG.
VANCOUVER, B. C.

TELEPHONES:

CALGARY 24128

24374

VANCOUVER
MARINE 9736

Calgary, Alberta,
March 8, 1954.

Mr. A. M. Lloyd,
White & Lloyd,
1928 Life of America Bldg.,
Dallas, Texas.

Re: Letter Report - Budget for Exploration Program
Griffith, Campbell, et al Holdings, Northwest
Territories

Dear Mr. Lloyd:

We are pleased to reply to your request for an estimate of the cost of conducting an exploration program over the Petroleum and Natural Gas Permit holdings of Griffith, Campbell, et al in the Trout Lake-Fathlina Lake area, immediately to the southwest of Great Slave Lake, Northwest Territories, and at the same time to give you our reasons for the view that preliminary geological work in the vicinity of this Permit acreage makes good exploration sense and should be done before any other type of exploratory work is conducted.

For your ready reference in this connection we attach hereto a preliminary geological map of the general area in question, showing the Permit acreage referred to between Trout Lake and Fathlina Lake and, as well, an additional block of four Permits which lie along the Liard River at the western extremity of the map-area.

A full list of these holdings as we understand them to be is as follows:

<u>Permit No.</u>	<u>Acreage</u>
326	63,488
327	63,488
328	60,416
329	60,416
330	64,000
331	64,000
332	61,004
333	57,734
334	63,104
335	63,104
360	37,132
361	40,960

<u>Permit No.</u>	<u>Acres</u>
352	61,460
354	50,796
355	51,796
357	39,040
358	64,000
359	64,000
360	64,000
361	64,000
362	64,000
363	64,000
364	64,000
365	64,000
366	62,149
368	62,149
369	63,744
370	63,744
371	64,000
372	64,000
380	53,120
405	63,290
406	48,500
407	64,000
408	61,600
493	63,744
494	63,936
495	63,098
496	63,975
513	49,856
514	58,464
515	54,120
662	36,398
<u>662</u>	<u>36,398</u>
No. of Permits - 44	2,575,903 - Total Acreage

In brief, a firm estimate that we are prepared to make for a geological reconnaissance of the main block of acreage is that the entire program can be carried out for \$75,000. In addition to that, the four-Permit block on the Liard River can be surveyed for \$8,000. This work would be done during 1954 and should commence at once if we are to do the most efficient job possible.

We think the geological reconnaissance program proposed makes good exploration sense for the reasons that follow:

1. The Permit acreage in question is located in the southern, anovet end, of the Mackenzie River basin, in an area where the stratigraphic section is believed to be within economic reach of the drill, and there is present a sufficiently interesting stratigraphic section (comprising mainly Cretaceous and Paleocene Devonian rocks) as to make the project promising.

2. The principal objectives in the area are the Devonian reefs that are believed to be present in fairly well defined reef trends, from evidence gleaned by examination of surface outcrops in areas updip from the present project block. We are reasonably certain that such Devonian reef prospects are present under the project acreage because of the fact that the area is in a basin position between known outcrops of such formations to the north and north-east, and from deep test wells drilled in northern Alberta and British Columbia immediately to the south.

3. The reef developments in this general area are not too well known at the present time, but we are reasonably certain from observations of the developments of such reef on the south shore of Great Slave Lake and elsewhere that reef trends are associated with Precambrian fault and erosional topographic features and that such Precambrian features have a dominant north-east-southwest or east-west trend and are, therefore, by virtue of draping of the overlying strata, probably detectable throughout the Paleozoic and possibly to some extent through the overlying Cretaceous strata.

4. Outcrops of bedrock from which observations relating to the subsurface structure can be made are present on streams and interstream areas within and in the vicinity of the Permit acreage, and reef trends are known to be present on and in the vicinity of the Permit acreage.

5. Air photographic coverage is available for the area and such photographic coverage being available would greatly reduce the cost and increase the efficiency of the operation to the point where it would be possible to cover the entire area in reconnaissance manner satisfactorily within the coming (approximately three to four-month) summer season.

6. The location of the subject area is between the Mackenzie River transportation system, the main traffic artery through the Northwest Territories, and the Mackenzie highway, which terminates at Hay River immediately to the east of the Permit area, and which passes within approximately fifteen miles of the southeast edge of the Permit area.

7. The area is fairly well drained and has, over the greater part of it, medium structural relief, in view of which the surface is not entirely covered by muskeg. Parts of it should be accessible from the Mackenzie highway on a year-round basis with the expenditure of reasonable sums of money.

8. In accordance with the Northwest Territories Permit regulations it is permissible to concentrate exploration effort on any portion of a given block of permits and apply credits elsewhere within the area. With this in mind it is of paramount importance that before moving any expensive drilling or seismic equipment into the area one should get as much preliminary data as possible on regional geological structural trends that would indicate subsurface features of local interest. In consideration of the probable dominant affect of Precambrian structural features on reef trends within the area concerned, it would be fairly reasonable to assume that any strong structural trends found in the area that connect with known trends immediately outside the area should be given special attention. It is this fact of being able to recognise structural trends within the area and identify them to some extent with known trends outside the area that makes us feel particularly optimistic

about the value of such preliminary work in localising later seismic, structure drilling, or deep drilling work.

In the above we have been discussing the main block of acreage between Inuit Lake and Fathlina Lake. The other block of four Permits lies, as has been noted above, along the Liard River, immediately to the north of the British Columbia border. These holdings are, from the standpoint of regional structure, just east of the foothills belt. Only a small portion of the northern Permits are located in the foothills and mountain belt, involving Devonian and Mississippian strata.

