

MAR 19680066: NORTHEASTERN ALBERTA

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ECONOMIC MINERALS
FILE REPORT No.
S-AF-071(1)

LINEAMENT STUDY
and
TERRAIN ANALYSIS
of
SULPHUR PROSPECTING PERMIT
NO. 71 *19680066*

Prepared for
WORLDWIDE ENERGY COMPANY LTD.



October, 1968.

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Materials to Accompany This Report :

Mosaic, with lineament study overlay, scale 2" = 1 mile.

Terrain Analysis Map, scale 2" = 1 mile.

*in map
cabinet*

INTRODUCTION

This study was undertaken for the purpose of delineating criteria that might indicate potential areas of sulphur occurrence.

A lineament study was completed covering an area of approximately 198 square miles over and adjoining Sulphur Prospecting Permit No. 71 in northeastern Alberta. A regional analysis of the lineaments is presented as an overlay to an air photo mosaic.

A stereoscopic examination of the air photographs covering the permit area was made to determine terrain and vegetation distribution. The results are presented as a hand colored map at a scale of two inches equals one mile.

It is recommended that field work be undertaken to test for the presence of significant quantities of sulphur in the most favourable portions of Sulphur Prospecting Permit No. 71.

LOCATION AND ACCESS

Sulphur Prospecting Permit No. 71 is located approximately 65 miles southeast of Fort Vermilion, Alberta, and one to two miles east of the Wabasca River.

The permit is in : Township 100, Range 8, W5M
 Township 99, Range 8, W5M
and in portions of : Township 100, Range 9, W5M
 Township 99, Range 9, W5M

The permit area can be reached by road and seismic lines from Fort Vermilion or by helicopter. Fixed wing plane landings can be made either on Wadlin Lake or on the Wadlin forestry airstrip.

PHYSIOGRAPHY AND REGIONAL GEOLOGY

The project area lies within the Great Plains Physiographic Province, approximately 140 miles west of the Precambrian Shield. It is primarily muskeg terrain that drains gently northward into the Mikkwa River. The southern portion is drained by Senex Creek flowing northwesterly into the Wabasca River, which lies immediately west of the permit area. These latter two streams have rather steep banks that range from 50 to 80 feet in height. The maximum relief on this permit is approximately 100 feet. Wadlin and Talbot Lakes and the Buffalo Head Hills lie to the west of the Wabasca River.

Norris (1963) outlines and discusses the geology along the Peace River, while the Geological Survey of Canada Map 1161A shows the extent of mapping along the Wabasca River. Lower Cretaceous exposures of shale and sandy shale are present on the banks of the Wabasca River. To the east, these Lower Cretaceous rocks overlie the Mikkwa Formation of Devonian age. The region is covered by glacial drift that was deposited by ice moving approximately southwest, as indicated by numerous glacial grooves or flutings in the Vermilion Chutes area.

PHOTOGRAPHY AND MAP COMPILATION

Stereoscopic, infrared air photographs taken for the Alberta Government in 1963 were used in this study. These air photographs were taken with a camera equipped with a six inch focal length lens and at an altitude above terrain of approximately 15,840 feet, resulting in a photograph scale of 1:31,680.

An uncontrolled, stapled mosaic was prepared of the permit area (plus a three mile border area) at a scale of one inch equals one-half mile (1:31,680). The mosaic was constructed by carefully matching topographic detail and vegetation features on alternate air photographs, along east-west flight lines. Federal Government 1:250,000 scale topographic maps and Alberta Department of Lands and Forests 1:63,360 scale planimetric maps were used for control. Due to the deviations from scheduled flight height, the scale of the air photographs was not consistent, thus inaccuracies in comparison to the planimetric base map can occur.

The terrain analysis map was prepared by transferring data, annotated on the air photographs during a stereoscopic study, to a Permascale base using the mosaic for control. Ozalid prints of this Permascale map were then hand colored.

Lineaments were annotated on a transparent overlay of the mosaic. These lineaments were compiled by :

- (a) direct transfer from the air photographs at the time of the stereoscopic study, and
- (b) study of the mosaic itself, under high intensity oblique lighting.

After a discussion with the client, certain other details were added to the overlay to help interpret the results of the terrain analysis and the lineament studies .

