MAR 19740004: ATHABASCA SANDSTONE BASIN

Received date: Dec 31, 1974

Public release date: Jan 01, 1976

REPORT ON PERMITS

179, 180, AND 181.

ALBERTA.

DR. K. THIEL

1. INTRODUCTION

1.1 AREA OF INVESTIGATION

Target of investigation was the SW rim of the Athabasca Sandstone Basin, which is located in the north-eastern part of Alberta. The investigations were carried out by URANERZ EXPLORATION AND MINING LTD. as operator in a joint venture with Inexco Mining Co. and the Saskatchean Government as partners with equal interest.

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Field work commenced May 23, 1974 for the Saskatchewan portion of the program; the Alberta permits were subjected to investigation during the latter part of the summer.

1.4 PERSONNEL

Personnel engaged in the operation were:

Uranerz Personnel

K. Lehnert-Thiel, Project Geologist

S. Hancock, Junior Geologist

J.T. McLeod, Prospector

D. Cook, Prospector

S. Roberts, Prospector

A. McCleod, Prospector

Donald Foien, Camp Cook

Ron Ritcher , Camp Cook

Contract Personnel

Jacques Proulx, Helicopter Pilot

Joan Studer, Fixed-wing Pilot

Brent Pouclet, Fixed-wing Pilot

Luis Schloegel, Fixed-wing Pilot

Jim Black, Fixed-wing Pilot

1.5 INSTRUMENTS, VEHICLES USED

1, GAM-2 Spectrometer (Scintrex)

1, TV-5 Spectrometer (McPhar)

3, SPP-2 Scintillometer (SRAT)

1, MAP-2 Magnetometer (Scintrex) rental

1, ETR-1 Emanometer (Scintrex)

1, Cessna 185 fixed-wing float plane

1 Beaver fixed-wing float plane

1, Bell G4A Helicopter

1, GMC Crew Cabin Truck, in operational base in La Ronge.

2. GENERAL INFORMATION

2.1 LOCALITY

Permits 179, 180, and 181 are contiguous mineral dispositions, each 49920 acres in size in northeastern Alberta within Townships 102, 103, 104, and 105 Ranges 1 to 4.

2.2 COMMUNICATION AND ACCESS

The only means of access to the area is by float-equipped aircraft from Fort McMurray, Alberta or Buffalo Narrows and La Ronge, Sask.

Due to the lack of lakes in this area transportation within the area is very restricted and done most conveniently by helicopters. La Ronge was operational base for this project.

3. PREVIOUS SURVEYS AND ACTIVITIES

3.1 TOPOGRAHIC MAPPING

The areas of investigation are covered by National Topograhic Survey sheets 74L and 74E at the scale of 1:250,000.

Airphotos, at a scale of 1:40,000, are available from the Alberta Research Council in Edmonton. Following flight line numbers and runs cover the area.

See enclosed Table.

TABLE I

Airphotos Covering Operational Area "B" in Alberta:

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1818 153 to 158
1783 114 to 129
1783 49 to 63
1779 82 to 94
1839 82 to 94
1779 153 to 162
1780 79 to 94
2126 25 to 29
2126 1 to 8
1831 10 to 21
1776 144 to 152
1776 128 to 130
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1782 60 to 68
1727 13 to 25
1709 122 to 125
1786 55 to 70
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No detailed geological mapping was ever conducted in this area.

G.S.C. Publications.

Map 16, Firebag River Area by L.P. Tremblay, 1960

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The area is completely covered by aero-magnetic maps surveyed by the Geological Survey of Canada at a scale of 1:62,360

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4.1 REGIONAL GEOLOGY

Rocks underlying the area of investigation belong to the Churchill structural province, which contains a wide variety of Cambrian units. During the lower Proterozoic (Aphebian) several northeast trending troughs were formed in the Archean basement. These troughs were filled with sediments derived from the Archean uplands bordering its rims. Two subparallel troughs are differentiated at the present time, the Wollaston Lake and Virgin River Fold Belts.

More recent theories recognize only the one major fold belt which include the Wollaston and Virgin River domains

as less metamorphic equivalents of the structural high metamorphic cental zone. Major tectonic lineaments separate this fold belt from the Archean basement.

After the Hudsonian orogeny the metamorphic complex was peneplained and, during the Helikian, the Athabasca sandstone was deposited.

4.2 STATIGRAPHY

Archean rocks:	orthogneiss, paragneiss, granite gneiss, migmatites
Lower Proterozoic:	(Virgin River Fold Belt) meta-arkose, meta-quartzite biotite-hornblende-garnet-sillimanite-corderite gneiss, calc silicate rock, felsic and mafic meta volcanics.
Middle Proterozoic:	basal conglomerates and sandstone (Athabasca Formation)
Intrusive Rocks:	granites, diorites and post-Athabasca diabase.

In the very southwest part of the area of investigation the following strata occur:

Middle Devonian:	shale and reef dolomites
Upper Devonian:	argillaceous limestone and shale

Undivided Cretaceous: sandstone, sands, oil-sands.

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Several periods of folding are known. Tight isoclinal folding with northeast trending axes is the major structural feature representing the youngest period of folding. Where older east-west folds are evident, arcuate-shaped and even closed interferference type outcrop patterns can be found as a result of both folding periods.

Metamorphism ranges from lower greenschist to upper amphibolite facies.

Several generations of faults are present. Axial plane faulting (NE) is a major feature within the Lower Proterozoic troughs contemporary with the Hudsonian orogenesis. Post Athabasca Block faulting has taken place.

4.4 ECONOMIC GEOLOGY

Significant uranium deposits have been found in the past few years in the vicinity of the unconformity between the Lower Proteroic assemblage and the overlying Middle Proterozoic-Athabasca Sandstone. Two hundred km northeast of the area of investigation, Gulf Minerals found the Rabbit Lake Deposit in 1968 and Mokta (Canada) Ltd. discovered their de-

posits 70 km north in the years 1968 -1972.

Knipping (IAEA-SM-138/38) assumes supergene origin for the uranium emplacement at Rabbit Lake. The hypothetical process is described by him as follows:

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No outcrops were observed within the three permits 179, 180 and 181, but by extrapolating geological data from Saskatchewan it is assumed that mesozoic sedimentary rocks cover the southern part of the permits, while Athabasca Sandstone underlies the northern part of it. (Map # 1).

6. INVESTIGATIONS

The following exploration methods were applied:

1) Airborne Radiometric Survey by helicopter.
2) Geological Mapping from helicopter.
3) Lake bottom sediment sampling.
4) Surficeal Geological Studies.

6.1 AIRBORNE SURVEY

According to the original layout of the 1974 program the survey was started in grid pattern employing a line spacing of o.5 miles. Soon, however, this proved unsatis-

factory for the following reasons:

1) The proposed areas to be surveyed were too large because of the uncertain position of the unconformity.

2) The SW rim of the Athabasca Basin is 90% covered by lacustrine sediments, outwash plains and muskeg. The unconformity itself is never (!) exposed. The chances of locating radiometric anomalies is sand plains is nil.

Therefore the approach was changed as follows:

1) Airborne mapping for closer delineation of the unconformity.

2) Subsequent structural flying and surveying within the area four miles up and eight miles down the glacial strike of the discordance.

Under structural flying is understood:

a) all kinds of glacial and post glacial drainage systems

b) rivers and creeks

c) drumlins.

d) eskers

e) ridges

f) lake shore lines

g) muskegs

h) outcrops and boulder trains.

