

MAR 19680110: LITTLE RED RIVER

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GEOLOGICAL REPORT OF SULPHUR PROSPECTING PERMIT NO. 129

By Mr. C.E. Dolan

During the fall of 1967 widespread deposits of native sulphur were discovered along both sides of the Peace River near Fort Vermilion. Sulphur permit no. 129 was acquired in January, 1968, and requires the permittee to make a geological study, and if warranted, to undertake a drilling and trenching program.

Location and Access

Sulphur permit no. 129 is located six miles south of the Peace River at Little Red River Post and may be reached via the Peace River or winter roads from Fort Vermilion, a distance of about 50 miles. Access to the permit is most convenient by helicopter.

Land Position

Sulphur permit no. 129 comprises 5,120 acres, being sections 19 to 22 and 27 to 30 inclusive, township 107, range 4 west of the 5th meridian. The permit is bounded on the north by permit no. 14 held by Shell Canada Limited; on the east by permit no. 47 held by Abatis Exploration; on the south by permit no. 29 held by Western Land Services Ltd.; and on the west by permit no. 36 held by Omega Hydrocarbons Ltd.

GENERAL GEOLOGY

The following account of the general geology of the area is abridged from a Geological Survey of Canada report. Upper Devonian rocks about 140 feet thick are discontinuously exposed along the northwest and southeast banks of the Peace River for seven miles above the Mikkwa River. These consist of an exposed thickness of 54 feet of the Grosmont Formation consisting mostly of reefal and vuggy dolomite below an erosional unconformity.

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Below the Grosmont formation are 87 feet of the Mikkwa formation. These consist of upper argillaceous limestone, mottled grey, green and red, and a lower unit of dolomite, limestone, and argillaceous limestone. Considerably greater thicknesses of these formations have been found in the subsurface nearby. The Devonian strata strike N 25 degrees W and dip about 23 feet per mile to the southwest. Numerous minor flexures in the outcrops show considerable variations from this dip.

Strata of the lower Cretaceous Loon River formation consisting mostly of shale are present several miles southwest of the mouth of the Mikka River. Much of the bedrock in other parts of the area is covered by drift of unknown thicknesses.

PHOTOGRAPHIC INTERPRETATIONS

Aerial photographs covering permit no. 129 were studied stereoscopically and compared with photos covering the known sulphur deposits on permit no.s 8 and 20. A mosaic of permit no. 129 is included. Permit no. 129 is crossed by several small streams with muskeg adjacent to them. Between the streams are tree-covered areas and slightly higher ground. No prominent linear features are present, nor were any cliffs observed where bedrock outcrops might be expected. The permit area is apparently covered by glacial drift to a depth of 50 feet or more. No spring deposits of the type observed near Lambert Creek were noted. In other sulphurous areas, the vegetation has been stunted or killed, but in permit no. 129, the tree cover is continuous except for some of the muskeg.

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ECONOMIC GEOLOGY

Although many reports of the sulphur occurrences are fragmentary and conflicting, the picture that emerges is that native sulphur has been deposited at the surface of the ground from ^cold sulphur springs close to the cretaceous- Devonian contact in northern Alberta on both sides of the Peace River. The flow of formation fluids from vast areas of sedimentary basins is north and northeast of this region, and the cold sulphur springs might well have their source in deep-seated formation waters. Any sulphur-carrying formation waters might be expected in this area to follow an impervious layer such as the overlying Cretaceous rocks and to deposit it at the surface near the contact. Such deposits would probably be limited in size because of the time available for their deposition since the retreat of the glacier.

Other sulphur deposits have been found in northern Alberta in the Lower Cretaceous reaches away from the Devonian-Cretaceous contact, but an explanation of their origin is lacking at this time. Permit no. 129 lies north of the divide separating tributaries of the Mikka River from Harper Creek. Hence, it does not appear to have favorable topography for the occurrence of springs capable of depositing sulphur in economic quantities.

Conclusions

Although permit no. 129 is well-located with respect to the Devonian-Cretaceous contact, a feature apparently having some affect on the location of sulphur deposits in northern Alberta, the absence of springs and the limited vegetation suggest sulphur is not present in economic quantities. The

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topography does not appear to be favorable for springs of the type consistent with sulphur deposits discovered elsewhere in the general area. Although sulphur may be present in the area, the evidence produced by the geological interpretation presented above is not sufficiently encouraging to warrant expenditures in further investigation of the permit.

