MAR 19700009: NORTHEASTERN ALBERTA

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GEOLOGICAL RECONNAISSANCE

RIO ALTO EXPLORATION LTD.
PERMITS 121, 122, 127
NORTHEASTERN ALBERTA

JAMES EXPLORATION LTD.

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INTRODUCTION

This memorandum report describes the results of a reconnaissance geological and radiometric examination of Quartz Mineral Permits 121, 122, and 127 in northeastern Alberta, for Rio Alto Exploration Ltd. The three permits cover approximately 50,000 acres of Precambrian Shield in Townships 125 and 126, and in Ranges 2 to 5, West of the Fourth Meridian.

James Exploration Ltd.'s geologist, D. Sevold, and assistant R. Fraser were mobilized to the permit areas from Uranium City, Saskatchewan in June, 1970. Seven areas of geologic and radiometric interest were mapped from three campsites, plus brief radiometric examinations were made of several areas displaying airborne anomalies.

Transportation and camp supply was provided by company and charter aircraft, and the field party was supervised by E. W. James. Several locations were visited by H. H. Williams, PhD, P. Geol., in late September.

CONCLUSIONS

No evidence of economic mineralization was found in any of the favorable areas examined on Permits 121, 122, or 127.

Limited sulphide mineralization at the north end of Selwyn Lake in Permit 121 was found to be mainly pyrite and pyrrhotite. Apparent molybdenite mineralization discovered at Gayle Lake in Permit 122 proved to be graphite on assay.

Airborne radiometric anomalies were found to reflect large granitic masses of higher than normal radiation background, as at Lester Lake on Permit 122, or to be the result of minor radioactive occurrences in pegmatitic lenses or in shears.

Most of the geologically and radiometrically favourable locations were prospected, although the areas examined represent less than ten percent of the permit areas. Complete mapping and prospecting of the permit areas would require at least three month's efforts by four or more field personnel.

RECOMMENDATIONS

In view of the disappointing results of examination of some of the more favourable areas, and the large amount of ground left to be prospected, it is the writer's opinion that further exploration effort by Rio Alto Exploration Ltd. might be more efficiently directed to more confined prospects.

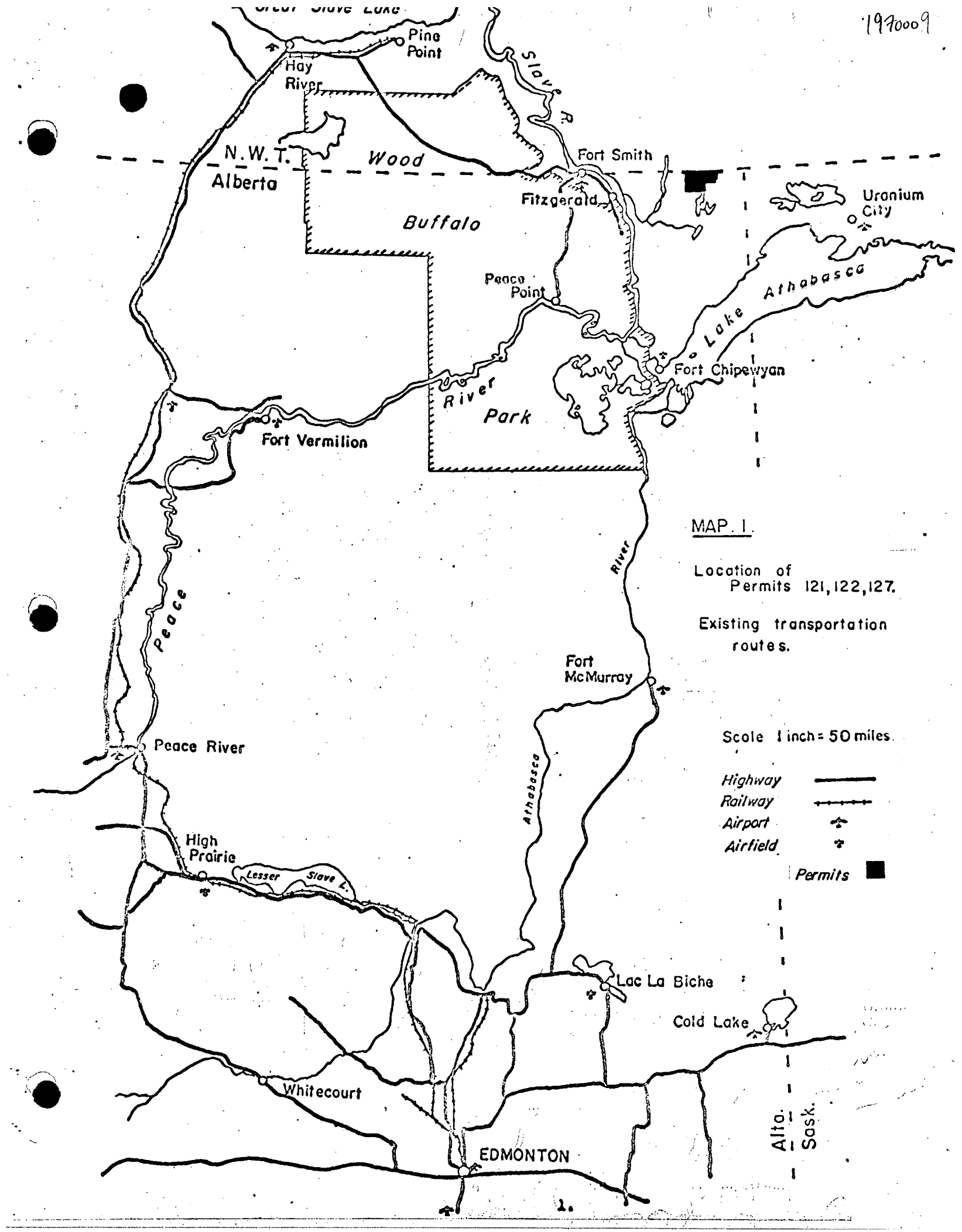
If, however, it is desired to maintain representation in this area, the remainder of the airborne "point anomalies" should be examined with ground scintillometer traverses, and the meta-sedimentary zones should be prospected for base metals. A geochemical program of analyses of uranium in lake waters, and base metals in lake-bottom sediments might provide valuable information in the location of economic mineralization.