TERRAIN ANALYSIS

As indicated in the vegetation categories (opposite), vegetation has been grouped into eight categories. The categories can be identified on aerial photographs by tonal patterns, topography, and by tree heights. The symbol indicating vegetation cover is representative of the dominant vegetation in that area. For example: an area shown as primarily tall trees may contain smaller trees and brush, but the dominant trees will be tall aspen, spruce or pine. Similarly, scattered groves of spruce and deciduous trees may be found in areas designated as muskeg.

Muskeg areas (comprising 30% to 40% of the permit area) have been subdivided into four separate categories to aid in determining the relationship, if any, between open clearings and the occurrence of sulphur.

VEGETATION CATEGORIES



Muskeg or open bog: few bushes, low vegetation, low relief, water table at surface.



Muskeg with scattered tall trees: minor stands of trees, many bushes, low relief, water table at or near surface.



Muskeg or swampy drainage: low dense bushes present in a broad gentle drainage channel, water table at or near surface.



Dense bushes - probably muskeg: moderate to low relief, fair to poor drainage, dense bushes and trees grow up to 20 feet high.



Scattered groves of trees, moderately stocked with bushes: moderate to low relief, fair to poor drainage, trees grow up to 40 feet high.



Undifferentiated vegetation associated with river bottomlands: the cover ranges from muskeg to tall trees.



Trees of medium height: moderate relief and drainage, trees grow up to 40 feet high, generally fully stocked.



Tall trees: trees average over 40 feet in height, generally fully stocked, moderate to good drainage.

LINEAMENT STUDY

The air photo mosaic was studied under high intensity oblique lighting and lineaments observed were annotated directly onto the mosaic. These lineaments were then transferred to an overlay on which was also annotated any additional lineaments resulting from the terrain analysis study.

Most of Sulphur Prospecting Permit No. 71 is covered by low lineament density that can be related to glacial grooving. Some lineaments in the northern and western regions are, however, transverse to the main trend of glaciation.

SUMMARY AND CONCLUSIONS

It is postulated that if sulphur is present in large amounts, it may be recognizable on air photographs by the lack of vegetation and generally dry terrain. Only one dry clearing was observed in the permit area; this was in the better drained region to the south.


Since major subsurface faults may provide surface escape routes for sour gas or for elemental sulphur, areas of high lineament density are significant in the search for concentrations of sulphur at or near surface.


In the northern two-thirds of the permit area, the drainage and many of the lineaments coincide with the approximate direction of the last period of glaciation. However, some of the lineaments may be an expression of northeasterly trending faults. For example, there is a series of lineaments trending approximately northeast in the centre of the permit area, north of the height of land, that may be related to a series of small faults from one-half to two and one-half miles long. These lineaments are shorter than many of those in other parts of the permit area; they are also very evident under the stereoscope as a definite break in the trees and thus are vegetation lineaments.

RECOMMENDATIONS

On the basis of the terrain analysis study, the lineament study, and information on sulphur sampling provided by the client, it is recommended that field work be undertaken on Sulphur Prospecting Permit No. 71. Hand and auger sampling for sulphur should be carried out on the drier ground over and surrounding the series of lineaments in the centre of the permit area and over the one dry clearing in the southwest.

Respectfully submitted,
GEOPHOTO SERVICES, LTD.