Using these criteria the area of investigation was reduced considerably.

The airborne survey was terminated when it was realized that the Helikian discordance was not exposed within the permits.

For the survey a GAM - 2S from Scintrex was used.

6.1.1 Helicopter

For the survey , a Helicopter, BELL G4A. from Athabasca Airways Ltd. , Prince Albert, was used. Survey speed was approximately 60 mph, maintaining an altitude between 100 and 150 feet above ground.

6.2 GEOCHEMICAL SURVEY

Lake bottom sediment sampling has been carried out in the permits, using helicopter and fixed-wing for transportation. All samples were assayed for U_3O_8, Zn, Cu, and Ni.

To retrieve the samples a dart sampler was used. The larger and deeper lakes were sampled using a fixed wing aircraft. For the smaller ones, the helicopter was used.

7. RESULTS

7.1 RADIOMETRIC ANOMALIES

No radiometric anomalies were found during the survey. Appendix I lists all sample descriptions shown on Map #2.

8. ASSESSMENT OF POTENTIAL

No Uranium potential can be given to permits 179, 180, and 181 since no Helikian discordance is exposed within the permits. As mentioned earlier in this report, Mesozoic sediments overlies the Athabasca Sandstone. No Proterozoic or older basement gneiss is exposed in the area.

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It is recommended to terminate Uranium prospecting for vein type pitch-blende deposits with close relationship to the Helikian discordance, since no Helikian discordance exixts within permit # 179, 180, and 181.

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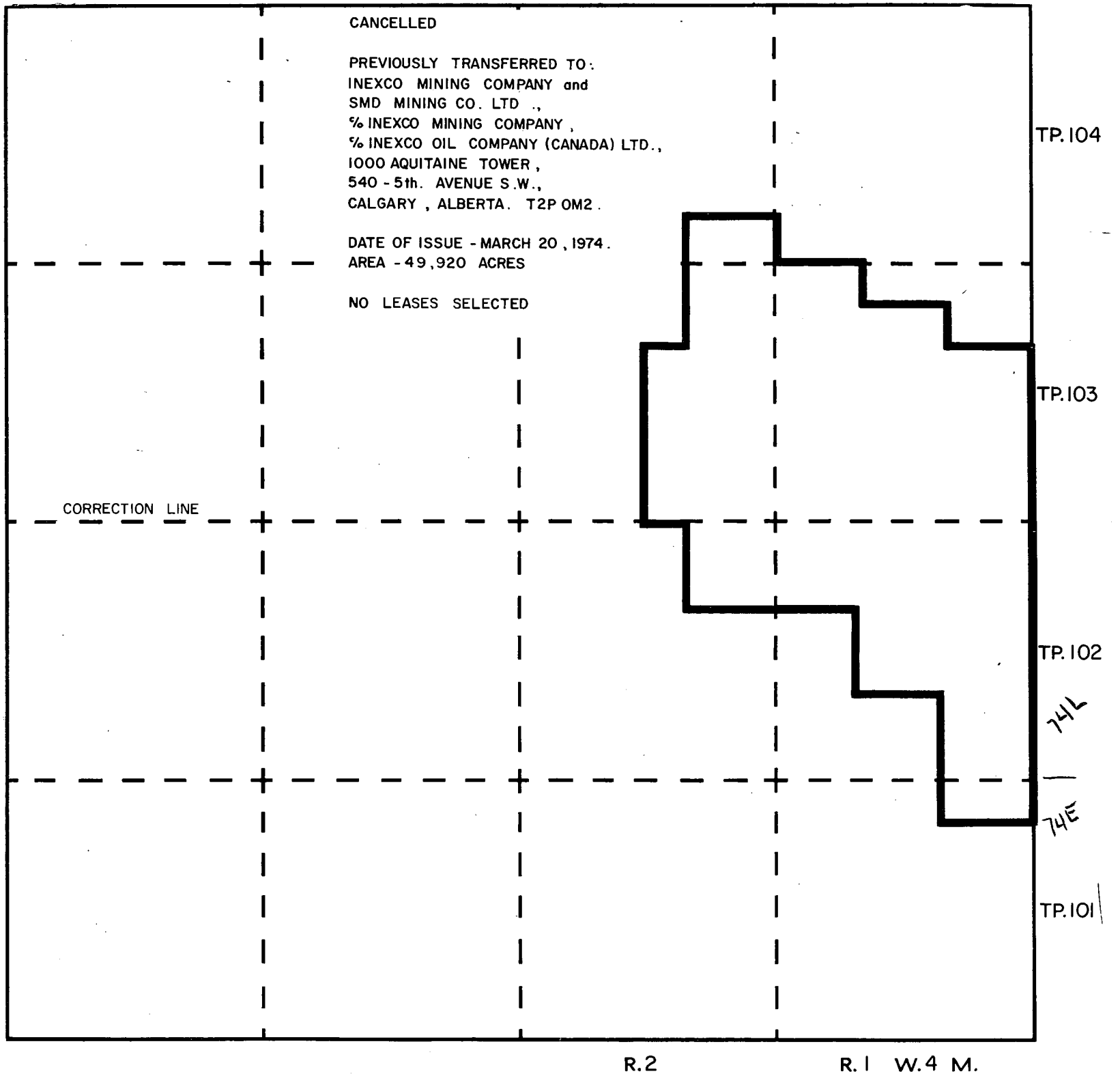
	DAY	MONTH					U_3O_8	Zn	Cu	Ni
11174	24	July	DC	Maybelle Lake	brown mud	5 ft.	---	71	10	5
11229	26	"	"	Maybelle River	dark green mud	33 ft.	1.1	36	10	15
11230	"	"	"	4 mi. SE Harwood Lake	greenish mud	9 ft.	1.3	55	7	10
11232	"	"	"	Harwood Lake	green mud	22 ft.	---	38	8	12
11236	27	"	"	4 mi. W Harwood Lake	green mud	9 ft.	---	75	10	11
11241	"	"	"	1 mi. NE Nash Lake	greenish mud	28 ft.	2.0	67	8	4
11242	"	"	"	4 mi. SW Nash Lake	greenish mud	14 ft.	1.7	52	7	5
11243	"	"	"	4 mi. NE Doug Lake	green mud	10 ft.	0.7	44	8	11
11244	"	"	"	2 mi. NW Hauk Lake	green mud	22 ft.	---	120	8	10
11245	"	"	"	Hauk Lake	brown mud	8 ft.	1.8	59	7	5

