

MAR 19680070: NORTH CENTRAL ALBERTA

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ECONOMIC MINERALS
FILE REPORT No.
S-AF-077(1)

GEOLOGICAL REPORT
SULPHUR PROSPECTING PERMIT NO. 77
NORTH-CENTRAL ALBERTA

Prepared For
Kamalta Exploration Ltd.
February, 1968

J. G. SPROULE AND ASSOCIATES LTD.
OIL AND GAS ENGINEERING AND GEOLOGICAL CONSULTANTS

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GEOLOGICAL REPORT

SULPHUR PROSPECTING PERMIT NO. 77

NORTH-CENTRAL ALBERTA

INTRODUCTION

This report has been prepared at the request of Mr. W.B. Ruck, acting for Kamalta Exploration Ltd., hereinafter referred to as "Kamalta."

Kamalta holds a 65 percent interest in Sulphur Prospecting Permit No. 77 issued by the Department of Mines and Minerals of the Government of the Province of Alberta. Other companies also holding interests in Sulphur Prospecting Permit No. 77 are Stall Lake Mines Limited and Northern Copper Ltd. This Permit is located in the general Fort Vermilion area of northern Alberta. The Permit and its geographic relationship to other Permits issued is shown on the accompanying map, Figure 1.

Sulphur occurrences have been reported from many points in northern Alberta and the adjacent Northwest Territories over a period of at least a century. Such sulphur shows are in the form of small deposits around springs and gas seeps (also "smoke" or "steam" escapes), thin stringers, bed and cavity infillings in various types of beds, and as finely disseminated sulphur, which is present as an appreciable constituent in many shale deposits and in the well-known Athabasca Oil Sands. Until recently, it had been assumed that such sulphur deposits were uneconomic. The current world-wide shortage of this mineral, plus the vastly increased sulphur prices over the last ten years, have tended to change the Industry's attitude toward such deposits. It is also pertinent that Industry, in general, has not previously known of the existence of these deposits.

Under the present conditions, the earlier scattered reports of sulphur shows in northern Alberta have suddenly become significant. During recent months, mainly as the result of a substantial show of native sulphur on what is now Sulphur Prospecting Permit No. 8, a considerable number of Sulphur Prospecting Permits have been issued to a number of persons and companies, and many other Permit applications are presently being processed by the provincial authorities. Several major oil and chemical companies have taken up Sulphur Prospecting Permits in the play and others are rumoured to be making deals with smaller companies, or individuals, already holding Permits.

The present report presents the results of an investigation of publicly available information relating to the Kamalta Permit and surrounding areas. The property itself was not examined in the field by the undersigned in conjunction with this report, but the occurrence of sulphur on Sulphur Prospecting Permit No. 8 (the "discovery" Permit) has been confirmed by other geologists of J.C. Sproule and Associates Ltd. Areas adjoining Sulphur Prospecting Permit No. 77 have also been examined by geologists of J.C. Sproule and Associates Ltd.

DESCRIPTION OF PROPERTY

The holdings under consideration, as presented to us, are as follows:

<u>Permit No.</u>	<u>Location</u>	<u>Gross Acreage</u>	<u>Kamalta Interest</u>
77	Townships 107 and 108, Range 1, W. 5 M.	19,840	65%

The information on this property, as given to us by Mr. W.B. Ruck, has been accepted as correct and we have made no investigation as to legal title or interests held.

LOCATION, ACCESS AND TOPOGRAPHY

The Permit lies in the general region to the east of Fort Vermilion, Alberta. Fort Vermilion is located approximately 320 miles north-northwest of Edmonton and is about 45 miles by road east of the town of High Level, which is served by both the Mackenzie Highway and the Great Slave Railway. The location of the Permit is shown, in outline, on the accompanying map, Figure 1.

Sulphur Prospecting Permit No. 77 is located about 15 miles south of the Peace River. At this time, there is no ready access to a convenient traffic artery inasmuch as the nearest road is another five miles north of the Peace River.

