

# MAR 19680119: ALBERTA

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ECONOMIC MINERALS

FILE REPORT No.

S-AF-137(1)

INDEXING DOCUMENT NO. 700508

ADVANCE GEOLOGY & GEOPHYSICS LIMITED

CASSETE MINES LIMITED

GEOLOGICAL-GEOCHEMICAL REPORT


PROVINCE OF ALBERTA

SUMMARY:

A program of geological coverage and geochemical soil sampling was recently completed on the Cassete Mines Limited Northern Alberta property to assess sulphur potential.

No areas of outcrop were observed. Government geological maps indicate that the property is underlain by geology favourable as host for sulphur deposits. Five geochemical anomalous conditions, each representative of concentrations of elemental sulphur material, were recorded in the area surveyed. These zones range from 2600 ft. to 1,000 ft. in length with intensities from well over five times background to four-five times background each located in an area of well drained glacial deposits. Two zones are open for extension off of property limits. "A" and "B" anomalies are prime features due to good dimension, intensity, and environment.

Recommendations are for further geochemical soil sampling under summer time conditions of anomalies "A" and "B" at 20 to 30 ft. depth and an estimated cost of \$4,000.00 with a view to diamond drilling. These recommendations are contingent upon the continuance of good sulphur markets and encouraging results from other properties in the region.

  
G.L. Kirwan

November 25, 1968.

CASSETE MINES LIMITED,  
Suite 305-100 Adelaide St. West,  
Toronto 1, Ontario.

Gentlemen:

This report covers results of a combined program of geological coverage and geochemical soil sampling with determinations for sulphur content on your property located in Northern Alberta.

PROPERTY, LOCATION, ACCESS:

The subject holdings consist of approximately 3,840 acres in all located in Township No. 101, range 11 west of the 5th meridian, being sections 1-3 and 10-12 inclusive.

The property comprises all available sulphur rights under Alberta's Schedule of Lands being Sulphur Prospecting Permit No. 137.

The property is located in the North Central portion of the Province of Alberta some 33 miles south of the settlement of Fort Vermillion, Alberta, and is situated in the Buffalo Head Hills, northeast flank.

Best means of access is by fixed wing aircraft to Wadlin Lake which occupies a portion of the southeast part of the property.

HISTORY:

Sulphur deposits in the area of the subject property have been known for over 100 years, however deposits were thought to be small vertically and horizontally. Spontaneously lit sulphur fires characterize the area and have been regarded as a nuisance.

Prompted by an acute world shortage of elemental sulphur, Madison Oils and Bow Valley of Calgary, Alberta, acquired considerable acreage in the vicinity covering known sulphur occurrences which triggered a rush for property in the region reaching proportions of a few millions of acres.

The subject property is located in the vicinity of the Madison Oils and Bow Valley acquisitions tied onto the south boundary of permits held by Hudson's Bay Oil and Gas Limited.

ECONOMIC CONSIDERATIONS:

Sulphur is known to exist in the region of the property and has apparently being concentrated through fault and fissure breaks in crustal sediments, and possibly by fumarole action. Source appears to be the Elk Lake Point Evaporite of Middle Devonian age. Both Devonian and Cretaceous age formations appear to be host.

In many instances, sulphur occurrences outcrop below overburden which is considered to be moderate in the area. Potential exists for deposits to occur at depth along structurally controlled paths.

TABLE OF GEOLOGICAL FORMATIONS

Source: G.S.C. Map No. 1002A, Geological Map of Alberta.

Lower Cretaceous: The area of the property is described as being underlain by Undivided Lower Cretaceous Formations which would include the essentially flat-lying, undisturbed, Fort St. John Group consisting mostly of marine shale and sandy shale. Associated Formations consist of sandstone. Thicknesses of Formations are not indicated.

GEOLOGICAL SURVEY:

Field Procedure: Based upon a preliminary study of airphotographs covering the area and field reconnaissance through use of helicopter traverses, and employing advantages of photogrammetric and planimetric map using topography for tie-in locations, the entire property was traversed on the ground on a north-south line separation grid of 1320 feet.

Geological Findings: No areas of outcrop were observed in the area covered.

GEOCHEMICAL SURVEY

Field Procedure: Through control by use of photogrammetric and planimetric maps, and employing normal soil auger equipment, samples of soil were taken from the "B" horizon immediately below the topmost

or humous horizon along a 1320 ft. grid. The grid covers a linear distance of 24 miles. Each station was marked in the field by brilliant orange plastic ribbon. Depth of samples ranged from a few inches to one foot in depth below surface, averaging about 10 inches.

Laboratory Procedure: All samples were dried then passed through an 80 mesh nylon screen to eliminate possible humus contamination. Concentrated hydrochloric acid is added and the solution heated to 150° C. for two hours then allowed to settle for 10 hours. The clear solution atop the precepitate is drained off, diluted with distilled water, and barium chloride is added. The resulting suspension of sulphur in the solution is then compared against known standards through visual methods.

"B" represents concentration of sulphur less than 500 parts per million, "L" is less than 5,000 PPM, "M" is less than 10,000 PPM, while "H" represents sulphur concentrations in excess of 10,000 PPM.