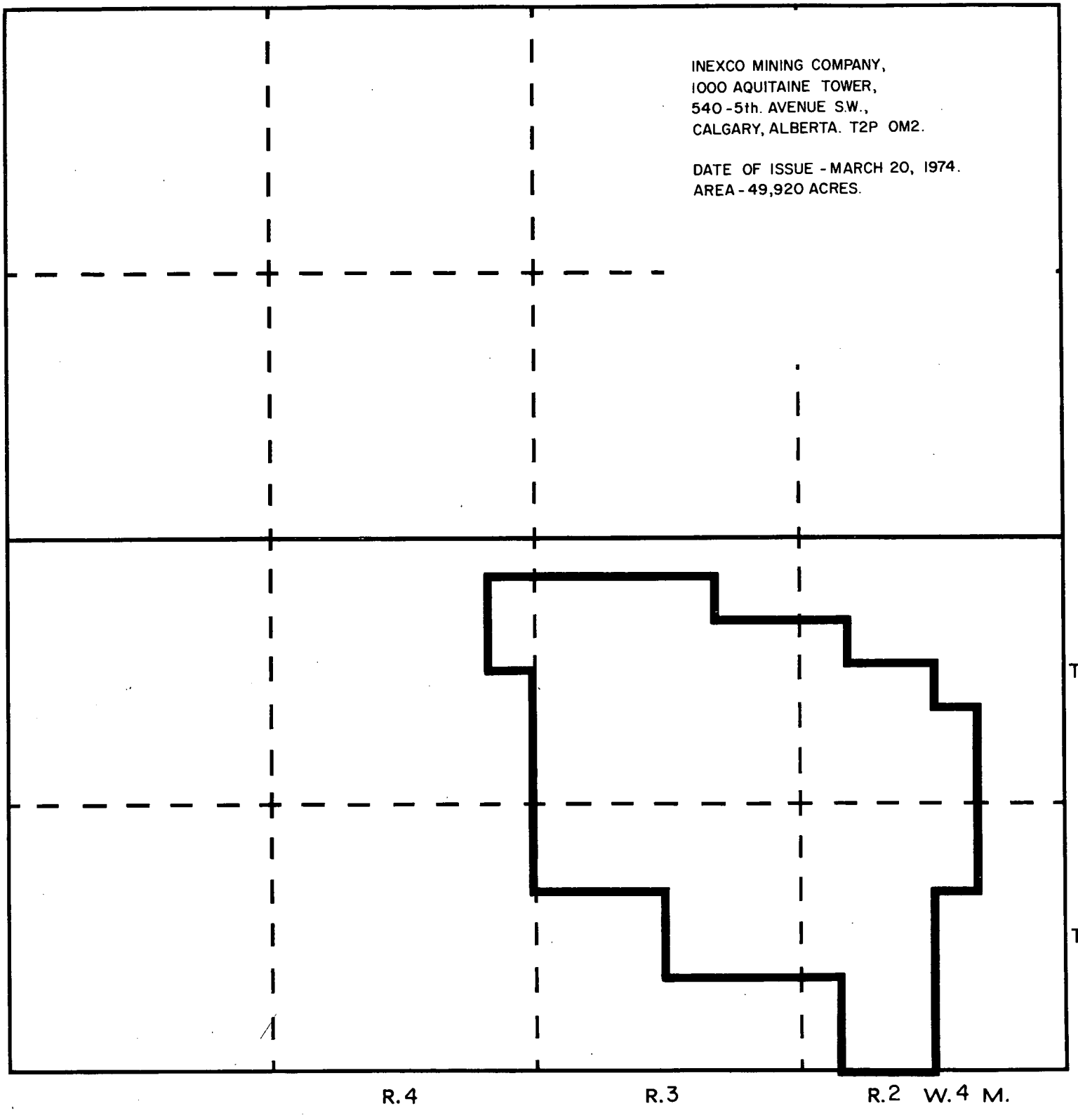
QUARTZ MINERAL EXPLORATION PERMIT NO. 177

This permit was cancelled and the Research Council has not as yet received any reports for it.

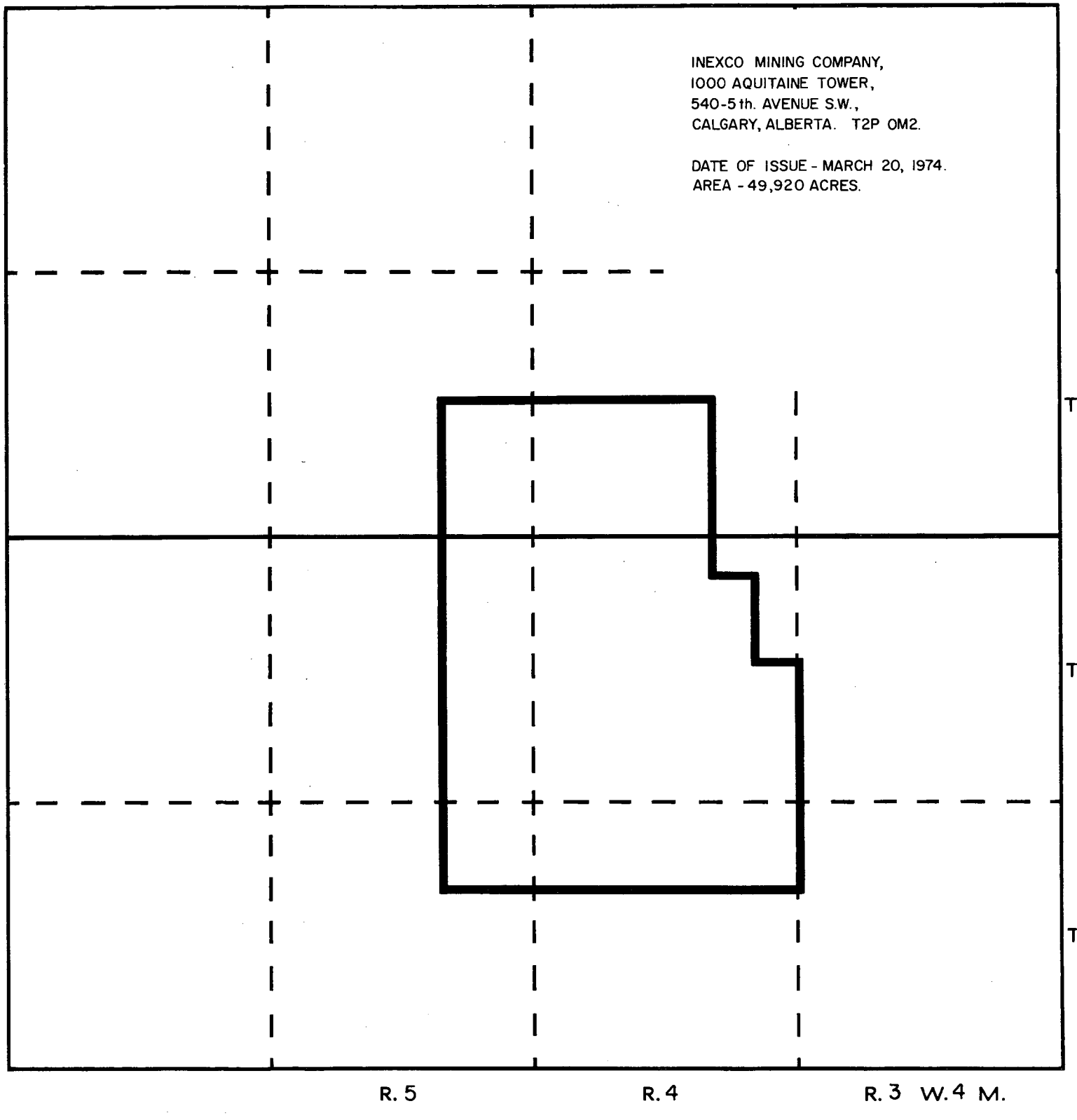
QUARTZ MINERAL EXPLORATION PERMIT NO. 179