Robert Smith


Eric J. Hooke

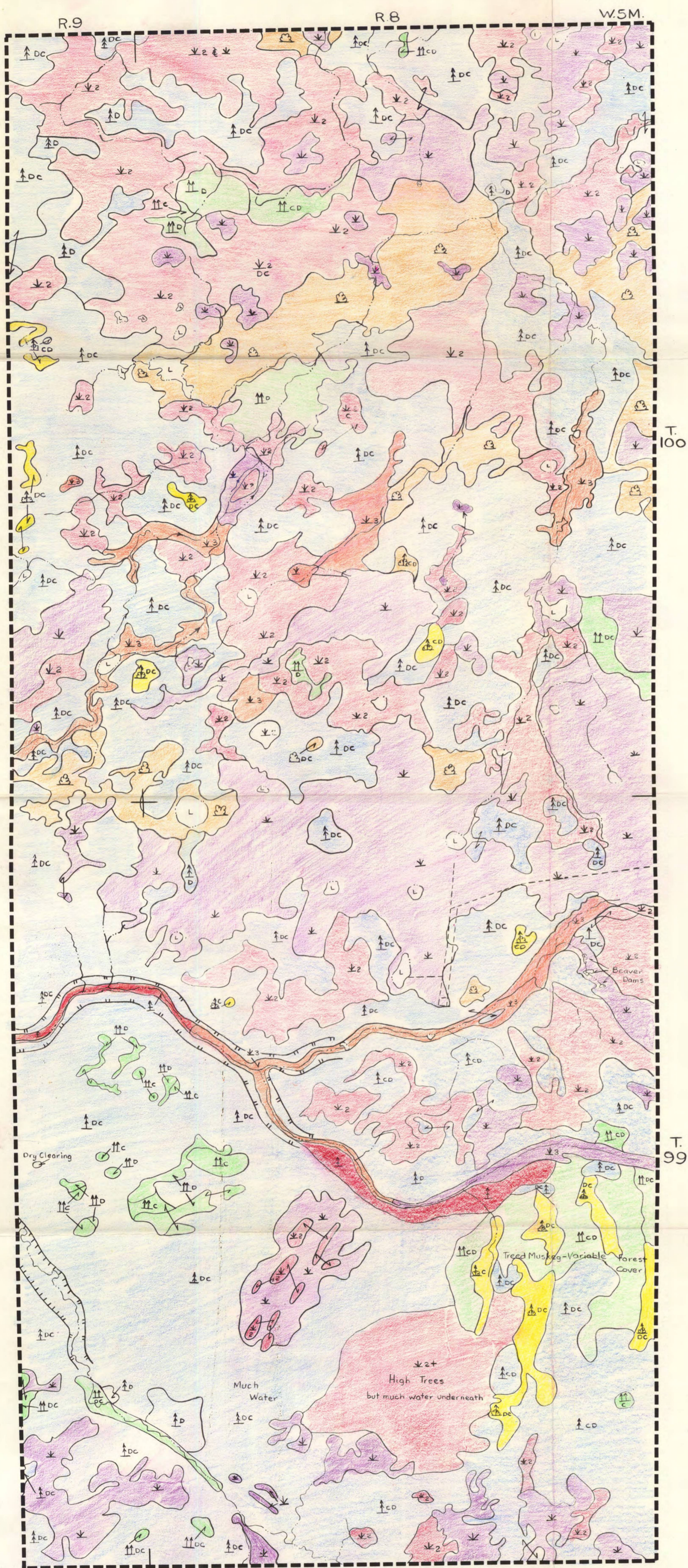
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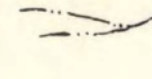
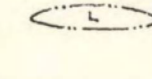
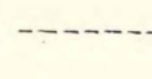





TERRAIN ANALYSIS
of
PERMIT AREA NO. 71
ALBERTA.



Scale
1 inch = 1/2 mile (1:31,680)

LEGEND

-  Muskeg or open bog: few bushes, low vegetation, low relief, water table at surface.
-  Muskeg with scattered tall trees: minor stands of trees, many bushes, low relief, water table at or near surface.
-  Muskeg or swampy drainage: low dense bushes present in a broad gentle drainage channel, water table at or near surface.
-  Dense bushes - probably muskeg: moderate to low relief, fair to poor drainage, dense bushes and trees grow up to 20 feet high.
-  Scattered groves of trees, moderately stocked with bushes: moderate to low relief, fair to poor drainage, trees grow up to 40 feet high.
-  Undifferentiated vegetation associated with river bottomlands: the cover ranges from muskeg to tall trees.
-  Trees of medium height: moderate relief and drainage, trees grow up to 40 feet high, generally fully stocked.
-  Tall trees: trees average over 40 feet in height, generally fully stocked, moderate to good drainage.
-  Moderate escarpment 15 - 50 feet.
-  Prominent escarpment over 50 feet.
-  Stream or river.
-  Lake or pond.
-  Seismic line.
-  Deciduous trees.
-  Coniferous trees.
-  Mixed conifers and deciduous (First letter indicates predominant type).

