# MAR 19680097: NORTH CENTRAL ALBERTA

Received date: Dec 31, 1968

Public release date: Jan 01, 1970

# GENERAL GEOLOGY & SULPHUR PROSPECTS

OF

SULPHUR PROSPECTING PERMIT NO. 107

FOR

HERITAGE HOLDINGS LIMITED

BY

WILLIAM G. CROOK, P. GEOL.

## LOCATION AND ACCESS

Sulphur Prospecting Permit Number 107 is located in Townships 103 and 104, Ranges 14 and 15, West of the Fifth Meridian. This is in north central Alberta, 260 miles north of Edmonton, 125 miles south of the Northwest Territories-Alberta border, and 125 miles east of the British Columbia-Alberta border. The village of Fort Vermilion is twenty miles to the northwest.

The Permit may be reached by car from Peace River via the MacKenzie Highway to High Level and then east on a good road to Fort Vermilion. From Fort Vermilion, a fair road leads south to the settlement of La Crete. The condition of this latter road is quite variable and is often impassable after a heavy rain.

The closest production comes from the Red Earth Oil Field 100 miles to the south.

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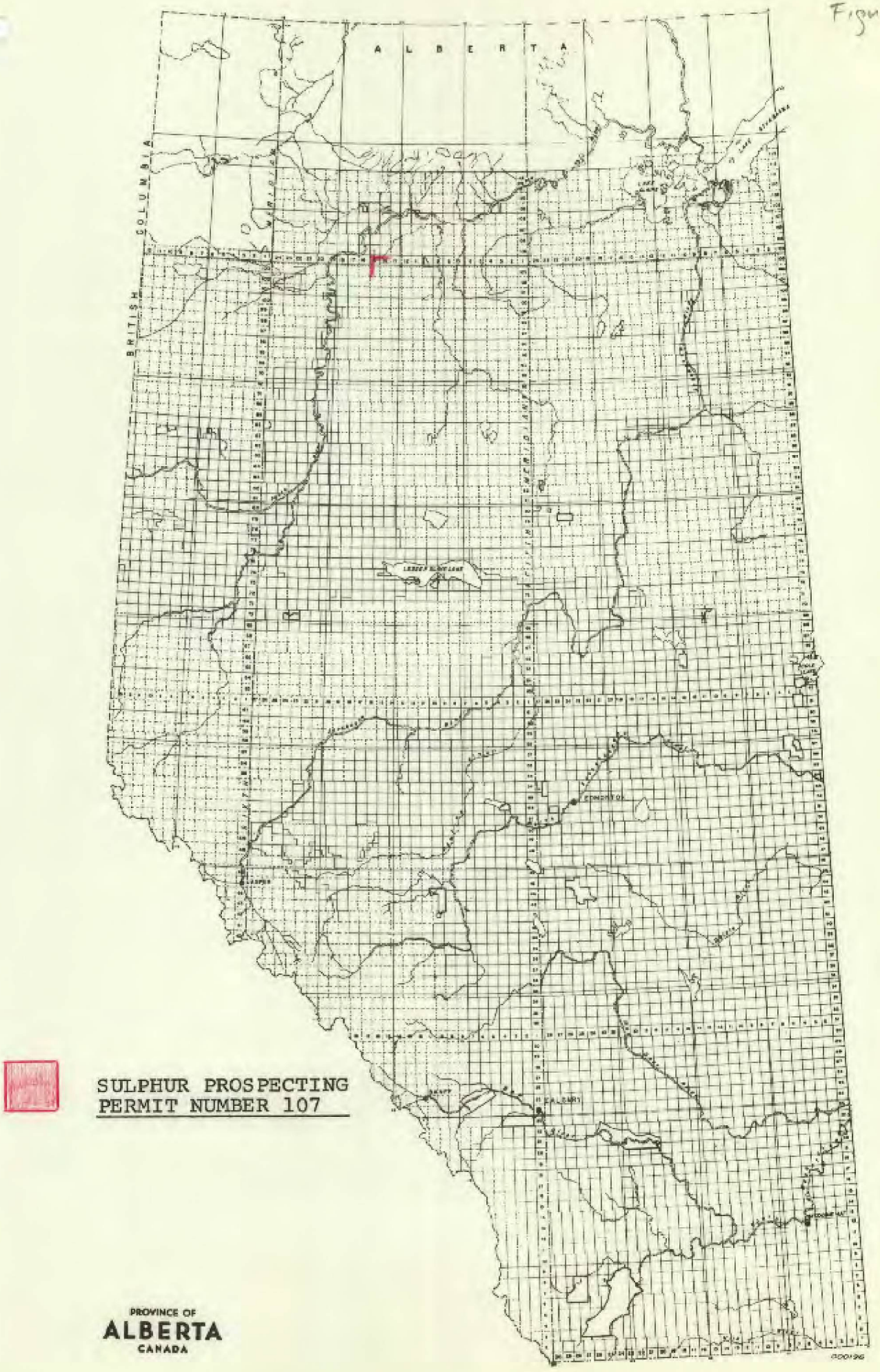
Figure 1