From the standpoint of regional topography, Sulphur Prospecting Permit No. 77 is low-lying to slightly rolling. Muskeg is prominent throughout the area.

MODE OF OCCURRENCE AND RELATIONSHIP OF SULPHUR

TO GENERAL GEOLOGY

Within the regional area of interest the principal outcropping bedrock formations are of Cretaceous age, but in the northeast portion, particularly in the valleys of the Peace River and Mikkwa River, erosion has stripped off the Cretaceous beds exposing older Devonian rocks. The Devonian, as well as the overlying Cretaceous rocks, is generally inclined gently westward into the Alberta Syncline so that progressively younger rocks of both Paleozoic and Mesozoic ages are present in that direction. Surface outcrops of both Paleozoic and Cretaceous ages are widespread but not numerous. Very little has been published on them.

The approximate erosional edge of the Cretaceous sediments is shown on Figure 1. It should be emphasized that the edge, as shown on this map, is based on limited control and is subject to correction as more information becomes available.

The bedrock, whether of Devonian or Cretaceous age, is overlain by a variable thickness of glacial and related sediments. The thickness of the glacial beds varies from zero to several hundred feet. The thickness is at a minimum in those areas where river valleys are deeply incised and greatest in the hilly portions of the area.

Sulphur occurrences in the general area may be placed into three groups, as follows:

1. Sulphur in muskeg or other poorly drained areas of lacustrine deposits. The most important known apparent example of this type is the Sulphur Prospecting Permit No. 8 discovery occurrence.

2. Deposits of elemental sulphur in connection with active springs with or without associated gas. One such occurrence involved gas that was, at least in part, combustible.

3. Finely disseminated sulphur which is frequently present in Cretaceous shales. Although we know of no reported concentrations of significant size from the Cretaceous, the possibility of such economic occurrences cannot be entirely eliminated.

The sulphur occurrence of most immediate interest to the present holdings is in Sulphur Prospecting Permit No. 8 (the "discovery" Permit). This appears to be mainly superficial and occurs in association with lacustrine deposits. Sulphur Prospecting Permit No. 77 is situated in a similar geologic setting as Sulphur Prospecting Permit No. 8 in that it is located near the approximate erosional edge of the Lower Cretaceous. A thin cover of surficial and possible Cretaceous sediments overlies Devonian rocks in this area.

At the present time, Bow Valley Industries Ltd., operating Sulphur Prospecting Permit No. 8, is the only company reported to have made any substantial effort to evaluate a sulphur deposit by drilling. Since the information from such investigations is privately held, no reliable publicly available data on sulphur reserves would appear to exist.

In the above comments on mode of occurrence, we have avoided discussion of theories of origin because of the large number of presently uncertain factors in this new area. Outcrop and sampling studies in the area are, however, likely to yield substantial information over the coming field season. Meanwhile, theories of origin from Paleozoic connate waters, or from bedded Devonian and other gypsum and anhydrite deposits, are of principal current interest.

The importance of considerations as to origin of sulphur deposits is that the mode of occurrence will determine whether they can be stripped or otherwise mined at the surface, or produced from deeper strata by the Frasch process. Consideration of questions on origin and occurrence is, therefore, of prime economic importance and should be given very detailed attention as the present Permit areas are evaluated.

SUMMARY AND RECOMMENDATIONS

Summary

(1) Kamalta Exploration Ltd. holds a 65 percent interest in Sulphur Prospecting Permit No. 77, located in northern Alberta. This permits totals 19,840 gross acres.

(2) The Permit is in an area where active interest has been shown by a number of companies, including large sulphur producers and users.

(3) The initial discovery of sulphur in this area was made on Sulphur Prospecting Permit No. 8. The occurrence of sulphur in this Permit has been confirmed by senior geologists of the staff of J.C. Sproule and Associates Ltd. Sulphur Prospecting Permit No. 77 is in the same general area as, and in a similar geological setting to, Sulphur Prospecting Permit No. 8.

