

# MAR 19680133: NORTHWEST ALBERTA

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ECONOMIC MINERALS  
FILE REPORT No.

*S-AF-167(1)*

GENERAL GEOLOGY & SULPHUR PROSPECTS

OF

SULPHUR PROSPECTING PERMIT NO. 167

FOR

HERITAGE HOLDINGS LIMITED

BY

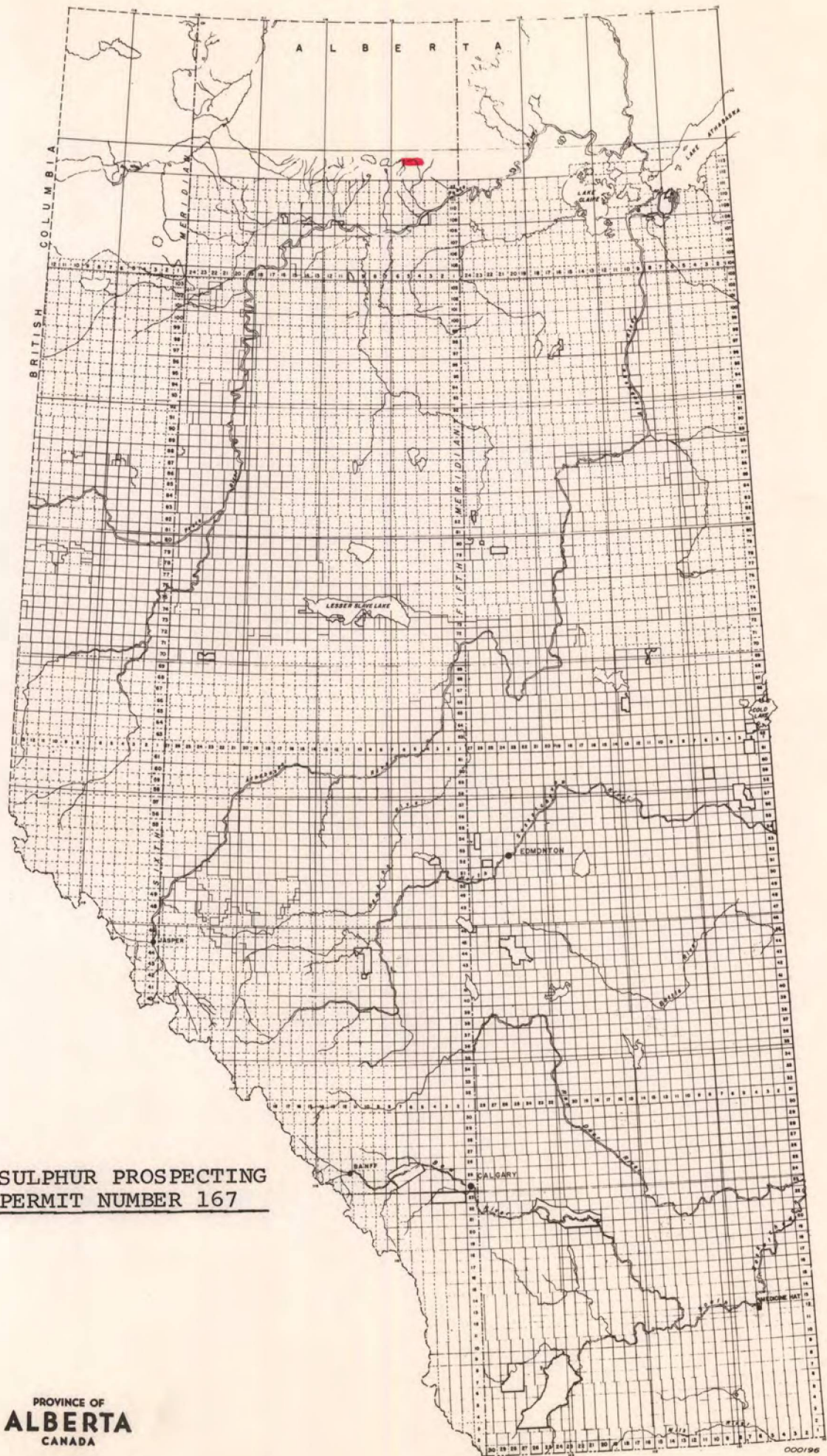
WILLIAM G. CROOK, P. GEOL.

LOCATION AND ACCESS

Sulphur Prospecting Permit Number 167 is located in Township 114, Ranges 4 and 5, West of the Fifth Meridian. This is in northwest Alberta, 335 miles north of Edmonton, 95 miles south of the Northwest Territories-Alberta border and 175 miles east of the British Columbia-Alberta border.