SULPHUR PROSPECTING
PERMIT NUMBER 107

PROVINCE OF
ALBERTA
CANADA

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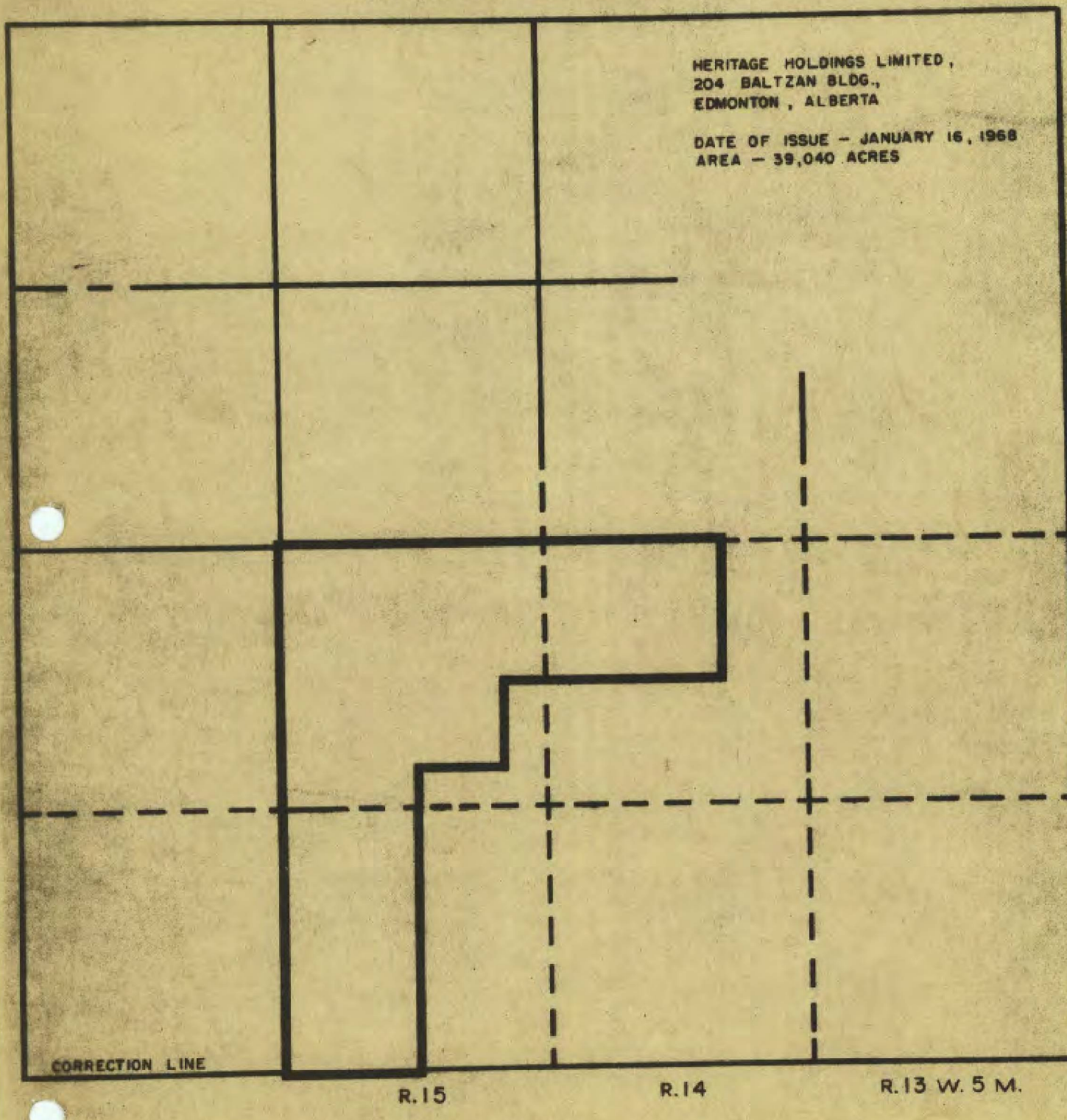