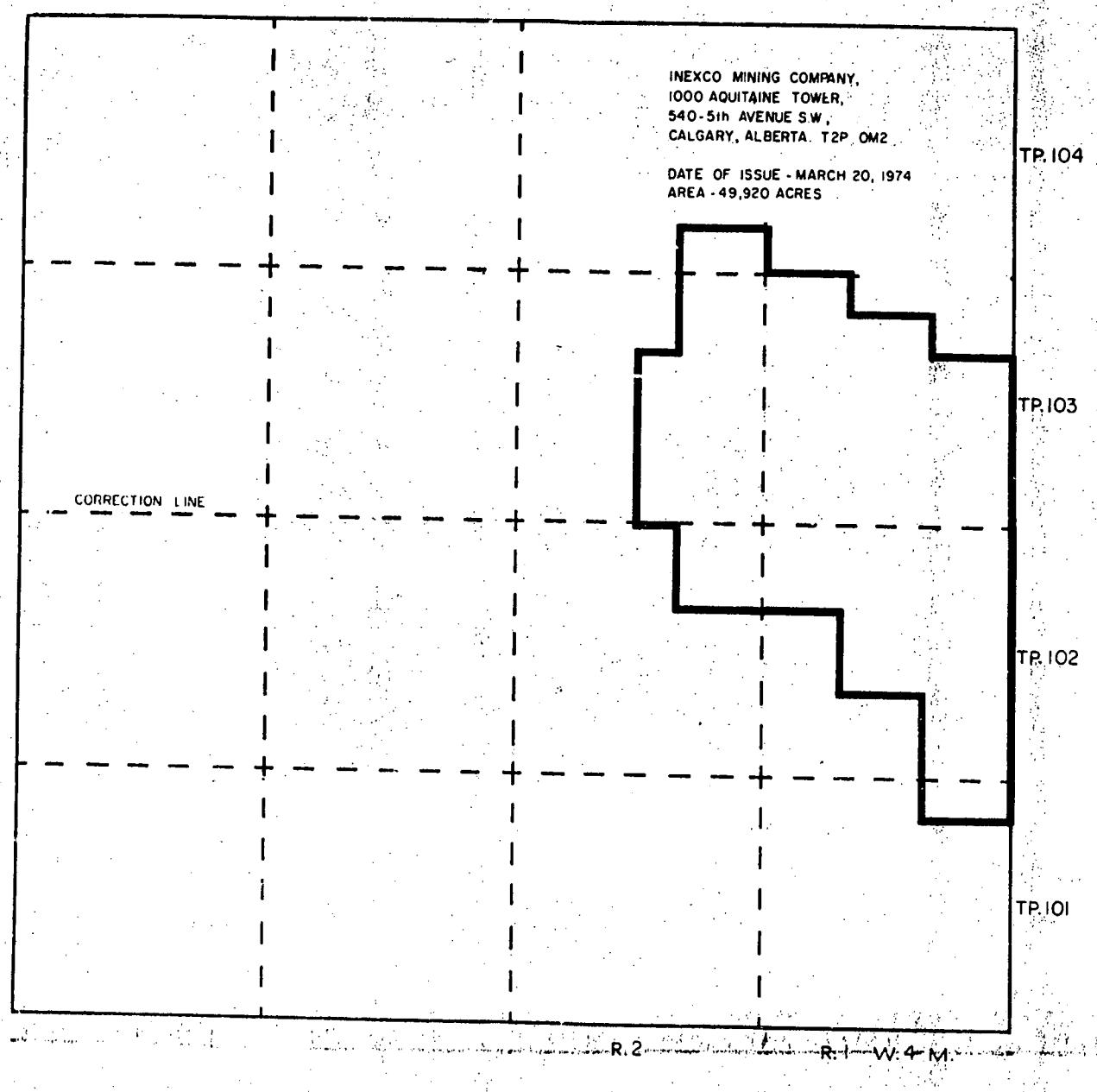
QUARTZ MINERAL EXPLORATION PERMIT NO. 180