Respectfully submitted,

JAMES EXPLORATION LTD.

E. W. James.

1970009


Great Slave Lake
Pine Point
Hay River
Slave R.
N.W.T.
Wood
Alberta
Buffalo
Fort Smith
Fitzgerald
Uranium City
Peace Point
Lake Athabasca
Fort Chipewyan
River
Park
Fort Vermilion
Peace River
Fort McMurray
Athabasca
High Prairie
Lesser Slave L.
Lac La Biche
Cold Lake
Whitecourt
EDMONTON
Alta. Sask.
MAP. 1.
Location of Permits 121, 122, 127.
Existing transportation routes.
Scale 1 inch = 50 miles.
Highway
Railway
Airport
Airfield
Permits

LOCATION AND ACCESS

Quartz Mineral Permits 121, 122, and 123 are situated approximately 65 miles west of Uranium City, Saskatchewan. Map 1 outlines the permit areas, major settlements, and transportation routes.

Access to the area is by float equipped aircraft based in Fort Smith (43 miles west), Uranium City (65 miles east), or Fort Chipewyan (20 miles south). Numerous lakes within the permit areas are suitable for aircraft operations and most of the area is accessible by foot from base camps on these lakes.

Scheduled commercial airline flights from Edmonton provide access to the major settlements.

PHYSIOGRAPHY

Pleistocene glacial scouring has left numerous rock-basin lakes, low-rounded hills, and a locally rugged surface having a maximum relief of about 250 feet. The elevation ranges from 950 to 1,300 feet above sea level.

Bedrock is exposed over about two thirds of the permit areas. Only a small proportion of the covered area is muskeg. Cover in the area is quite variable, being characterized by an open, parkland terrain.

The distribution, size and shape of lakes are controlled by structural and lithological features modified by ice erosion. Alignments of lakes often delineates fault zones which have been eroded.

PREVIOUS GEOLOGIC WORK

In 1929 and 1930 H. E. Cameron and H. S. Hicks (Cameron, 1930; Cameron and Hicks, 1931; Hicks, 1930, 1932) conducted a reconnaissance survey of the Shield area north of Lake Athabasca, within Alberta.

After the gold discovery at Goldfields, Saskatchewan, Alcock (1936) mapped the extreme northwest corner of Saskatchewan on a scale of 1 inch to 4 miles. Wilson (1941) mapped the adjoining Fort Smith, N.W.T., area on a scale of 1 inch to 4 miles.

In 1959, the Geological Survey of Canada carried out a reconnaissance survey of the Precambrian Shield in northeastern Alberta. The work resulted in a map on a scale of 1 inch to 4 miles, with marginal notes (Riley, 1960). In 1958, J. D. Godfrey of the Alberta Research Council mapped the area on a scale of 1 inch to 1/2 mile (Godfrey, 1963). Godfrey (1958) made an aerial photographic interpretation of the Precambrian structures in the area.

During the summer of 1969, GEO-X SURVEYS LTD., carried out an airborne radiometric survey over the permit areas. This survey outlined several anomalous areas.

GENERAL GEOLOGY

A Precambrian complex of igneous and metamorphic rocks underlies the permit areas.

The most striking feature of the area is the prevailing northerly trend and the vertical or steep attitude of all major geologic features, such as the foliation, gneissic trends, the metasedimentary and amphibolite bands, mylonite zones, and the elongated outlines of the younger intrusive granites and porphyroblastic biotite granites.

Rocks in the area consist of granites, granite gneisses, metasediments, and mylonites in decreasing order of abundance. The characteristics of these rocks are largely the result of an extensive history of metamorphism and deformation. Godfrey and Baadsgaard (1962) and Baadsgaard et al (1964) have dated the rocks at 1.7 to 2.3 billion years.

AIRBORNE RADIOMETRICS

The 1969 GEO-X airborne radiometric survey displayed several apparently anomalous Bi 214 radiation zones in computer contoured form (Map 4). The data appear to be strongly flattened by the contouring technique (e.g. 16 cps anomalies containing several points in excess of 25 cps), and no strong directional trends are apparent except possible N-S line biasing.

Since many significant uranium deposits in the nearby Beaverlodge area have small surface showings which represent only one or a few points on 1/4 mile flight lines, the airborne Bi 214 data was replotted manually in unfiltered form (Map 3). Several concentrations of Bi 214 point anomalies then became evident in the northwest and southwest corners of Permit 122.

The abrupt decline in background in the eastern half of Permit 121 evident on maps 3 and 4 is geologically unsupported, and may represent a break in instrument calibration or other technical fault.

EXPLORATION

Selected areas within the three permits were prospected and mapped with the view to outlining zones of mineralization and their geologic controls. These areas are outlined on Map 2 . Emphasis was placed on uranium prospecting; scintillometers being carried on all traverses.