The Permit can be reached by car from Peace River via the MacKenzie Highway to High Level, then east on a secondary road to Fort Vermilion. From here several seismic roads and wellsite access roads lead east to the area of the Permit. These latter roads can only be used during the winter months when the ground is frozen.

A float-equipped aircraft can land on the lakes in the north part of the Permit.



**SULPHUR PROSPECTING  
PERMIT NUMBER 167**



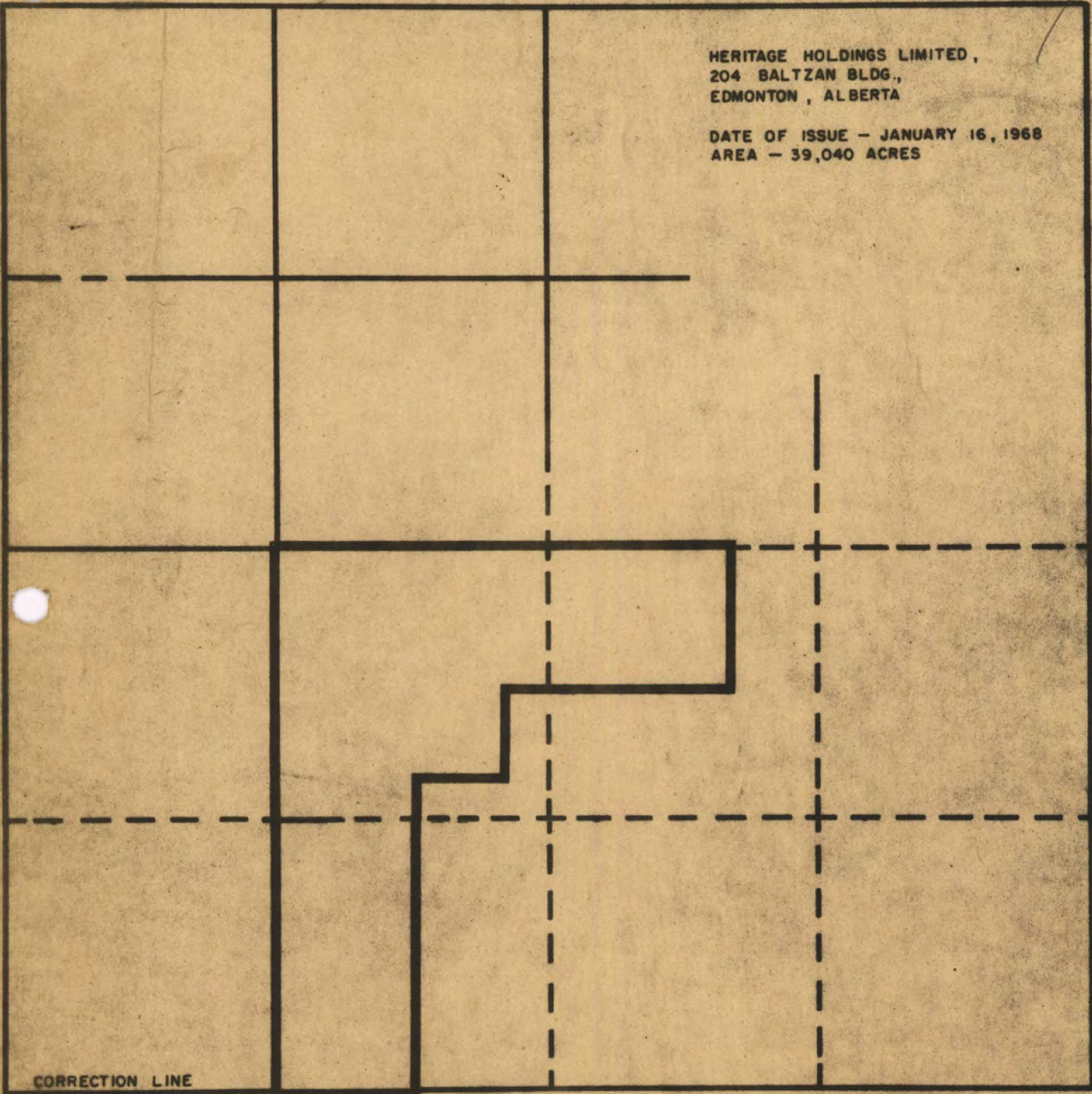
PROVINCE OF  
**ALBERTA**  
CANADA

# SULPHUR PROSPECTING PERMIT No. 107

HERITAGE HOLDINGS LIMITED,  
204 BALTZAN BLDG.,  
EDMONTON, ALBERTA

DATE OF ISSUE - JANUARY 16, 1968  
AREA - 39,040 ACRES

*Miller  
107*



CORRECTION LINE

R. 15

R. 14

R. 13 W. 5 M.

TP. 104

TP. 103

STRATIGRAPHY

The sedimentary section under Sulphur Permit Number 167 is about 5,000 feet thick, and the Devonian and Cretaceous systems are represented. There are four large unconformities in the section. They are, from older to younger:

1. Between the Pre-Cambrian Basement and the Middle Devonian.
2. Between the Middle Devonian and the Upper Devonian.
3. Between the Upper Devonian and the Cretaceous.
4. Between the Cretaceous and the Tertiary.

