MAR 19680101: FIREBAG RIVER

Received date: Dec 31, 1968

Public release date: Jan 01, 1970

DISCLAIMER

By accessing and using the Alberta Energy website to download or otherwise obtain a scanned mineral assessment report, you ("User") agree to be bound by the following terms and conditions:

a) Each scanned mineral assessment report that is downloaded or otherwise obtained from Alberta Energy is provided "AS IS", with no warranties or representations of any kind whatsoever from Her Majesty the Queen in Right of Alberta, as represented by the Minister of Energy ("Minister"), expressed or implied, including, but not limited to, no warranties or other representations from the Minister, regarding the content, accuracy, reliability, use or results from the use of or the integrity, completeness, quality or legibility of each such scanned mineral assessment report;

b) To the fullest extent permitted by applicable laws, the Minister hereby expressly disclaims, and is released from, liability and responsibility for all warranties and conditions, expressed or implied, in relation to each scanned mineral assessment report shown or displayed on the Alberta Energy website including but not limited to warranties as to the satisfactory quality of or the fitness of the scanned mineral assessment report for a particular purpose and warranties as to the non-infringement or other non-violation of the proprietary rights held by any third party in respect of the scanned mineral assessment report;

c) To the fullest extent permitted by applicable law, the Minister, and the Minister's employees and agents, exclude and disclaim liability to the User for losses and damages of whatsoever nature and howsoever arising including, without limitation, any direct, indirect, special, consequential, punitive or incidental damages, loss of use, loss of data, loss caused by a virus, loss of income or profit, claims of third parties, even if Alberta Energy have been advised of the possibility of such damages or losses, arising out of or in connection with the use of the Alberta Energy website, including the accessing or downloading of the scanned mineral assessment report and the use for any purpose of the scanned mineral assessment report so downloaded or retrieved.

d) User agrees to indemnify and hold harmless the Minister, and the Minister's employees and agents against and from any and all third party claims, losses, liabilities, demands, actions or proceedings related to the downloading, distribution, transmissions, storage, redistribution, reproduction or exploitation of each scanned mineral assessment report obtained by the User from Alberta Energy.

ECONOMIC MINERALS
FILE REPORT No.
S-AF-1116)

REPORT ON FIELD EXAMINATION SULPHUR PROSPECTING PERMIT NO. 111 FIREBAG RIVER AREA, ALBERTA

Prepared For
Canadian Superior Oil Ltd.
December, 1968

1968101

INDEXING DOCUMENT NO 700472

THIS REPORT HAS BEEN PREPARED
FOR THE EXCLUSIVE USE OF:

CANADIAN SUPERIOR OIL LTD.

COPY NO: 2

REPORT ON FIELD EXAMINATION

SULPHUR PROSPECTING PERMIT NO. 111

FIREBAG RIVER AREA, ALBERTA

Prepared For

Canadian Superior Oil Ltd.

December, 1968

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

1009 FOURTH AVENUE S.W.
CALGARY — ALBERTA

TELEPHONE 269-7951

TABLE OF CONTENTS

LIST OF PLATES

ILLUSTRATION

REPORT ON FIELD EXAMINATION

SULPHUR PROSPECTING PERMIT NO. 111

FIREBAG RIVER AREA, ALBERTA

The field work on this permit has been carried out at the request of Mr. J. W. Porter, acting for Canadian Superior Oil Ltd. The work was authorized under our letter agreement of June 10, 1968, and the request made was that J. C. Sproule and Associates Ltd. should investigate and sample representative locations from selected areas. This work was described as Step 1 of Phase II in the program proposed in our June 10 letter. We quote as follows with reference to our proposal for field examination:

> "The field party conducting Phase II would, upon arrival in the field, immediately check those points of indicated interest that had become evident from the photogeological study. More specifically, we think that the preliminary study will give you a good idea of all those areas that are likely to contain sulphur. All areas where sulphur is likely to occur will be checked by the helicopter reconnaissance crew. Hand specimens and/or auger samples will be taken to determine the presence or absence of sulphur. We might call this preliminary part of the field program Step 1 of Phase II."

The field work was conducted in September, 1968, by Mr. S. R. L. Harding and Mr. N. Soul, from a base field camp on the east side of the Athabasca River about six miles upstream from the mouth of the Firebag River. Use was made of a Bell G2 helicopter contracted from Okanagan Helicopters Ltd. Fuel was placed in the area by barge.

The sample locations are shown on the accompanying Figure 1 and the related analyses by Chemical and Geological Laboratories Ltd. are presented as the Appendix. Field notes relating to samples taken have been placed beside the analyses in the appendix.