QUARTZ MINERAL EXPLORATION PERMIT NO. 181

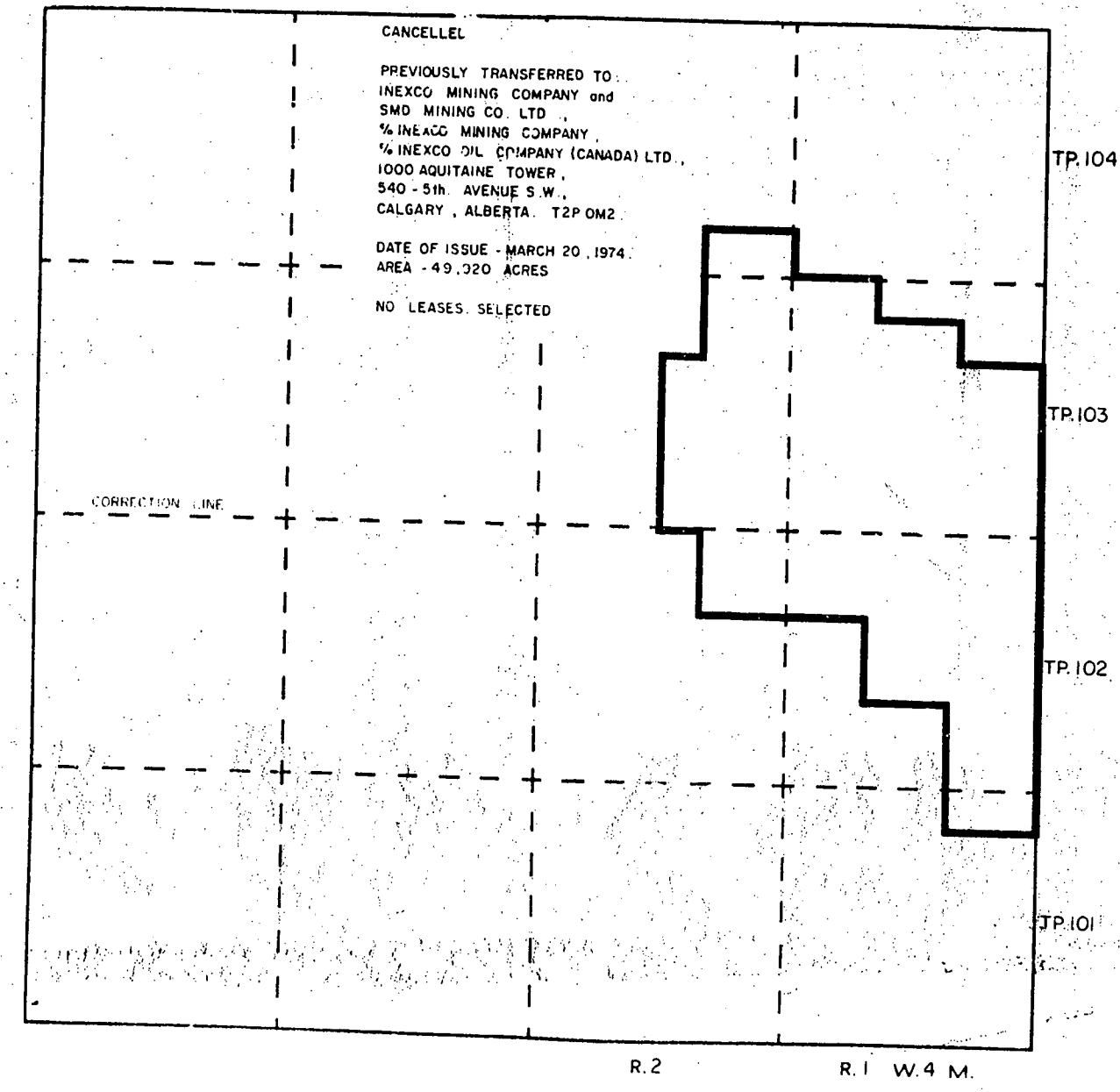


QUARTZ MINERAL EXPLORATION PERMIT NO. 179a



179000

QUARTZ MINERAL EXPLORATION PERMIT NO. 1796



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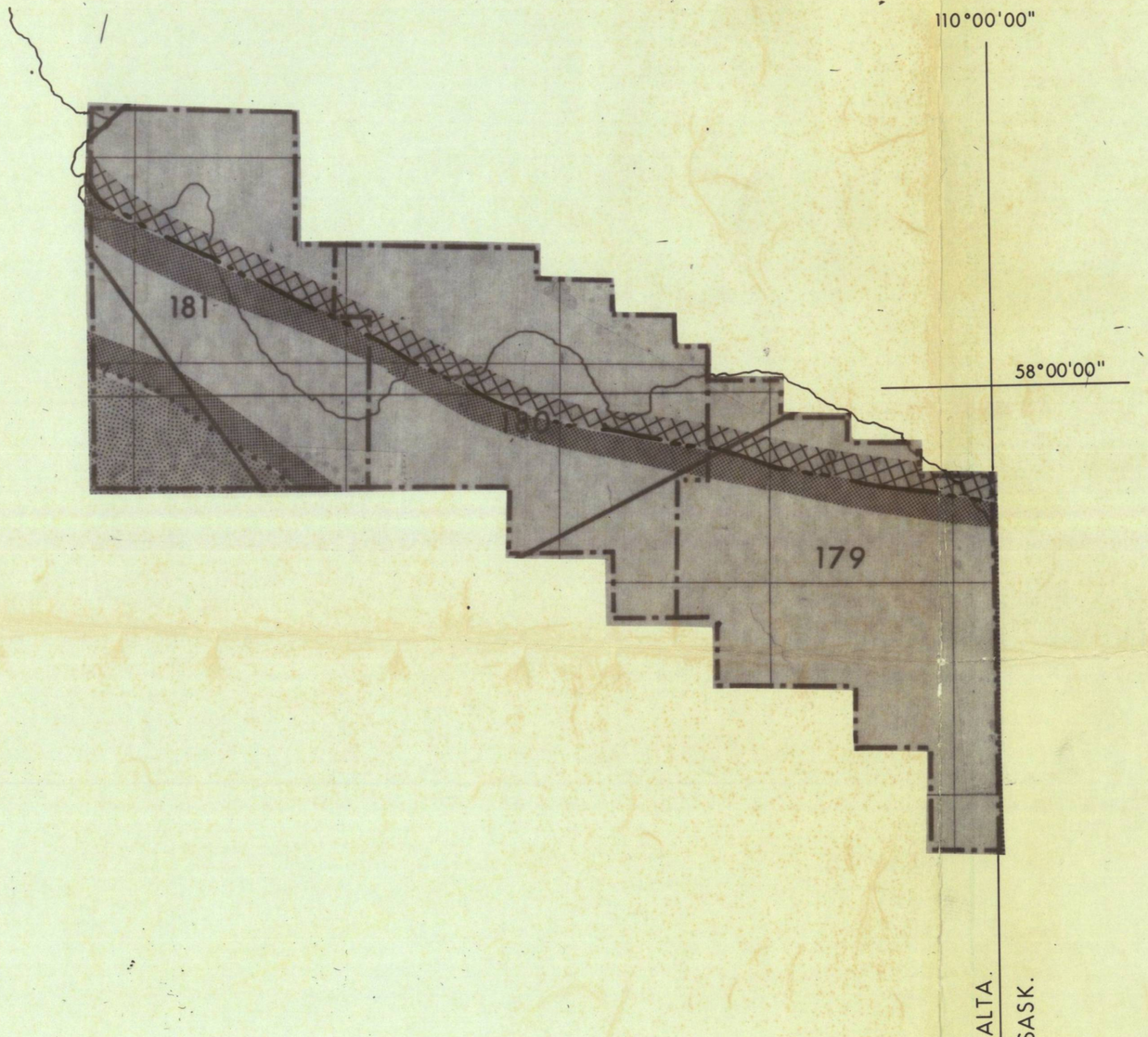


LEGEND

- HELIKIAN ATHABASCA SANDSTONE FORMATION
- MESOZOIC SEDIMENTS
- APHEBIAN & ARCHEAN BASEMENT GNEISS
- PERMIT BOUNDARY
- GEOLOGICAL BOUNDARY (ASSUMMED)

URANERZ EXPLORATION & MINING LTD.

SOUTHWEST ATHABASCA PROJECT

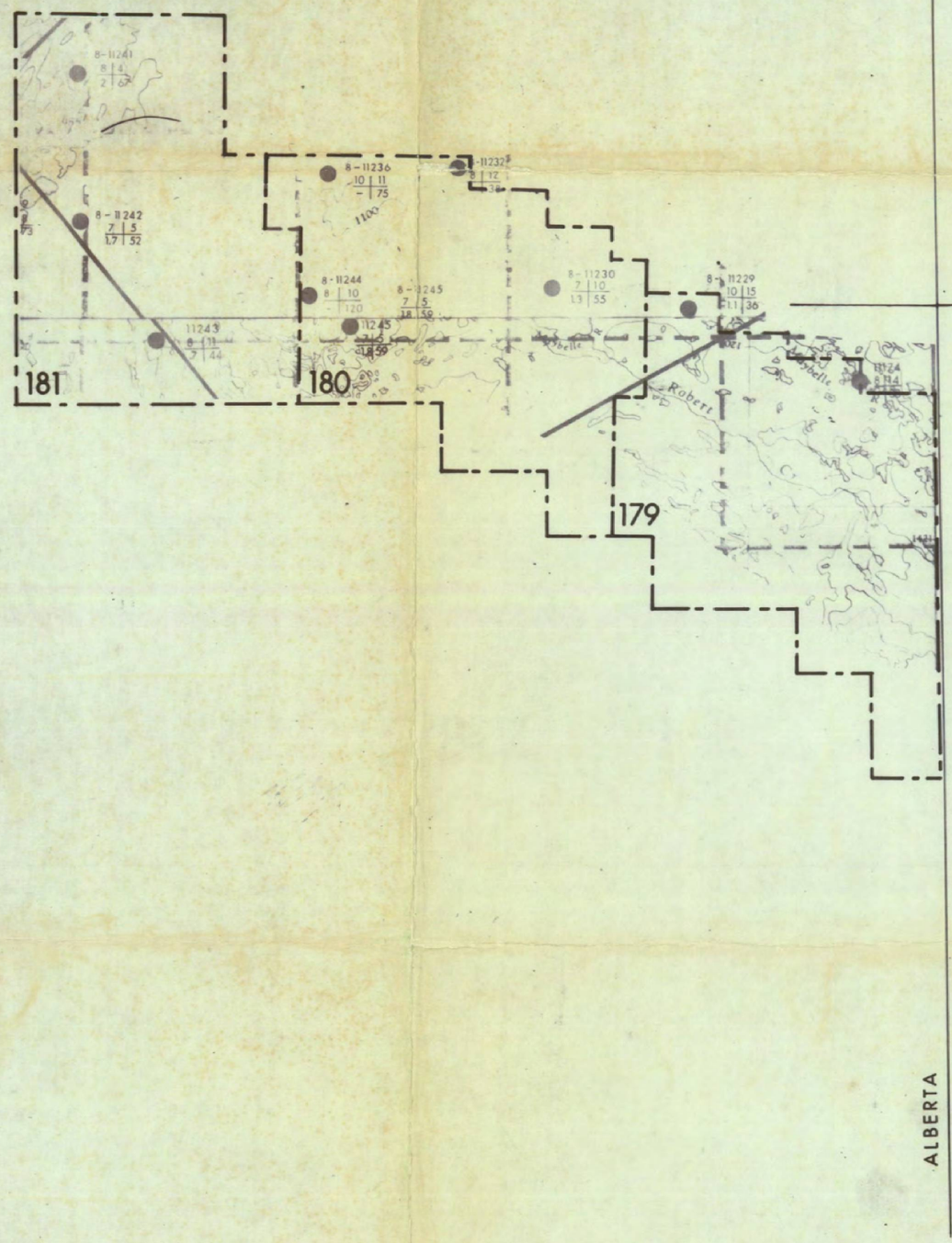
GEOLOGY AND DISPOSITION MAP IN ALBERTA PERMITS NOS. 179 - 180 - 181