Selection of areas to prospect was based on:

1) Radiometric anomalies outlined on the hand plotted $B.^{214}$ data (Map 3).
2) Previously published showings.
3) Favorable geologic areas.

Favorable zones of uranium mineralization have previously been shown occurring along major mylonite zones, the intersection of E-W striking faults with NE-SW trending shear zones, and along dilatancies along the axis of folds, generally associated with faults.

Permit 121

Logan Lake

A prominent N-S trending mylonite zone 1/4 mile wide outcrops along the west shore of Logan Lake. Wide bands of quartzite border the mylonite (see Map 2). Two intersecting faults, trending NE-SW and NW-SE cut the mylonite zone southwest of Logan Lake, forming very favorable loci of

uranium mineralization.

A scintillometer traverse was carried out to prospect potential uranium mineralization. No mineralization was found, however, the more favorable areas were covered by muskeg or water.

Selwyn Lake

A broad mylonite zone, representing an eastern branch of the Allen fault system, passes through Selwyn Lake. Godfrey (1966) reports two radioactive occurrences within irregular N-S trending bands of quartzite and amphibolite approximately 1/2 mile west of the north end of the lake. This area was intensively prospected for both base metal and uranium mineralization.

Numerous small pegmatitic zones and minor fractures have radioactivities of 5 to 15 times background, however, these zones rarely exceed an area of several square inches to one or two square feet.

Several highly weathered, feruginous areas with a N-S trend were observed. These zones covered a fairly extensive area west of the north end of Selwyn Lake. Radioactivities of 5 to 10 time background were noted in several locations associated with the hematization and variable sulfide mineralization. Several old trenches

were sampled and examined in detail. Mineralization consists of pyrite, pyrrhotite, and minor chalcopyrite, however the sulfide content does not exceed 10 percent.

Two samples were assayed for copper, nickle, and zinc. Sample no. 1 represents a 10' chip sample across the largest trench. Sample no. 5 contains 0.1% copper, and was taken across the surface of a sulphide pod approximately 2' wide and 12' long.

The feruginous zones occur near the contact of Godfrey's Quartzite and Biotite Granite Gneiss units (see Map 2), and are related to a small shear zone which can be traced the entire length of the lake. Mineralization does not appear to be extensive.

Permit 122

Gayle Lake

Gayle Lake is situated west of the area mapped in detail by Godfrey (1966). Riley (1960) describes the rocks as consisting of undivided plutonics and mafic gneisses.

Airborne radiometrics outlined a linear anomaly near the west end of Gayle Lake in proximity to a series of N-NE trending faults.

Prospecting failed to reveal significant uranium mineralization, however, several field showings of suspected molybdenite were reported along the north shore of Gayle Lake. Mineralization occurred in sheared porphyroblastic granite gneisses. Samples of this mineralization yielded less than 0.005% M_oS_2 (see Appendix A), the mineralization being graphite. No other sulfide mineralization was noted in this area.

Charles Lake

The area of interest contains a sequence of granites and granite gneisses cut by N and N-NE trending faults. Two airborne radiometric anomalies were outlined, the anomalies occurring along the fault zones.

Detailed scintillometer prospecting failed to reveal significant uranium mineralization. Radiation over the area is uniform at about 80-120 cps measured on an SPP2 SRAT scintillometer.

Foil Lake

Riley (1960) has mapped a complex of granites and granite gneisses in the Foil Lake area, where a series of NW trending faults are transected by weaker N-S trending fractures. Airborne radiometrics outlined two N-S linear anomalies along the north shore of Foil Lake.

Mapping has outlined a porphyroblastic mylonite zone interpreted as a shear zone. Hornblende-Biotite Granite Gneisses occur on either side of the mylonite zone.

Several areas in the order of square inches in size have radiations of 2000 to 5500 cps. The highest radioactive counts were noted within the mylonite zone and were found to coincide with the airborne radiometric anomalies. The observed radiation is very limited in extent.

Lester Lake

The Lester Lake area, situated in the extreme northwest corner of Permit 122, is characterized by a series of porphyroblastic granite gneisses (Riley, 1960) and a complex structural pattern (Godfrey, 1958). Numerous

N-NE trending faults and fractures intersect a prominent recumbent fold. Airborne radiometrics outlined an anomolous area on the north and south shores of the lake, coincident with a prominent fault zone.

A detailed scintillometer survey over the anomalies using total count and discriminating scintillometers indicates that there is an enrichment of uranium and thoreum in the porphyroblastic granite gneiss on the north shore of Lester Lake. Mapping indicates that the predominant rock type in the area is a porphyroblastic granite gneiss. Uranium enrichment coincides with an increase in feldspar porphyroblasts and is a low grade enrichment.

Mercredi Lake

A scintillometer traverse was made around the northwest arm of Mercredi Lake. Rock type encountered was a biotite granite gneiss with red feldspar megacrysts up to 1 inch in size, and generally similar to the rocks at Lester Lake. Radiometric anomalies of 20 to 30 times background were commonly found in N-NW trending shears, but were usually only a few square inches in surface area.

Permit 127

Several small isolated airborne radiometric anomalies were outlined within Permit 127 along the prominent Allen fault zone. Follow-up ground checks of these were made. The airborne response was attributed to a generally high background and a few point anomalies associated with pegmatitic lenses are occasionally found in shears.