The discussion of the stratigraphy will be based on the section as found at Crusade Dynamic Caribou 7-8-113-5-W.5. This well was drilled to the Red Beds.

DEVONIAN

The Devonian is about 2,760 feet thick and both Middle and Upper Devonian are present.

MIDDLE DEVONIAN

The Middle Devonian is 1,490 feet thick and may be assigned to the Elk Point Group.

ELK POINT GROUP

The Elk Point is divided into five formations, viz- Red Beds, Chinchaga, Keg River, Muskeg and Watt Mountain.

RED BEDS FORMATION

The Red Beds are about 340 feet thick and consist of orange and red (rarely green and brown) anhydrite, marl and dolomite. Salt casts are common. The Granite Wash sandstone often occurs at the base of the Red Beds, and where present is a fine to coarse grained arkosic sandstone.

CHINCHAGA FORMATION

The Chinchaga is about 185 feet thick and is composed of brown, dense, anhydrite with thin beds of brown microgranular to granular dolomite.

KEG RIVER FORMATION

The Keg River is 115 feet thick and consists of brown, medium crystalline dolomite with some intercrystalline and vuggy porosity.

MUSKEG FORMATION

The Muskeg is 810 feet thick and consist of light brown to white, massive anhydrite, with thin beds of fine crystalline evaporitic dolomite.

WATT MOUNTAIN FORMATION

The Watt Mountain is 40 feet thick and consists of green, black and brown, waxy shale, with some anhydrite and dolomite.

UPPER DEVONIAN

The Upper Devonian is 1,280 feet thick and the following units are present, in ascending order - Slave Point and Shale Unit.

SLAVE POINT

The Slave Point is 148 feet thick and consists of an upper 62 feet of brown, granular to crystalline, fossiliferous limestone; and a lower 86 feet of white to brown, massive anhydrite with some gray to buff, evaporitic dolomite (Fort Vermilion member).

SHALE UNIT

The Shale Unit is about 1,130 feet thick and consists of green and brown, calcareous, splintery shale. The shale is



often silty and thin beds of light gray-brown limestone are common near the base of the unit. The Shale Unit correlates with the Beaverhill Lake and the Hay River Shale.

### CRETACEOUS

The Cretaceous section is about 2,300 feet thick at Crusade Dynamic Caribou 7-8 and both Lower and Upper Cretaceous units are present.

#### LOWER CRETACEOUS

The Lower Cretaceous is 1,230 feet thick and consists of the Spirit River and Peace River formations. The Spirit River is about 1,150 feet thick and consists of gray, sandy, chunky shale with thin beds and stringers of sandstone. The Peace River is about 80 feet thick and consists of the Cadotte Sand which is 60 feet thick and the Harmon Shale which is about 20 feet thick.

#### UPPER CRETACEOUS

The Upper Cretaceous is about 1,000 feet thick and consists of the Shaftesbury Shale (700 feet thick) and the Dunvegan formation ( 300 feet thick ) which consists of interbedded sandstone and shale.

PLEISTOCENE

A layer of sand, gravel, clay and till of glacial origin lies on the surface of the Permit. It has a variable thickness but should not exceed 60 feet.

## SOURCES OF SULPHUR

The sulphur bearing horizons under the Permit may be classed as follows:

### CRETACEOUS

The writer has examined the Cretaceous shales in nearby outcrops and without exception the outcrops do contain small amounts of sulphur, plus greater amounts of selenite and ironstone concretions. However, these sulphur beds are so thin (maximum one-eighth of a inch thick) that they are of no commercial value. Usually the sulphur consists of yellow streaks on the shale.

### DEVONIAN

Some minor traces of elemental sulphur has been noted in the Grosmont reef (D-2) in the Red Earth Oil Field 165 miles to the south, but no sulphur has been reported in well cuttings from tests near this permit.

### SULPHUR WATER

The porous horizons within the Devonian often contain salty sulphur water. At the moment there is no commercial method of extracting the sulphur from the water but, undoubtedly such an extraction process will be developed in the future.

In conclusion it can be briefly stated that the prospects of finding elemental sulphur in commercial quantities under the Permit are very remote. Therefore, it is my recommendation that the Permit be dropped.

Respectfully submitted by:



WILLIAM G. CROOK, P. GEOL.

WGC/jp