(4) The origin of the sulphur occurrences in the general Fort Vermilion area is not known at this time. On the basis of our general knowledge of sulphur occurrence and our specific knowledge of the area, we believe the best prospects are in the areas where Devonian beds are at or near the surface. From this point of view, Sulphur Prospecting Permit No. 77 is particularly favourably located.

(5) Sulphur Prospecting Permit No. 77 is located some distance from an all-weather road and in an area of considerable muskeg. It is, therefore, accessible to heavy drilling equipment only during the winter months.

Recommendations

It is recommended that photogeological and field studies be undertaken prior to drilling operations. These studies would provide a useful background for the location of test holes.

A photogeological study of Sulphur Prospecting Permit No. 77 which would serve as a guide to summer field studies, is estimated to cost \$600. A summer geological field study would include a limited amount of shallow auger testing, the results of which would influence recommendations for subsequent auger or drilling program. A preliminary estimate of the cost of this program is \$3,500. Preliminary estimates for the cost of a winter program of drilling shallow test holes is \$12,000.

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J.C. Sproule, P. Geol.

1009 Fourth Avenue S.W.,
Calgary, Alberta.
February 20, 1968.
JCS/VAF/ldl

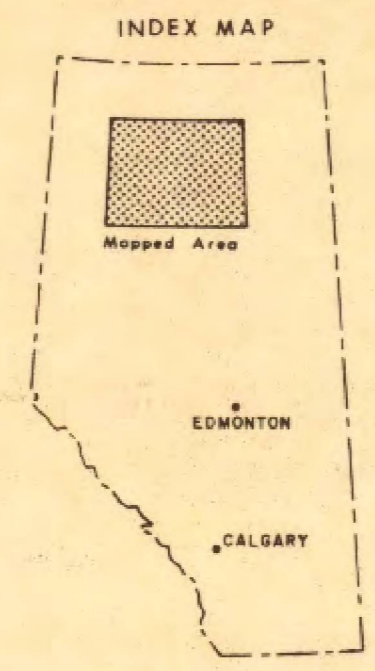
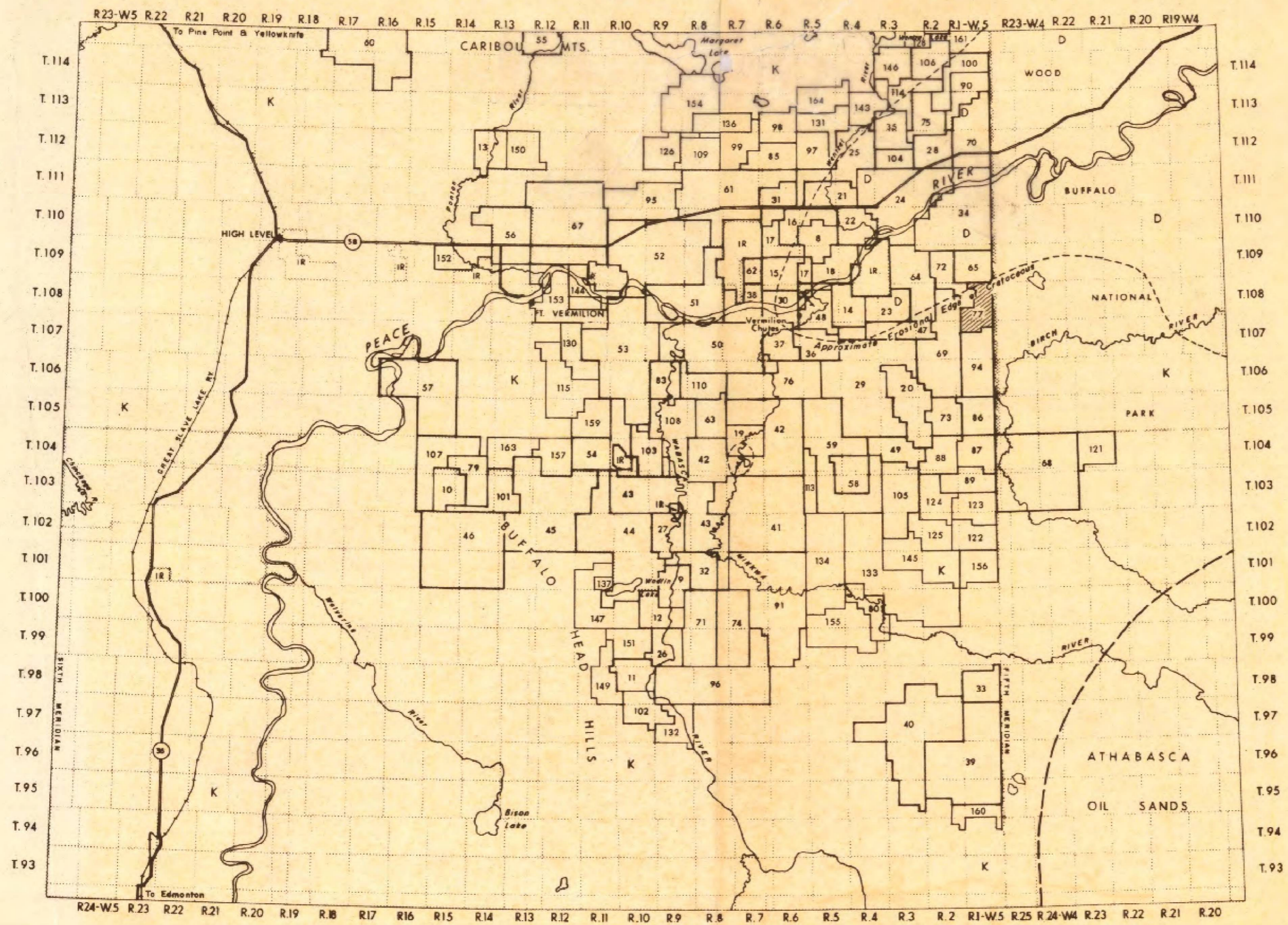
CERTIFICATE