REFERENCES

Riley, G.C.	1960	Geology, Fort Fitzgerald, Alberta Geol. Survey Can., Map 12-1960
GEO-X SURVEYS, LTD.	1969	Report on an Airborne Radiometric Survey of Permits 121, 122, 127.
Godfrey, J.D.	1966	Geology of the Bayonet, Ashton, Potts and Charles Lakes District, Alberta. Research Council of Alberta, Preliminary Report 65-6.
Godfrey, J.D.	1958	Aerial Photographic Interpretation of Precambrian Structures North of Lake Athabasca. Research Council of Alberta, Bull. 1.
Godfrey, J.D. and Baadsgaard H	1962	Structural patterns of the Precambrian Shield in northeastern Alberta and mica age-dates from the Andrew Lake district. Roy. Soc. Can. Spec. Publ. IV, p. 30-39.
Baadsgaard, H., Cumming, G.L., Folinsbee, R.E., and Godfrey, J.D.	1964	Limitations of radiometric dating. Roy. Soc. Can. Spec. Publ. No. 8 p. 22-38

APPENDIX A

ASSAY RESULTS

To: JAMES EXPLORATION,
[redacted] - 635 - 6th Ave. S.W.
CALGARY 1, Alberta.
Mr. B. James

File No. 2983
Date July 23rd 1970
Samples Grab

Certificate of ASSAY

LORING LABORATORIES LTD.

SAMPLE No.	MoS2 %
B - 7	.003
B - 13	.004
B - 17	.004

THREE GRAB SAMPLES
FROM CAYLE LAKE AREA

[redacted]

I Hereby Certify THAT THE ABOVE RESULTS ARE THOSE ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

Rejects Retained one month.

Pulps Retained one month unless specific arrangements made in advance.

[redacted]

Licensed Assayer of British Columbia

GEOPHOTO AA LABORATORY
ANALYSIS REPORT
JAMES EXPLORATION LTD.

27 August 1970

Sample	Cu PPM	Ni PPM	Zn PPM	PPM	PPM	PPM	PPM	PPM
No. 1	70	275	13					
No. 5	1125	175	21					

Processing: Rock samples pulverised to -200 Mesh.
1 gram sample digested in 20 ml 1:1 aqua regia for 3 hours at 90°C.
Solution diluted to 125 ml with 1:1 aqua regia (50% dilution).
Solution allowed to stand overnight before reading analyses on Model 303 Perkin-Elmer Spectrophotometer with Direct Concentration Readout Unit.

Samples #1 and #5 from trenches on Selwyn Lake [redacted]

APPENDIX B

DESCRIPTION OF ROCK UNITS

to accompany Map #2

DESCRIPTION OF ROCK UNITS
to accompany Map #2

Units 1 - 6 after Godfrey (1966)

1. BIOTITE GRANITE GNEISS, with megacryst feldspar phases, and minor hornblende and chlorite. Biotite and quartzite lenses are common.

2. "ARCH LAKE" GRANITE, subparallel alignment with feldspar megacrysts in massive to foliated biotite granite matrix.

3. LEUCOCRATIC GRANITE, generally massive, with pink or red anhedral feldspars.

4. QUARTZITE, pure and impure, including biotite schist and granitic lenses.

5. HORNBLENDE GRANITE GNEISS with some biotite, chlorite, and locally feldspar megacrysts.

6. RECRYSTALLIZED MYLONITE, feldspar porphyroclasts in foliated to aphanitic feldspar biotite matrix.

7. PORPHYROBLASTIC GRANITE GNEISS (Gayle Lake), 1/8 to 1/4 inch feldspar porphyroblasts in a medium grained matrix of quartz and mafics consisting of hornblende, biotite, and chlorite in varying amounts. Red to pink on weathered surfaces. Highly sheared in places with a general N-NE strike.

8. HORNBLENDE-BIOTITE GRANITE GNEISS, characteristically medium grained and red colored with up to 25% mafics (hornblende and biotite). Well defined contorted foliation trending N to NE.

9. PORPHYROBLASTIC MYLONITE, with abundant feldspar porphyroblasts up to 1" long in a medium- to coarse-grained groundmass of quartz, feldspar, and mafics (hornblende and biotite).

10. PORPHYROBLASTIC GRANITE GNEISS (Lester Lake), feldspar porphyroblasts up to 2" long in a medium grained groundmass of quartz, feldspar, and biotite. Mafic and feldspar porphyroblast contents variable.

February 14, 1970

Department of Mines and Minerals,
Minerals Division,
Agriculture Building,
9718 - 107 Street,
Edmonton 6, Alberta.

Attention: Mr. Robert A Seaton.

Dear Sir:

Re: Quartz and Mineral Exploration Permit No. 120

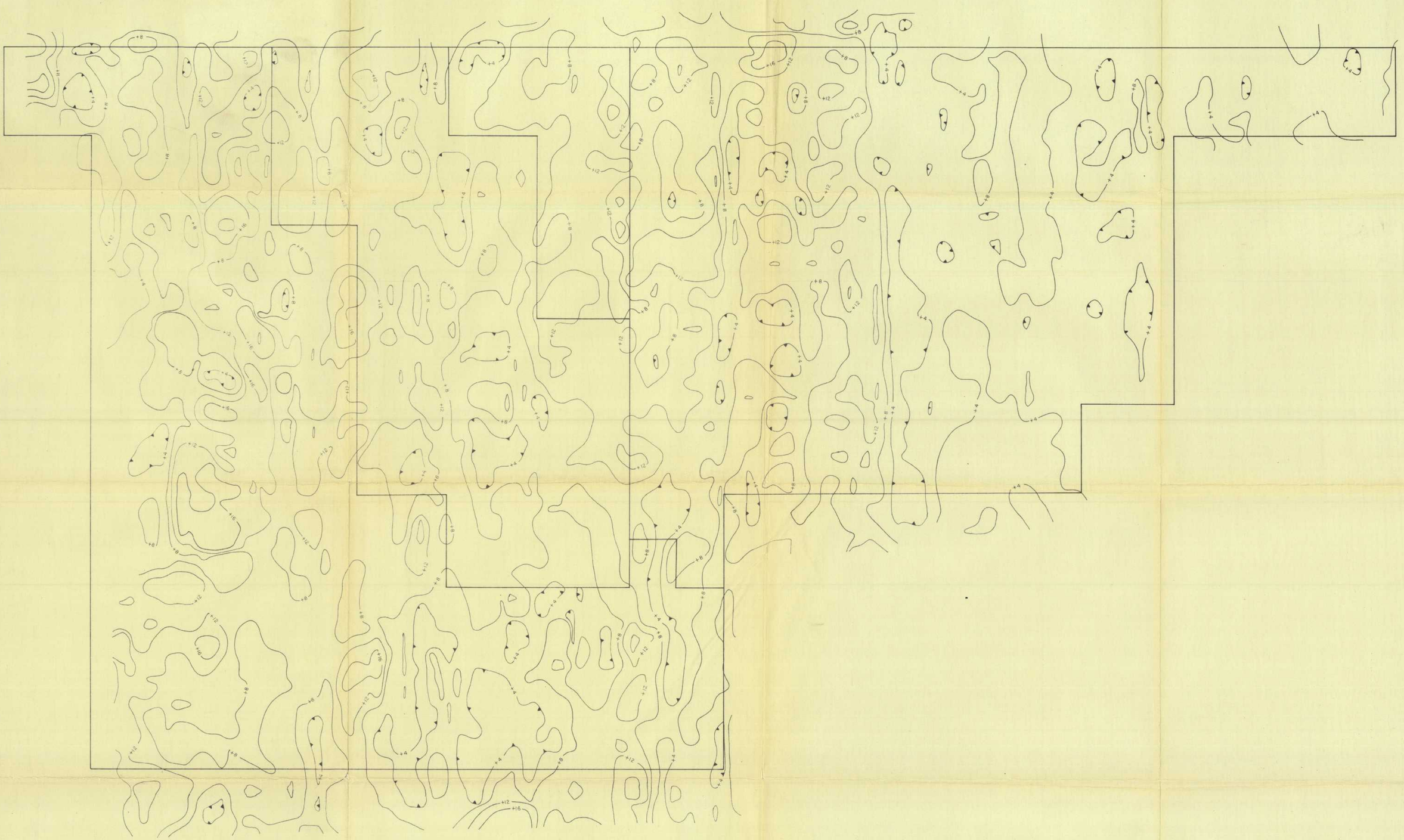
From a study of air photos, we have observed certain geomorphic forms and structures in Permit 69, which appear to be associated with the South-west extention of the Black Bay fault. This coincides with the magnetic and scintillometer anomalies disclosed by the Brameda Resources Limited Surveys. They also coincide with the North-Western limits of the Athabasca Sandstone basin.

There is no evidence that these more detailed features occur within Permit No 120, nor does extropolation of the Gamma Ray Total Count contours on the Magnetic Total Intensity contours suggest that any such anomalies may occur within that permit.

Respectfully submitted

[redacted]

W.B. Gallup, P. Geol.



SUMMIT OILS LTD.
LAKE ATHABASCA AREA
ALBERTA

PERMITS - 121, 122, 127
BISMUTH 214
CONTOUR INT.: 4 C.P.S.

1/2 0 1/2 1 1 1/2
MILES (APPROX.)

MAP 4

DRAWN	CROSS CANADA COMP.	JOB NO	FIG NO
DATED	OCT. 29, 1969	1104	4
CHECKED			

GEO - X SURVEYS LTD.

19700009

60°00'

R.5 | R.4 | R.4 | R.3 | R.3 | R.2

LESTER LAKE

FOIL LAKE

CHARLES LAKE

SELWIN LAKE

LOGAN LAKE

PERMIT NO. 127

PERMIT NO. 121

PERMIT NO. 122

MERCREDI LAKE

TREASURE LOCH

GAYLE LAKE

CHARLES LAKE

TWP. 126
TWP. 125

R.3 | R.2

TWP. 126
TWP. 125

59°52'30"

R.5 | R.4 | R.4 | R.3

59°52'30"

N

LEGEND

- Allen Fault
- Fault
- Strong fracture
- Foliation
- Geologic boundary
- Sulfide mineralization
- Graphite
- Trench
- Radiation (c.p.s.)
- Scintillometer ground check
- Permit boundaries (approximate)

LEGEND

1. Biotite granite gneiss
2. Arch Lake granite
3. Leucocratic granite
4. Quartzite
5. Hornblende granite gneiss
6. Mylonite
7. Porphyroblastic granite gneiss (Gayle lake)
8. Hornblende-Biotite granite gneiss
9. Porphyroblastic mylonite
10. Porphyroblastic granite gneiss (Lester lake)

RIO ALTO EXPLORATION LTD.

QUARTZ MINERAL PERMITS 121, 122, & 127

NORTHEAST ALBERTA

MAP 2

1/2 0 1/2 1
MILES

JAMES EXPLORATION LTD. JULY 1970.