In consideration of the fact that regional structural features and trends are involved in this survey, attention should not be confined strictly to the Permit acreage. With this in mind we find that, although the Permit acreage itself involves only approximately 2,350,173 acres in the major block and 225,730 acres in the Fort Liard block, the area actually to be mapped would be over three times this acreage. In terms of square miles, the area required to be mapped in the eastern block is eighty miles by one hundred and fifty miles, and that required to be mapped in the Fort Liard area is approximately sixteen miles by forty-four miles. This involves an overall reconnaissance of nearly thirteen thousand square miles, a total acreage of approximately eight million.

A summary description of the work involved in the exploration program under consideration is as follows:

Since the project area is not far from the main traffic artery through the Northwest Territories (the Mackenzie highway to the south and the Mackenzie River to the north) a few years ago it would have been serviced by airplane monthly and covered on the ground by canoe, and the job would have taken a geological party several field seasons. With the use of a helicopter it is now possible to cover the same area and to do a much more detailed job in a small fraction of the time. The reason for the improvement in rapidity of coverage is obvious. The improvement in the detail of information acquired is due to the fact that outcrops in bush and muskeg country can be by-passed on a ground traverse by a matter of a few feet, whereas such outcrops are clearly visible from the air. There is also the additional advantage of being able to see rock outcrops in an improved perspective from above and thus to observe attitudes of rock bedding that can not always be identified on the ground. It may take only one such observation on an outcrop to justify the entire program.

If it is decided to conduct a reconnaissance survey of the type herein proposed, and if we are to stay within the budget figure given above, it will be necessary to establish helicopter fuel caches at intervals over the project area by plane on or before the middle of March. Such caches should be flown in on skis while the snow is still on the ground and thus obviate the necessity for using the helicopter unnecessarily for transport of fuel. The small payload that a helicopter can handle so reduces the efficiency of the machine that transport of gasoline by helicopter is entirely impractical except under special circumstances. The machine we plan to contract for the coming summer's field operations is a Miller two-passenger unit. This machine is operated by a pilot and mechanic and the operating fee is about \$125 per hour, plus fuel and living expenses for the crew. We mention this item of operating expense to illustrate

the value of having fuel caches established ahead of the field survey.

The field party for the above project would consist of two senior and two junior geologists and a cook for the Trout Lake-Fathlina Lake area and a third senior geologist and assistant, and a canoe-man, for the Liard River project.

In our Northwest Territories field work last year we were able to make use of the services of a bombardier for muskox travel, and if it were feasible within the present map-area the same unit would be again employed. On the other hand, we have been informed that large parts of the area are sufficiently well-drained as to be accessible on an all-year round basis.

In the supposition that whatever program is carried out in this area air photos will be essential, we have, as above noted, already ordered coverage for the area and for a broad boundary around it, and will be able to put a staff of photogeologists and photogrammetrists on it at once in preparation for the field season. We have also made provisional arrangements with Associated Airways, who have agreed to establish the necessary helicopter fuel caches during the present month, providing they receive final instructions within the next few days. Paul Ostrander, of Canadian Helicopters, has promised us a machine for the summer and will be out here next week to add his knowledge of the area to ours in the establishing of caches of fuel and other essential heavy material, such as canned goods that can be flown in at this time, and save uneconomic effort during the summer months.

It is estimated that any preliminary work that we can do now in flying in fuel and other equipment, purchase of canoes and other essential field equipment, purchase and preparation of photo-mosaics, photogeological study of photos and mosaics, and preparation of maps may amount to as much as \$20,000 to \$25,000 of the total anticipated cost of \$83,000.

After a preliminary examination of the magnetometer results obtained over the east half of the reservations block, it is not clear what interpretation to place on these results, and we would, therefore, prefer to reserve judgment as to the advisability of carrying out a similar program over the west half of the project area until after we have made our preliminary photogeological interpretation at least. About all we can say now is that the thickness of the sedimentary mantle over the Precambrian in this area is not great (probably a maximum of 4,000 feet), in view of which Precambrian paleotopographic features and other features that may influence the overlying structure might be interpreted by magnetic means. If the remainder of the main block and the Liard River block were to be surveyed by airborne magnetometer the cost would be approximately \$29,000.

Another advantage to an early decision in this matter is that we can order canoes for the river work sufficiently far ahead of time as to ensure their delivery.

Yours sincerely,

J. C. Sproule
J. C. Sproule, . . .

JCS:T
cc. Mr. Gail Moulton

CERTIFICATE

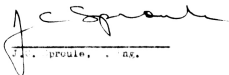
I, John Campbell Sproule, consulting geologist, of 901 - 8th Avenue West, Calgary, Alberta, do declare:

1. That I graduated as a geologist from the University of Alberta with the degree of Bachelor of Science in the year 1930; I obtained the degree of Master of Arts at the University of Toronto in the year 1931; and I obtained the degree of Doctor of Philosophy in Geology from the University of Toronto in the year 1935.

2. That I am a Fellow of the Geological Society of America and a Member of the American Association of Petroleum Geologists, the Society of Exploration Geophysicists and the Society of Economic Paleontologists and Mineralogists, and that I am a registered Professional Engineer for the Provinces of Alberta and Saskatchewan.

3. That I have no interest, direct or indirect, nor do I expect to receive any interest, direct or indirect, in the properties described in the attached "Letter report - Budget for Exploration Program Griffith, Campbell, et al Holdings, Northwest Territories."

4. The above report is based on my geological and other general knowledge of the areas described above and upon a consideration of all available data on wells drilled in adjacent areas, and upon examination of electric logs and available engineering data on wells in and in the vicinity of the aforementioned properties.



J. C. Sproule, P. Eng.

901 - 8th Ave. West,
Calgary, Alberta.
March 8, 1954.