SULPHUR PROSPECTING PERMIT No. 129

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TP. 107

TP. 106

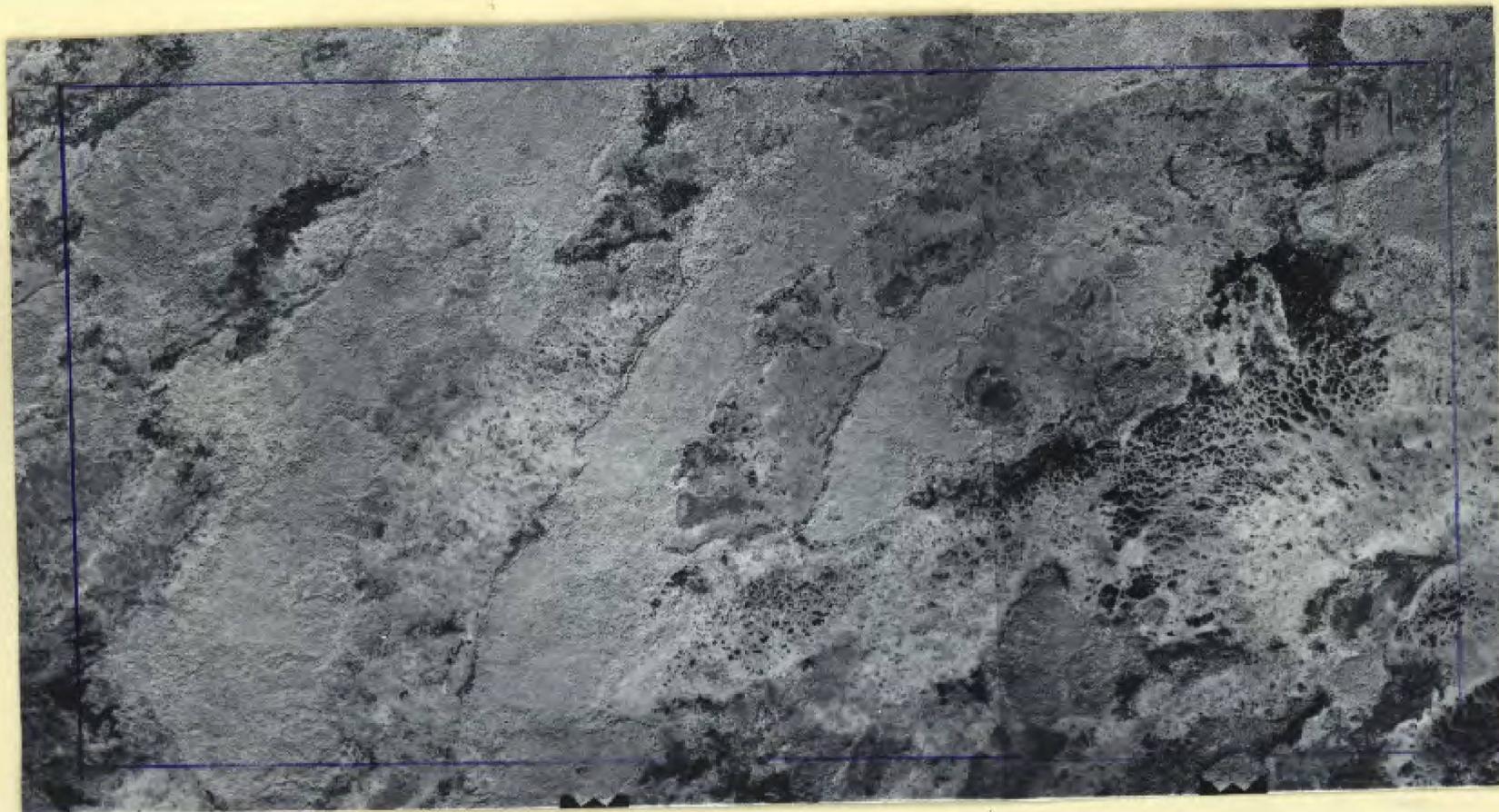
R. 4

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Figure 1

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Scale: 1" = $\frac{1}{2}$ mile.

Aerial Photograph of Sulphur Prospecting Permit No. 129.