

# MAR 19660009: ERNESTINA LAKE

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19660009

ECONOMIC MINERALS

FILE REPORT No.


POJ-AF-005(2)

POTASH OCCURRENCE IN ALBERTA

ERNESTINA LAKE AREA

Prepared for

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POTASH OCCURRENCE IN ALBERTA  
ERNESTINA LAKE AREA

Calgary, Alberta,  
February 28, 1966.

General

The economical production of potash over a large area of Saskatchewan has recently widened the search of this mineral into Manitoba and North Dakota. The identical geological stratigraphic sequence and depositional environment that resulted in potash deposition in Saskatchewan is also present in a portion of Alberta.

A detailed study of this portion of Alberta showed the presence of small, irregular veinlets of potassium minerals in the Lesser Slave Lake Area of Northern Alberta and a substantial quantity of carnallite ( $KCl \cdot MgCl_2 \cdot 6 H_2O$ ) and possibly sylvite ( $KCl$ ) in the Vermilion area in the East Central Plains of Alberta. Literature made available from the Alberta Conservation Board, the Dominion Government on the initial well, corroborates this potash occurrence in Alberta. The cores from the well, containing the carnallite have been lost and dispersed since the well was drilled in 1944-45.

Geology

The potash minerals in the VCO #15 well in Lsd. 6, Sec. 12, Twp. 49, Rge. 6 W4 are found in the Prairie Evaporite section of the Middle Devonian Elk Point Basin. The carnallite and the pinkish potash mineral mentioned in the enclosed literature, lies on top of a thick 400 foot section of common salt (halite). A thickness of twelve feet of carnallite

was reported to be present in this well and the pinkish and greyish mineral, in all probability sylvite, occurs through the first 80 feet of the Prairie Evaporite. Potash occurs over the upper 150 feet at Esterhazy and in the Saskatoon area. The cores from the VCO #15 well were exposed for weeks to the atmosphere and transported long distances before being spot analyzed. Because of these two conditions and the very high solubility of sylvite, a true and accurate analysis was probably not ascertained.

The potash minerals in the VCO #15 well are of the same composition and depositional sequence and depth as the potash at Unity, Saskatchewan. The Unity potash deposits are reported to be in the formational stages of economical mining. It is feasibly possible that the potash in VCO #15 and Unity are one large deposit. On the accompanying cross-section, it is shown that possible potash beds exist in the Ernestina Lake area. Carnallite is recorded twice in the sample descriptions in the Cold Lake and Lotsberg salt sequences of the Elk Point which are not present in Saskatchewan. A possible potash bed occurs at 2600 feet in the Prairie Evaporite which could be an extension of the Unity or VCO #15 deposit. The lower deposits are separate but occur at 3500 feet which is the same depth as the Saskatoon deposits.

In the Fort McMurray area, the overburden and geological strata overlying the potash deposits become less. This thinning has allowed subsurface waters to percolate throughout the highly soluble potassium salts and removing them by solution and leaching. This solution by waters also caused areas of salt collapse in this vicinity. To the northwest, the salt section becomes more anhydritic and potash was not deposited. Further to the northwest, the section becomes carbonate in the Rainbow Lake Area. South of

the VCO #15 well, in the deeper portion of the Elk Point Basin and beyond its southern synclinal edge, deep wells reveal no trace of potash.

#### Recommendations

- (1) Land for potash production should be acquired over an area encircling the Ernestina Lake well.
- (2) If possible, the Petroleum and Natural Gas rights should also be obtained. Ernestina Lake is in the heavy oil sand area.
- (3) Protection acreage should be obtained in the vicinity of the V. C. O. or Vermilion deposit.

#### Conclusions

1. The geological strata and basinal effects of the Vermilion area are closely related to the potash rich areas of Esterhazy, Saskatoon and Unity. This is shown on the enclosed cross-section.
2. Oil and gas reservoirs in the area could provide economical energy sources for developing potash by solution.
3. Economics for the production of potash appear very favorable in this area. The depth is such that either solution mining or shafting could be carried out. Developing markets in Japan and other Asian countries, could make the area competitive with Saskatchewan potash.
4. The area is probably of the same potential as the Unity potash.
5. More potash than originally recorded may be present, as much leaching and solution loss took place by inadequate coring knowledge and loss of cores in 1945. In the Saskatchewan potash areas, sylvite is always associated with carnallite. It is believed that the pinkish mineral mentioned throughout the core description in the VCO #15 well is primarily sylvite.