COMPILED: K. THIEL	DATE: MAR. 1975	TENEMENT:	MAP No. 1
DRAWN: F. del Val	DATE:	PLAN No.	REPORT No.
LAST REVISION:		SCALE: 1" = 250,000	PROJECT No.
T.C. TO BONN:	REF: NTS 74E		FILE No.

1974-0004

110°00'00 W.

58°00'00" N.



ALBERTA

SASKATCHEWAN

LEGEND

● Cu | Ni / U308 | Zn in ppm.

URANERZ EXPLORATION & MINING LTD.

SOUTHWEST ATHABASCA PROJECT

LAKE BOTTON SEDIMENTS SAMPLING MAP ALBERTA

PERMIT NOS. 179 - 180 - 181

COMPILED: K. L. THIEL	DATE: FEB. 1975	TENEMENT:	MAP No. 2
DRAWN: F. del Val	DATE: FEB. 1975	PLAN No.	REPORT No.
LAST REVISION:		SCALE: 1: 250,000	PROJECT No. 7152
T.C.TO BONN:	REF: NTS 74 E		

19740004

19740004

REPORT ON PERMITS

179, 180, AND 181.

ALBERTA.

DR. K. THIEL

COPY #2

J. Sciarra
18-April-06

Missing Permit No. 179, Permit No. 180, Permit No. 181.

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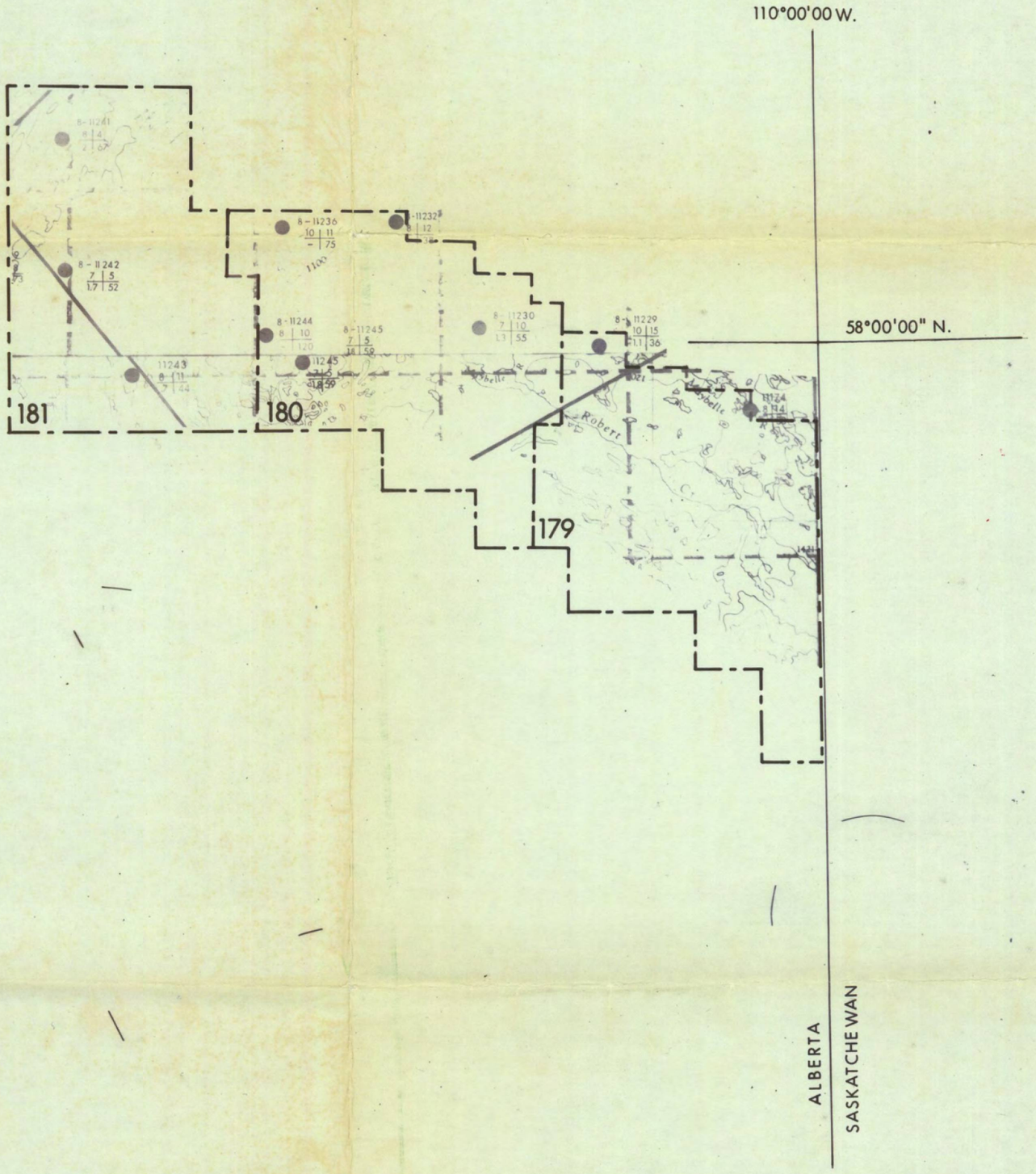


LEGEND

Cu	Ni
U308	Zn

in ppm.

URANERZ EXPLORATION & MINING LTD.