Three areas were indicated by the photogeological study to be prospective for sulphur. These were labelled Areas 1, 2 and 3 on the photomosaic. Analysis of a sample from the auger hole at Location 111-G in Area 1 revealed only a trace of sulphur. Similarly, analyses of samples from auger holes at Locations 111-E and 111-F in Area 2 revealed only traces of sulphur. Area 3 included a number of relatively small muskeg areas in a very extensive area of pine covered sandy soil. This area was carefully reconnoitered from the air but no helicopter landings were possible. On the basis of aerial visual inspection, the prospectiveness of this area for a possible accumulation of commercial sulphur is strongly discounted.

In the course of further examining Permit No. 111, the valleys of the Firebag River and the tributary Marguerite River were studied throughout their lengths within the Permit. These valleys were studied at river level and again by flying at higher elevations. Both points of view were necessary.

Some revisions have been made in the interpretation previously submitted. On the photomosaic accompanying this report, the Cretaceous-Devonian boundary has been placed in the Firebag River valley at the farthest upstream outcrop of Devonian carbonates and the farthest downstream occurrence of McMurray Formation oil sand in place. Any observed occurrence of oil sand farther downstream from this point was reworked material.

Sample Location 111-1 lies outside the permit at the southeast corner. At this location, a bank of McMurray Formation oil sand was overlain by bituminous

drift. The oil sand generally contains an appreciable amount of sulphur and in the mud at the foot of the cliff sulphur had apparently been concentrated as a carefully selected sample analyzed 38.04 percent sulphur. There does not appear, however, to be any area in the vicinity suitable for the accumulation of a significant quantity of sulphur. Although Sample Location No. 111-1 has been marked as a sulphur spring on the mosaic, it is not a sulphur spring such as others which emerge from the porous Devonian carbonates.

Sulphur springs occur at Sample Locations 111-2 and 111-3, a few hundred yards downstream from the first Devonian outcrop. Between these two locations an additional two sulphur springs were observed,both on the west side of the stream. In each case, the spring emerges from the Devonian carbonates and flows a short distance into the Firebag River. Sulphur deposits tend to be only a slight crust on the rocks. Analyses of samples taken vary from 3.06 percent sulphur for Location 111-2 to 45.86 percent for Location 111-3.

Another sulphur spring was observed a little farther off from the river on the east side and one-half mile northeast of Location 111-3. This occurrence is not far from rapids caused by a ledge of carbonates crossing the Firebag River.

Sample Location 111-8 (Plate II-B), is in a sulphur-marl swamp about one-half mile northwest of Location 111-3. Samples taken at Location 111-8 analyzed 34.86 percent sulphur and 49.08 percent sulphur.

At Sample Location 111-5 (Plate II-A), a pair of sulphur springs emerge from Devonian dolomite and flow a short distance to the Firebag River. The deposit on the rocks at the spring outlet analyzed 43.80 percent sulphur. A bottom sample about 40 feet from the outlet analyzed 24.06 percent sulphur but a sample at the same location from a depth of 3 feet revealed only a trace of sulphur. In this area, at least, it appears that the sulphur is only a surface deposit.

Another sulphur spring was also observed at the edge of the Firebag River at the northeast end of a bridge which is being constructed across the river to extend the forestry road from Bitumount. Location 111-6 near here is an excellent outcrop of porous Devonian Methy dolomite.

At the extreme western edge of Permit No. 111, several sulphur springs emerge from the base of the escarpment, which forms the east side of the Athabasca River valley. One of these is shown in Plates I-A and I-B. Samples Nos. 111-A and 111-B, taken by auger near the outlet of the spring from depths of 4 feet and 8 feet, yielded 40.19 percent sulphur and 26.66 percent sulphur, respectively. Auger samples Nos. 111-C and 111-D, from the lower end of the meadow below the spring, showed only traces of sulphur when analyzed. A sample taken near the outlet of another sulphur spring at Location 111-7 showed only a trace of sulphur on analysis.

In conclusion, our observations indicate that, in general, sulphur springs in northeastern Alberta emerge from Devonian rocks. In Sulphur Prospecting Permit No. 111 Devonian rocks outcrop along the valley of the Firebag River for a distance of approximately 20 miles and a number of sulphur springs have been observed. In one area above the junction of the Marguerite and Firebag rivers (see Figure 1) there are numerous sulphur springs and samples of a local sulphur-marl deposit has been analyzed as having 34.86 percent sulphur and 49.08 percent sulphur. It is recommended that a more thorough exploration and sampling of this area be undertaken.