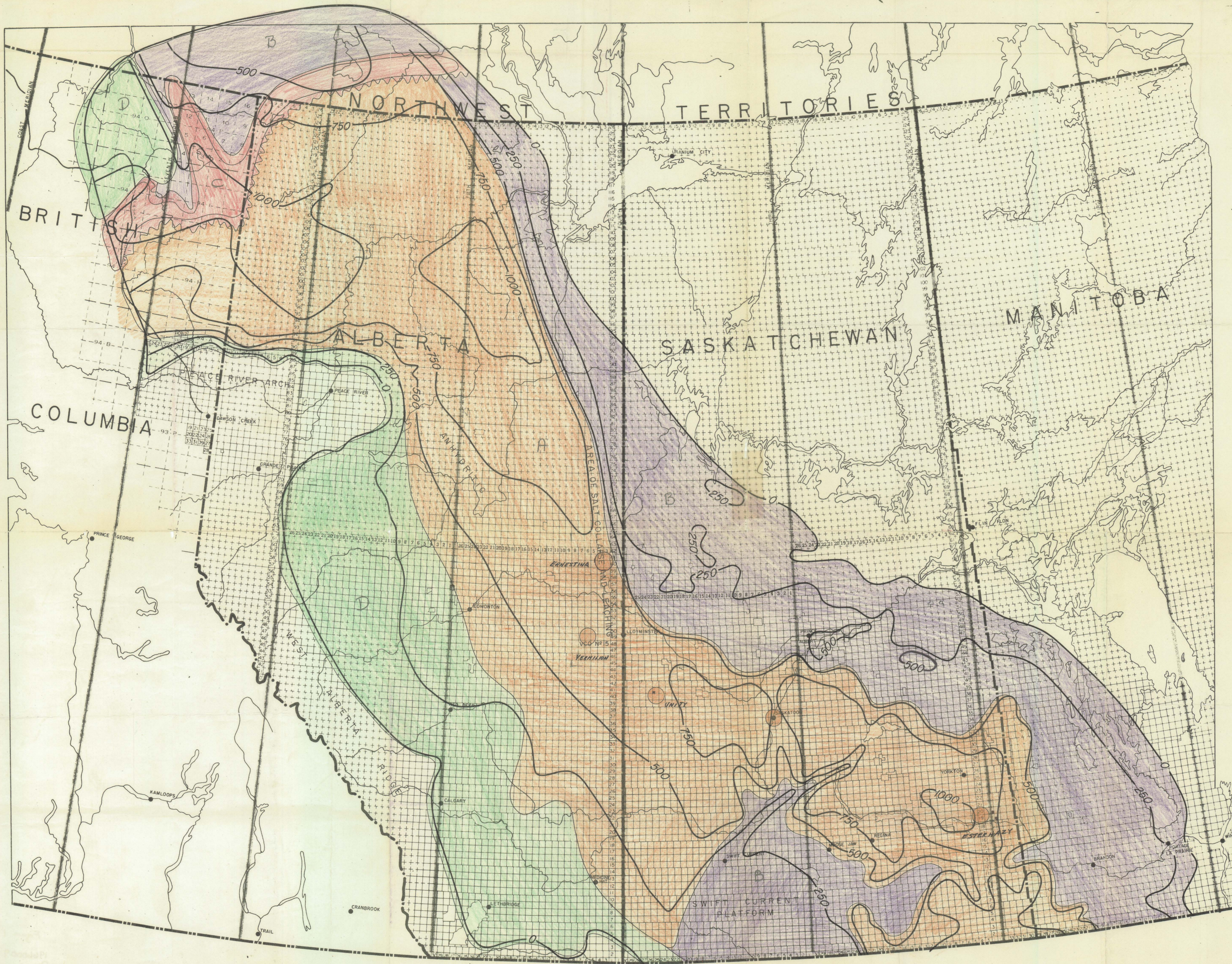
Enclosures

1. Map of Elk Point Isopach ✓ - Figure 1
2. Cross-section of Potash Producing Areas Figure 2 (missing)
3. Literature from Alberta Conservation Board
4. Copy of Alberta Potash Regulations

References

1. Potash in Saskatchewan - Dept. of Mines, Saskatchewan
2. Economic Geology (Ries)
3. Tomkins R. (1955)
4. A.S.P.G. Atlas - (1965)
5. Reference Literature Alberta Conservation Board.

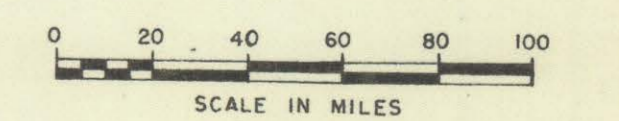
Al. Golden



**LEGEND**

- A EVAPORITES (Potash, Anhydrites, Salt etc.)
- B CARBONATES (Limestone, Dolomite)
- C REEF
- D CLASTIC (Shale, Sand etc.)

**WESTERN CANADA**



**MIDDLE DEVONIAN  
UPPER ELK POINT**

ISOPACH OF ELK POINT

CONTOUR INTERVAL 250'

AL GOLDEN  
E. A. BROWNLESS, P. GEOL.  
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Figure 1