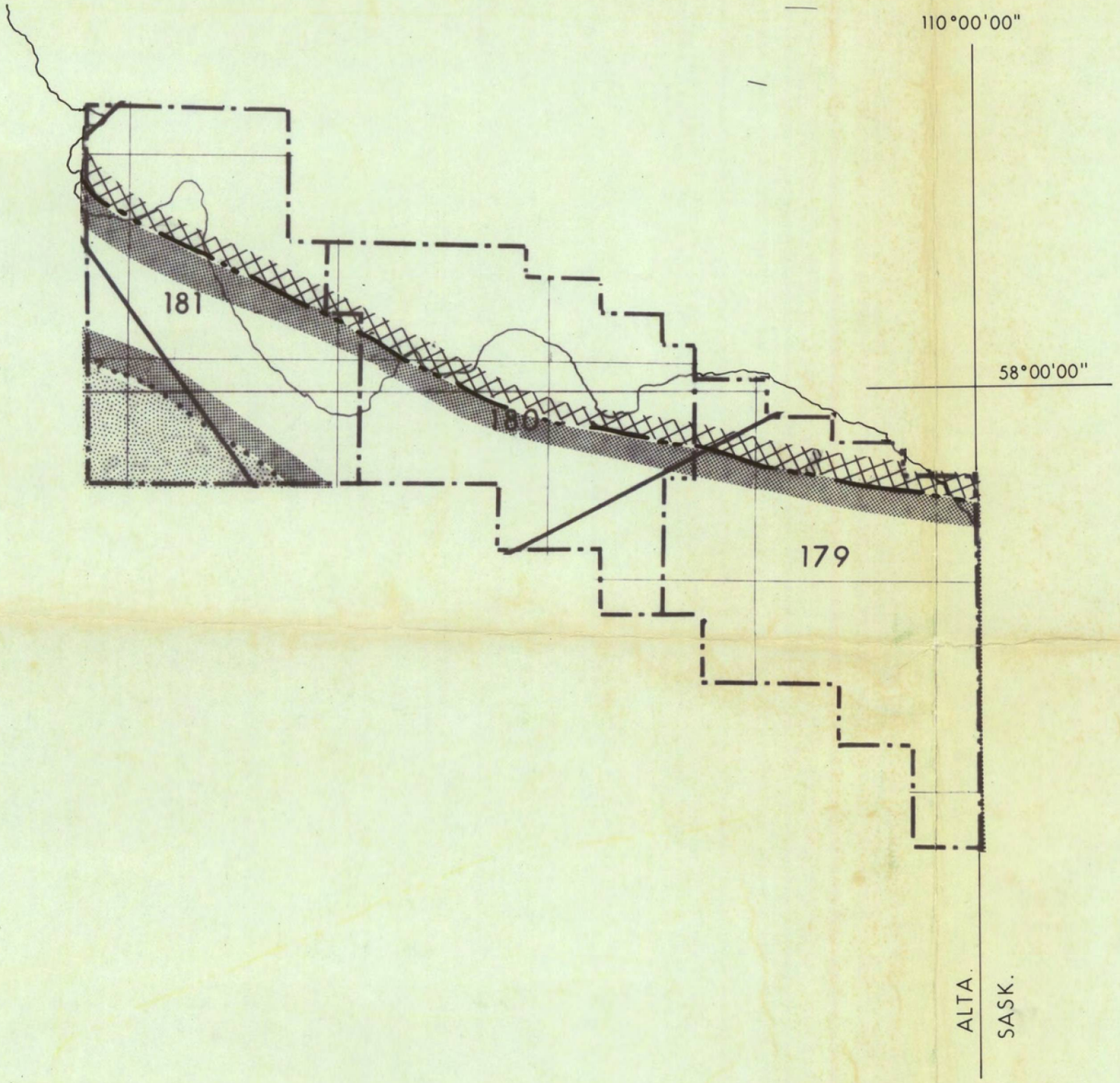
SOUTHWEST ATHABASCA PROJECT

LAKE BOTTON SEDIMENTS SAMPLING MAP ALBERTA

PERMIT NOS. 179 - 180 - 181

COMPILED: K. L. THIEL	DATE: FEB. 1975	TENEMENT:	MAP No. 2
DRAWN: F. del Val	DATE: FEB. 1975	PLAN No.	REPORT No.
LAST REVISION:		SCALE: 1: 250,000	PROJECT No. 7152
T.C.TO BONN:	REF: NTS 74 E		

1974 0004



LEGEND

- HELIKIAN ATHABASCA SANDSTONE FORMATION
- MESOZOIC SEDIMENTS
- APHEBIAN & ARCHEAN BASEMENT GNEISS
- PERMIT BOUNDARY
- GEOLOGICAL BOUNDARY (ASSUMMED)

URANERZ EXPLORATION & MINING LTD.

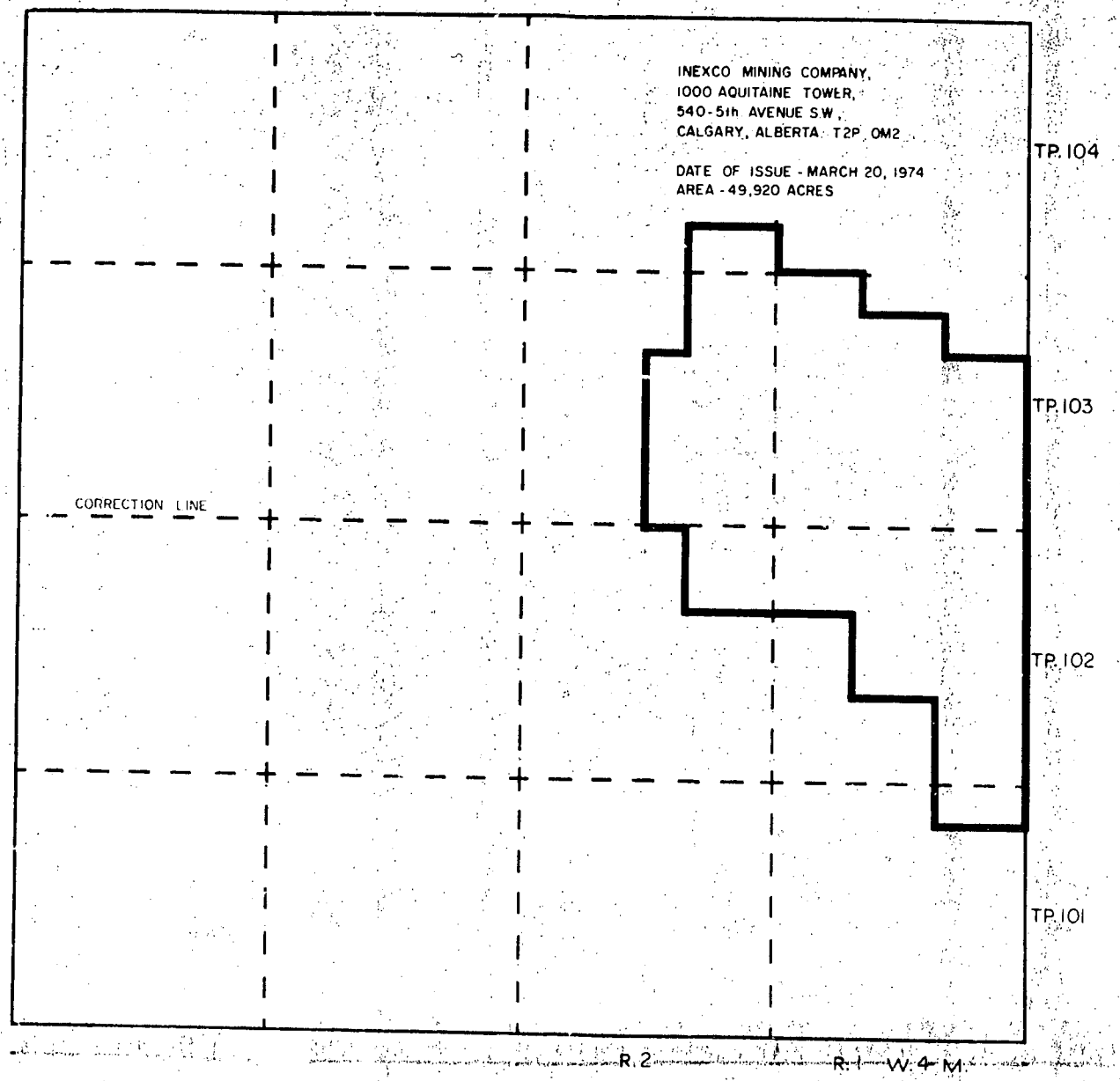
SOUTHWEST ATHABASCA PROJECT

GEOLOGY AND DISPOSITION MAP IN ALBERTA PERMITS NOS. 179 - 180 - 181

COMPILED: K. THIEL	DATE: MAR. 1975	TENEMENT:	MAP No. 1
DRAWN: F. del Val	DATE:	PLAN No.	REPORT No.
LAST REVISION:		SCALE: 1" = 250,000	PROJECT No.
T.C.TO BONN:	REF: NTS 74 E		FILE No.