19700009

PERMIT NO. 122

PERMIT NO. 127

PERMIT NO. 121

N

flight lines may be displaced 1/2 mile west

MANUAL PLOT OF GEO-X AIRBORNE DATA

- 25 + c.p.s.
- 20 - 24 c.p.s.
- 15 - 19 c.p.s.
- uncertain flight line control

1/2 0 1/2 1 1 1/2

MILES

MAP 3

RIO ALTO EXPLORATION LTD

PERMITS 121, 122, 127
N.E. ALBERTA
BISMUTH 214

JAMES EXPLORATION
1970

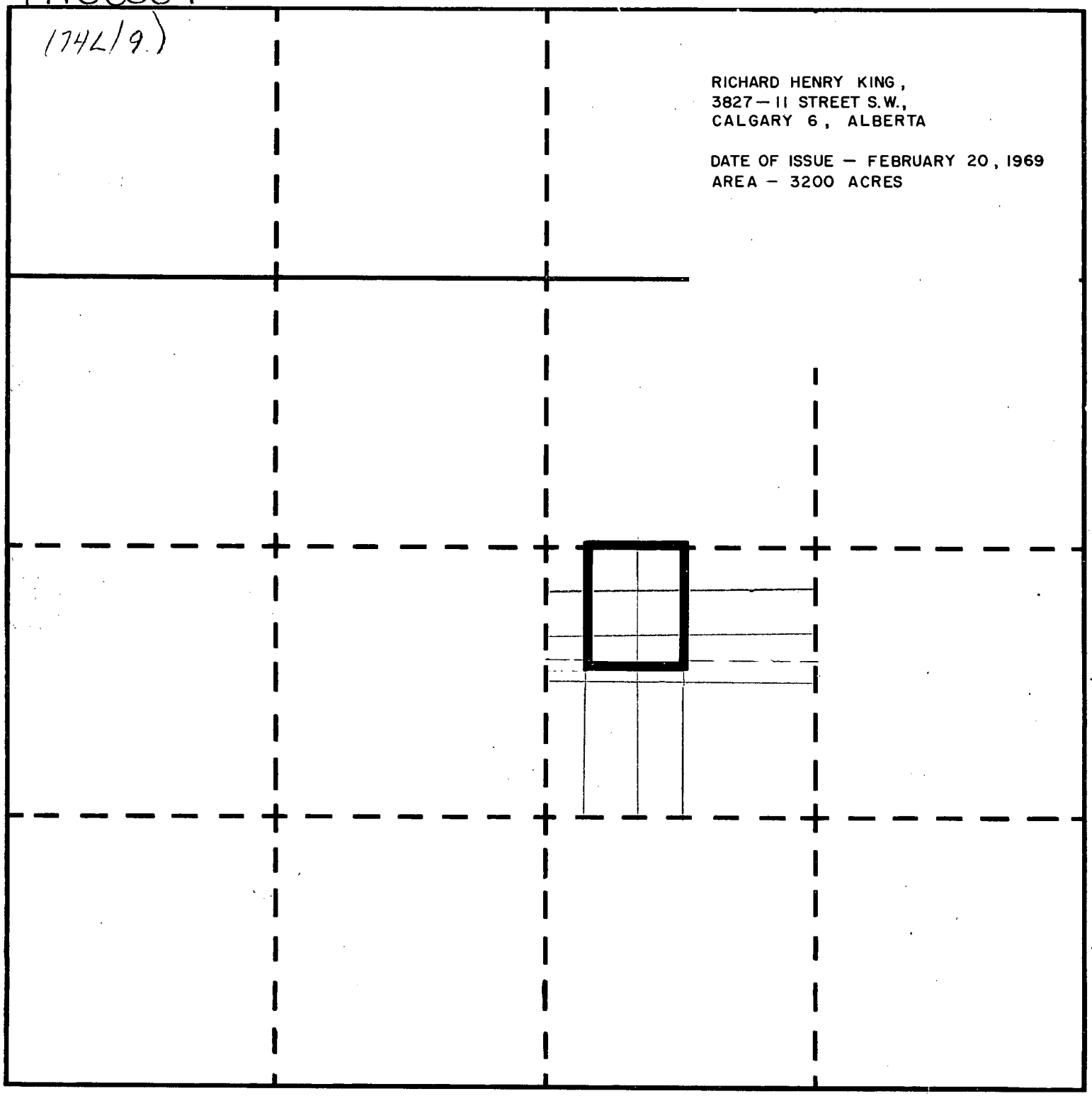
1970009

QUARTZ MINERAL EXPLORATION PERMIT No. 120

19700009
(174L/9.)