On the west side of the permit below the escarpment that forms the east side of the Athabasca River valley there are extensive swampy areas and observed sulphur springs. It is recommended that a more thorough examination of this area, extending north to the mouth of the Firebag River, should be undertaken.

The preliminary survey which we have conducted has revealed a number of sulphur springs along the Firebag River valley and there are swampy areas within the valley where sulphur accumulations could occur. It is, therefore, recommended that portions of Sulphur Prospecting Permit No. 111 which lie along the Firebag River valley downstream from the first Devonian outcrop and a wider area on the east side of the Athabasca River should be retained for further exploration.

The area recommended for retention includes the following sections, totalling approximately 23,680 acres:

Sections 8, 9, 10, 15, 16, 17, 19, 20, 21, 22, 29, 30, 31, Township 99, Range 7, W. 4 M.

Sections 25, 34, 35, 36, Township 99, Range 8, W. 4 M.

Sections 2, 3, 4, 9, 10, 16, 17, 19, 20, 30, 31, Township 100, Range 8, W. 4 M.

Sections 11, 13, 14, 23, 24, 25, 26, 35, 36, Township 100, Range 9, W. 4 M.

It is recommended that those portions of Sulphur Prospecting Permit No. 111 not listed in the preceding paragraph should be abandoned by the Company and a request made for the return of any deposits for which the Company may be eligible.

We will be pleased to submit an estimate of the cost of conducting an adequate exploration sampling program over the areas recommended for retention at such time as a complete analysis of costs and performance of the past season's operations have been completed.

This report has been prepared for the exclusive use of Canadian Superior Oil Ltd. and is not to be reproduced in whole or in part in any form without the written permission of J. C. Sproule and Associates Ltd.

[redacted]
Norman Soul, P. Geol.

[redacted]
S. R. L. Harding, P. Geol.

1009 Fourth Avenue S. W.,
Calgary 2, Alberta.
December 20, 1968.
VAF/SRLH/fc

CHEMICAL & GEOLOGICAL LABORATORIES LTD.

14240 - 115 AVENUE, EDMONTON, ALBERTA

4605 - 12th. St. N. E., Calgary 67, Alberta.

APPENDIX

Date Received: October 24th., 1968 Laboratory Report Number: C68-4216-11

Kind of Sample: Soil Date Reported: November 5th., 1968.

J. C. SPROULE & ASSOCIATES LTD.

SAMPLE NUMBER	ELEMENTAL SULPHUR (% by Weight on Dry Sample)	FIELD NOTES (By S.R.L. Harding and N. Soul)
111-1-1	33.04%	Mud in weak spring at base of oil sand cliff
111-1-2	4.55	Bituminous sand.
111-1-3	2.21	Bituminous glacial drift.
111-2	3.06	Surface coating on dolomite at sulphur (spring
111-3	45.86	Surface deposit at sulphur spring.
111-4	Trace only	Glacial clay.
111-5-1	43.00	Deposit on dolomite at sulphur spring.
111-5-2	24.06	Bottom sample in stream 40' from spring.
111-5-3	Trace	Sample at depth of 3', 40' from spring.
111-7	Trace	Mud sample at sulphur spring.
111-8-1	34.86	Surface material in sulphur-marl swamp.
111-8-2	49.08	Mossy material at depth of 3'.
111-A	40.19	Sulphur spring deposit, depth 4'.
111-B	26.66	Sulphur spring deposit, depth 8'.
111-C	Trace	Organic material, depth 4'.
111-D	Trace	Organic material, depth 8'.
111-E	Trace	Alluvium at 8'.
111-F	Trace	Alluvium at 8'.
111-G	Trace	Alluvium at 8'.

NOTES: 111-6 - Dolomite sample, not analyzed.
See Plate I for Sample Locations 111-A, B, C and D.
See Plate II for Sample Locations 111-5 and 111-6.

PLATE I

A. Aerial photograph of sulphur spring, below the escarpment of the Athabasca River valley, at the west edge of Permit No. 111. Samples 111-A and 111-B, with sulphur content, were obtained near the spring outlet in the background (Plate I-B). Samples 111-C and 111-D were taken by auger from depths of 4 feet and 8 feet in the lower part of the clearing below the spring. These latter samples showed only traces of sulphur on analysis.