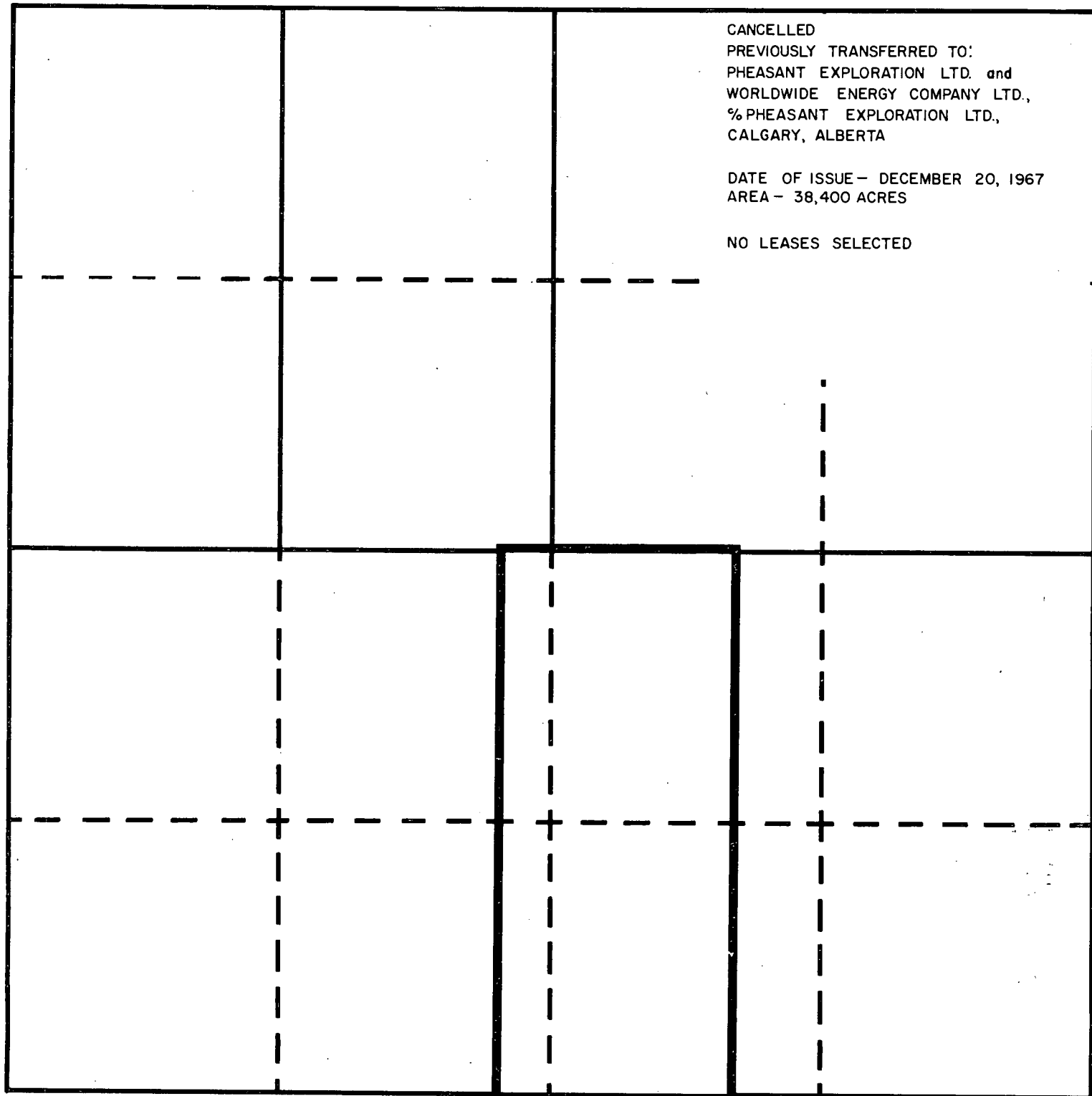
1968 0066

SULPHUR PROSPECTING PERMIT NO. 71 19880066

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WORLDWIDE ENERGY COMPANY LTD.,
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CALGARY, ALBERTA

DATE OF ISSUE - DECEMBER 20, 1967
AREA - 38,400 ACRES

NO LEASES SELECTED



846/11

TP. 100

TP. 99

R. 9

R. 8

R. 7 W. 5 M.