RICHARD HENRY KING,
3827—11 STREET S.W.,
CALGARY 6, ALBERTA

DATE OF ISSUE — FEBRUARY 20, 1969
AREA — 3200 ACRES



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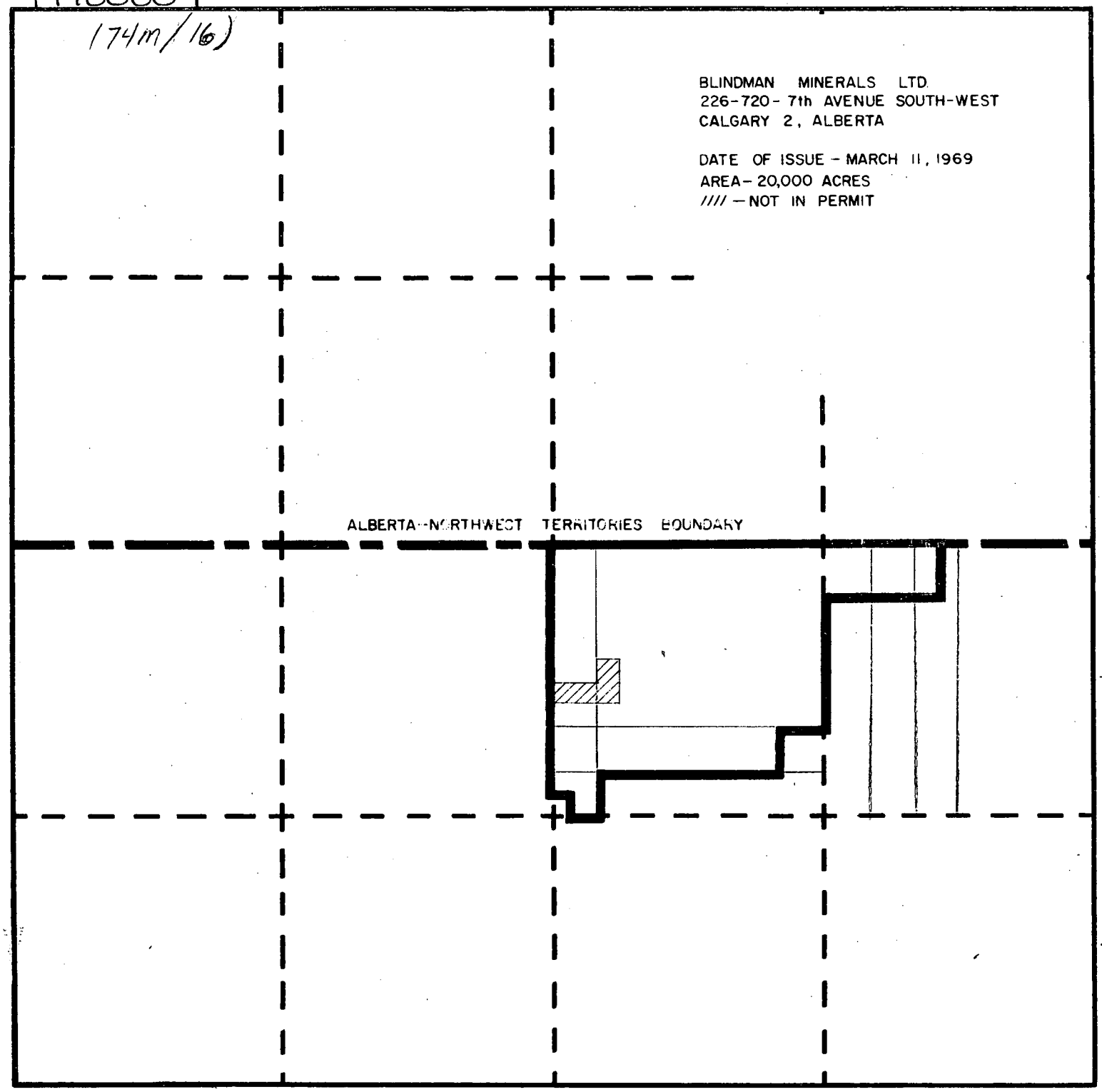

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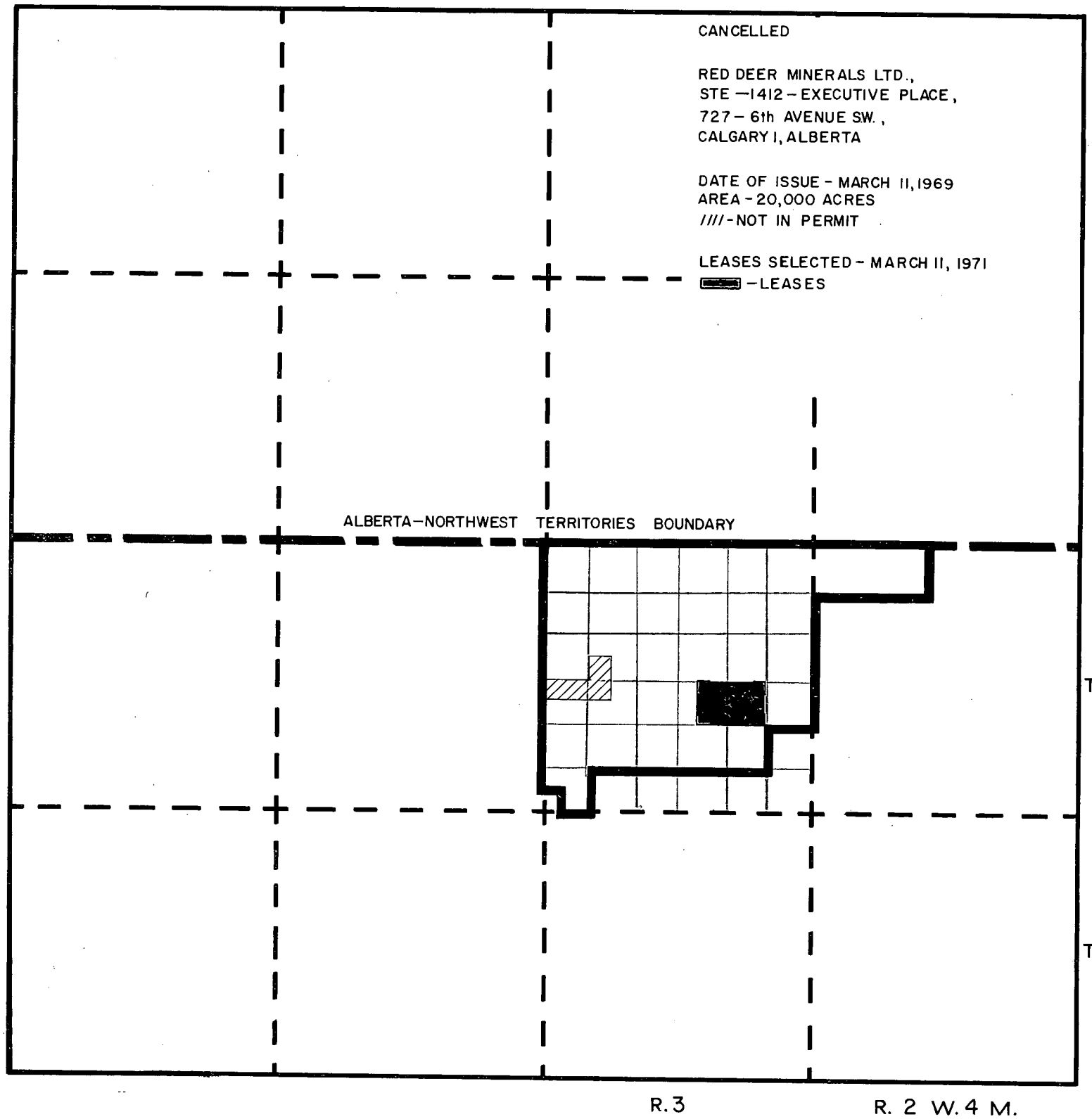