I, John Campbell Sproule, consulting geologist, of [REDACTED]
S.W., 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, 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 Geologist for the Province of Alberta, a registered Professional Engineer for the Province of Saskatchewan, a registered Engineer for the Province of Manitoba, and a non-resident Licensed Engineer for the Province of British Columbia.
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 report entitled, "Geological Report, Sulphur Prospecting Permit No. 77, North-Central Alberta," dated February 19, 1968, nor have I any interest, present or expected, in the securities of the Companies.
4. The above report is based on my geological and engineering knowledge of the areas described above, and that of my Associates, and upon a consideration of all available data on wells drilled in adjacent areas.

[REDACTED]
J.C. Sproule P. Geol.

[REDACTED] S.W.,
Calgary, Alberta.
February 19, 1968.



- LEGEND**
- K Cretaceous Formations
 - D Devonian Formations
 - 17 Sulphur Prospecting Permit
 - A Permit Applied For
 - Permit 77 in which Kamalta Explorations Ltd., Stall Lake Mines Limited, and Northern Copper Ltd. have Interest

NORTH - CENTRAL ALBERTA
 showing
 SULPHUR PERMIT 77
 with reference to
 REGIONAL SURFACE GEOLOGY AND PERMITS HELD BY OTHERS

0 16 32 48
 SCALE: 1" to 16 MILES

NOTE: Permits as Published to February 15, 1968

SULPHUR PROSPECTING PERMIT No. 77

KAMALTA EXPLORATION LTD.,
709 - LANCASTER BLDG.,
CALGARY, ALBERTA.

DATE OF ISSUE - JANUARY 8, 1968
AREA - 19,840 ACRES.

TP. 108

845/8

TP. 107

R. 1 W. 5 M.