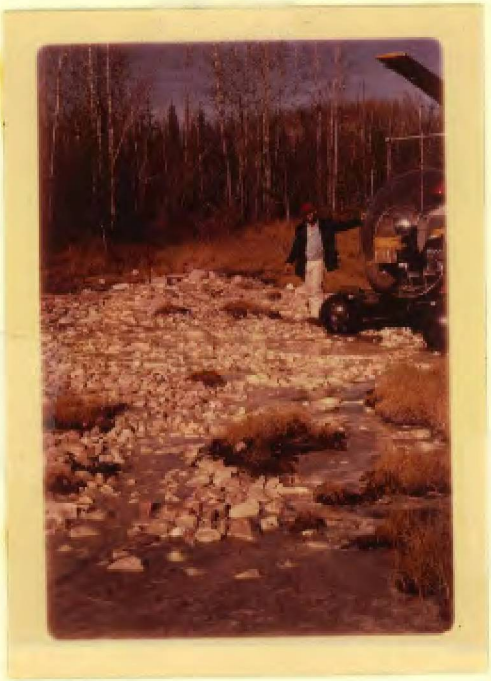
September 27, 1968

B. Close-up view of sulphur spring shown in Plate I-A, where samples 111-A and 111-B were obtained at depths of 4 feet and 8 feet. These samples analyzed 40.19% sulphur and 26.66% sulphur, respectively.

September 27, 1968

Photos by S. R. L. Harding

PLATE II



A. Sulphur springs emerge from Devonian dolomite at Sample Location 111-5. High sulphur content appears to be only in surface material.
September 24, 1968

B. Sulphur-marl deposit, estimated to be 2 or 3 feet thick at Sample Location 111-8. Sample No. 1, at surface, analyzed 34.86% sulphur. Sample No. 2, mossy material at 3 feet, analyzed 49.08% sulphur.
September 30, 1968

Photos by S. R. L. Harding

To accompany Report to Canadian Superior Oil Ltd., December 1968

R.9 | 111°15' | R.8 | R.7 W.4 | 111°00'

T.100 | 57°40' | T.99 | 57°35' | T.98 | 57°30'

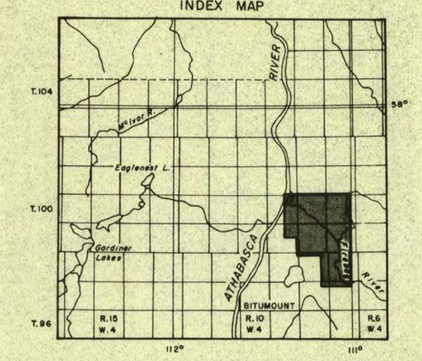
ATHABASCA RIVER
EDGE OF FIREBAG VALLEY
FIREBAG RIVER
ESCARPMENT
MARGUERITE RIVER
CHRISTINA RIVER
SAND DUNES
AREA 1
AREA 2
AREA 3
HIGH GROUND
EXTENSIVE AREA OF PINE — COVERED SANDY SOIL — NO HELICOPTER LANDINGS POSSIBLE
APPROXIMATE EDGE OF CRETACEOUS
Qal
D
K
Plate I A & I B
III-7
III-C
III-A
III-B
New Bridge on Forestry Road from Bitumount
III-6
SSp
Lst.
III-5
Plate II A
III-4
Plate II B
III-8-1 & III-8-2
III-3
III-E
III-F
III-G

LEGEND

SURFICIAL DEPOSITS
- Qal — Alluvium
- Muskeg
BEDROCK FORMATIONS
- K — Cretaceous (Undifferentiated)
- D — Devonian (Undifferentiated)

PHOTOGEOLOGICAL SYMBOLS
- Approximate erosional edge of Cretaceous
- Scarp
- Alignment interpreted to indicate faulting or fracturing in bedrock
- A — Alignment of probable geological significance
- AREA 1, 2 etc. — Areas of interest discussed in report
- III — Sulphur prospecting permit outline
- R — Rapid
- Lst. — Limestone Outcrop
- SSp — Sulphur Spring
- III-5 — Sample Location
- Area Recommended for Retention

INDEX MAP



REPRODUCTION OF THIS ILLUSTRATION, OR ANY OF THE INFORMATION ON IT, IN ANY FORM IS PROHIBITED WITHOUT THE WRITTEN AUTHORITY OF J.C. SPROULE AND ASSOCIATES LTD.

PHOTOGEOLOGICAL MOSAIC
SULPHUR PROSPECTING PERMIT
No. III

FIREBAG RIVER AREA
ALBERTA

PREPARED FOR
CANADIAN SUPERIOR OIL LTD.

Mi 1/2 0 1 2 3Mi.

APPROXIMATE SCALE IN MILES

THIS IS A SEMICONTROLLED MAP-MOSAIC AND SHOULD NOT BE MISTAKEN FOR AN ACCURATE GEOGRAPHIC BASE

J.C. SPROULE AND ASSOCIATES LTD. CALGARY, ALBERTA

FIGURE 1.

SULPHUR PROSPECTING PERMIT No. 111