Results of Survey: In assessing anomalous areas, consideration is given to the relative high solubility of sulphur and thus its high degree of migration. Consideration is also given to local environment of each sample taken with drainage features taken into account. In view of possible sulphide concentrations, it is noted that all determinations lack associated iron content and therefore are representative of elemental sulphur.



The general base level of sulphur throughout the soil in the area surveyed ranges from less than 500 PPM to 5,000 PPM with an average background of about 2,000 PPM sulphur.

Five anomalous zones designated "A" to "E" representing areas of significant geochemical build-up indicating elemental sulphur concentrations were detected in the area surveyed. The zones occur along an east-west line in the middle of the property, however results of work do not indicate relationship one to the other.

"A" anomaly, located in the extreme western portion of the property, trends in direction northeast, is 2600 ft. long and has average intensity of well over five times background. This zone is open for extension in a direction southwest. The anomaly is contained within an area of well drained glacial deposits. "B" anomaly, located about centre of the property, is 2,000 ft. long with intensity of about four to five time background and has an environment of well drained glacial deposits with some peat bog material. Anomalies "C", "D" and "E" are each about 1,000 ft. in dimension, have intensity of from four-five times background, and have an environments of well drained glacial deposits. "E" is open for extension eastward.

CONCLUSIONS AND RECOMMENDATIONS:

A program of geological coverage and geochemical soil sampling was recently completed on the Cassete Mines Limited Northern Alberta property to assess sulphur potential.


No areas of outcrop were observed. Government geological maps indicate that the property is underlain by geology favourable as host for sulphur deposits. Five geochemical anomalous conditions, each representative of concentrations of elemental sulphur material, were recorded in the area surveyed. These zones range from 2600 ft. to 1,000 ft. in length with intensities from well over five times background to four-five times background each located in an area of well drained glacial deposits. Two zones are open for extension off of property limits. "A" and "B" anomalies are prime features due to good dimension, intensity, and environment.

In order to more fully assess sulphur potential of the property, the following work is recommended under summer time conditions in consideration to the continuance of good elemental sulphur markets and with a view to encouraging results from work programs on other properties in the region;

Employing portable plugger or Packsack equipment, five randomly located soil samples in each of anomalies "A" and "B" would be acquired from depth of 20 to 30 ft. from surface and determined for sulphur content. This work would evaluate anomalies with a view to diamond drilling. The estimated cost of this work, all-inclusive, is \$4,000.00.

Further work is contingent upon the results of the above recommended program.

Respectfully submitted,

  
G.L. Kirwan, B.Sc.  
Consulting Geologist

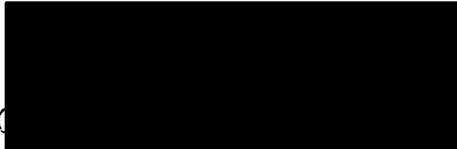
GLK/bh  
Toronto, Ontario  
November 25, 1968.

CERTIFICATE

I, Gerald L. Kirwan of the city of Toronto in the Province of Ontario, certify as follows:

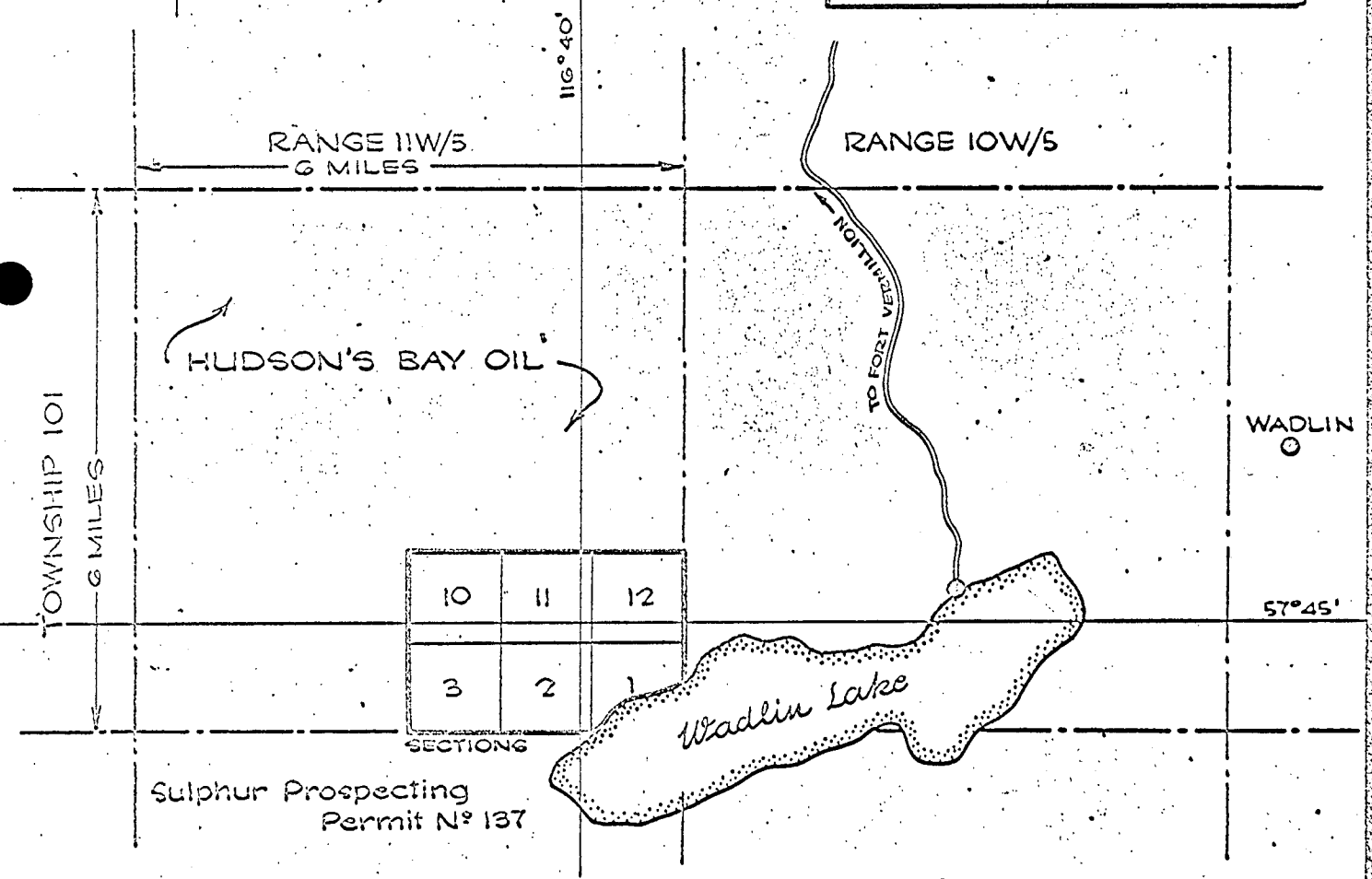
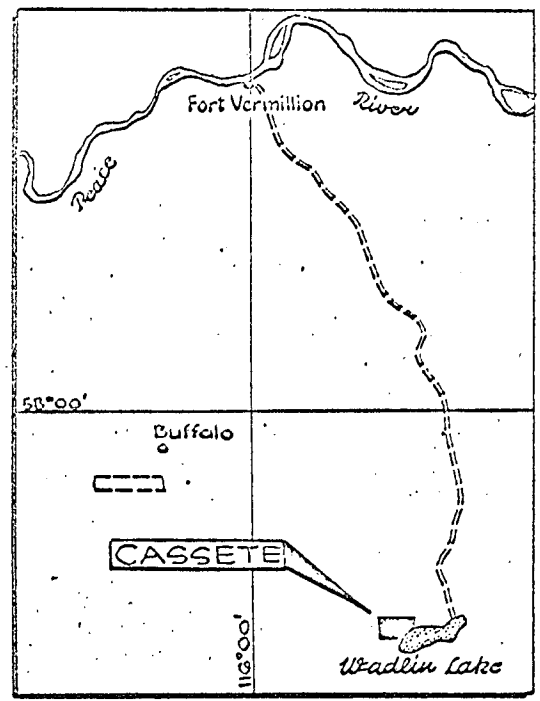
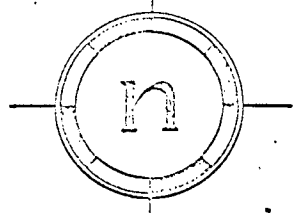
1. THAT I am a geologist with offices at 160 Bay Street, Toronto, and 130 Kingslake Road, Willowdale, Ontario.
2. THAT I have practised my profession continuously since being graduated from Carleton University, B.Sc., 1957.
3. THAT I am a Fellow of the Geological Association of Canada.
4. THAT I have not directly or indirectly received nor do I expect to receive any interest direct or indirect in the property of Cassete Mines Ltd. or any affiliate, nor do I beneficially own directly or indirectly any security of the Company or any affiliate thereof.
5. THAT the accompanying report has been prepared by myself and is based upon supervision of the programs herein noted.

Dated at Toronto, Ontario, this 25th day of November, 1968.

  
G.L. Kirwan

SOURCE:  
G.S.C. Map No. 1002 A

GEOLOGY:  
Undivided Lower Cretaceous  
Rocks.



*Property Location and Geology Map*

**CASSETE MINES LIMITED**

TOWNSHIP 101, RANGE 11W5, FORT VERMILLION AREA  
ALBERTA

Scale: 1 inch to 2 miles

19680119  
Map No. 1

MAY, 1968

G.L. KIRWAN B.Sc.

SCHEDULE  
to Sulphur Prospecting Permit No. 137

IN TOWNSHIP ONE HUNDRED AND ONE (101), RANGE ELEVEN (11), WEST  
OF THE FIFTH (5) MERIDIAN:

Sections One (1), Two (2), Three (3), Ten (10),  
Eleven (11) and Twelve (12);

containing an area of Three Thousand, Eight Hundred and Forty  
(3,840) acres, more or less.

84 6 1/2 NW