## STRATIGRAPHY

The sedimentary section under Sulphur Permit Number 107 is about 4,255 feet thick and the Devonian, Cretaceous and Tertiary systems are represented. At least four major unconformities are present in the section. They are, from older to younger:

1. Between the PreCambrian 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 T.G.T. A-1 La Crete 10-18-106-15-W.5. This well was drilled to the Keg River formation in 1960 and is located nine miles north of the Permit. Published reports will be used for information on formations between the Keg River and Basement.

## DEVONIAN

The Devonian sediments are about 3,800 feet thick and both Middle and Upper Devonian units are present.

### MIDDLE DEVONIAN - ELK POINT GROUP

The Middle Devonian sediments (Elk Point Group) are about 1,200 feet thick and are divided into the Red Beds, Chinchaga, Keg River, Muskeg and Watt Mountain Formations.

#### RED BEDS

The Red Beds are about 100 feet thick and consist of pink, reddish brown, brown and white anhydrite and dolomitic anhydrite; interbedded with reddish brown, dolomitic marl.

#### CHINCHAGA FORMATION

The Chinchaga is about 150 feet thick and consists of light gray to brown anhydrite, with minor amounts of brown to gray cryptocrystalline dolomite. Salt casts are common.

#### KEG RIVER FORMATION

The Keg River is 250 feet thick and consists of dark brown to gray, microcrystalline, partly porous dolomite; and brown, partly argillaceous, fossiliferous limestone.

MUSKEG FORMATION

The Muskeg is 675 feet thick and consists of white, gray and brown anhydrite; salt; crystalline dolomite; and cryptocrystalline to microfragmental limestone.

WATT MOUNTAIN FORMATION

The Watt Mountain is 25 feet thick and consists of varicolored shales; shaly siltstone and sandstone and some breccia.

UPPER DEVONIAN

The Upper Devonian is 2,600 feet thick and is comprised of the Fort Vermilion, Slave Point, Shale Unit, Silty Limestone Unit and Wabamun formations.

FORT VERMILION FORMATION

The Fort Vermilion is 80 feet thick and consists of brown to white, massive anhydrite.

SLAVE POINT FORMATION

The Slave Point is 196 feet thick and consists of light brown to gray, microcrystalline to microfragmental, partly dolomitic limestone. Traces of porosity have been noted in the section.

SHALE UNIT

The Shale Unit is 1,529 feet thick and consists of gray to green, calcareous, splintery to fissile shale.

SILTY LIMESTONE UNIT

The Silty Limestone Unit is 684 feet thick and consists of gray to pale yellow-brown, cryptocrystalline, very silty limestone.

WABAMUN FORMATION

The Wabamun is about 365 feet thick under the Permit and consists of gray to yellow-brown, fragmental to crystalline limestone.

## CRETACEOUS

The Cretaceous sediments are about 1,400 feet thick under the Permit and are confined to the Lower Cretaceous. The section correlates with the Spirit River formation of the Peace River (town) area, and consists of gray, silty to sandy, partly calcareous shale. A shaly sandstone bed at the base of the Cretaceous may correlate with the Gething formation.

## TERTIARY

### PLEISTOCENE

A layer of sand, gravel, clay and till lies on the surface of the Permit. This layer has a variable thickness, but should not exceed 150 feet in the vicinity of the Permit.

## 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 slty sulphur water. At the moment there is no commerical 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:

[redacted]

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