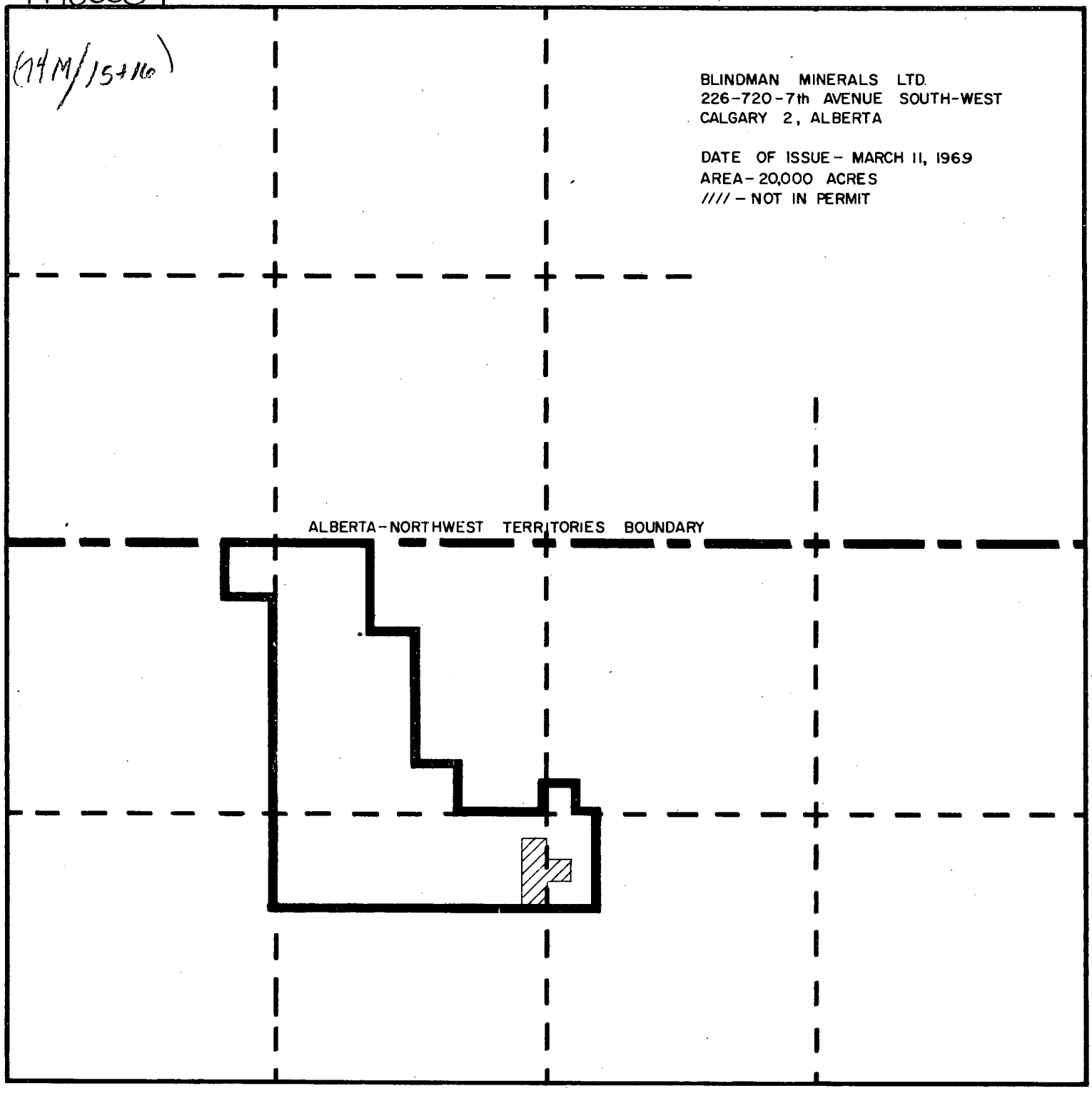
QUARTZ MINERAL EXPLORATION PERMIT No. 122

19700009

(114M/15+16)

BLINDMAN MINERALS LTD.
226-720-7th AVENUE SOUTH-WEST
CALGARY 2, ALBERTA

DATE OF ISSUE - MARCH 11, 1969
AREA - 20,000 ACRES
//// - NOT IN PERMIT



QUARTZ MINERAL EXPLORATION PERMIT No. 122