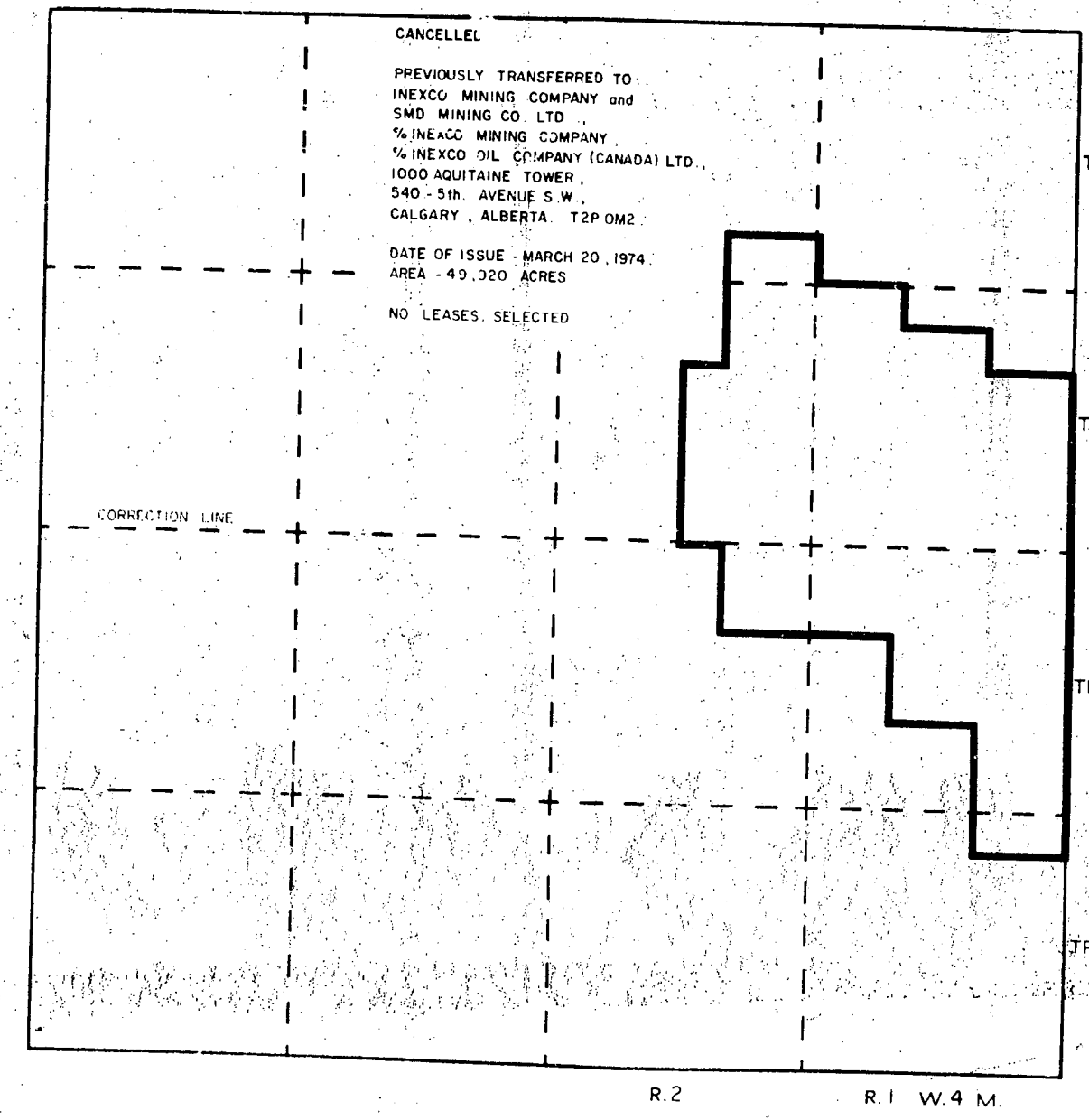
1974-004

QUARTZ MINERAL EXPLORATION PERMIT NO. 179a



1974

QUARTZ MINERAL EXPLORATION PERMIT NO. 179 b



179000Y

19740004

REPORT ON PERMITS

179, 180, AND 181.

ALBERTA.

DR. K. THIEL

COPY #3

Missing Permit No. 179 (a & b),
Permit No. 180, Permit No. 181

[redacted]

18-April-06

1. INTRODUCTION

1.1 AREA OF INVESTIGATION

Target of investigation was the SW rim of the Athabasca Sandstone Basin, which is located in the north-eastern part of Alberta. The investigations were carried out by URANERZ EXPLORATION AND MINING LTD. as operator in a joint venture with Inexco Mining Co. and the Saskatchean Government as partners with equal interest.

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The sole purpose of investigation was to locate uranium mineralization which might occur along the rim of the Athabasca Sandstone Basin.

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Field work commenced May 23, 1974 for the Saskatchewan portion of the program; the Alberta permits were subjected to investigation during the latter part of the summer.

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1 Beaver fixed-wing float plane

1, Bell G4A Helicopter

1, GMC Crew Cabin Truck, in operational base in La Ronge.

2. GENERAL INFORMATION

2.1 LOCALITY

Permits 179, 180, and 181 are contiguous mineral dispositions, each 49920 acres in size in northeastern Alberta within Townships 102, 103, 104, and 105 Ranges 1 to 4.

2.2 COMMUNICATION AND ACCESS

The only means of access to the area is by float-equipped aircraft from Fort McMurray, Alberta or Buffalo Narrows and La Ronge, Sask.

Due to the lack of lakes in this area transportation within the area is very restricted and done most conveniently by helicopters. La Ronge was operational base for this project.

3. PREVIOUS SURVEYS AND ACTIVITIES

3.1 TOPOGRAHIC MAPPING

The areas of investigation are covered by National Topograhic Survey sheets 74L and 74E at the scale of 1:250,000.

Airphotos, at a scale of 1:40,000, are available from the Alberta Research Council in Edmonton. Following flight line numbers and runs cover the area.

See enclosed Table.

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1831 55 to 61
1777 58 to 66
1831 28 to 38
1820 51 to 65
1818 86 to 94
1818 153 to 158
1783 114 to 129
1783 49 to 63
1779 82 to 94
1839 82 to 94
1779 158 to 162
1780 79 to 94
2126 25 to 29
2126 1 to 8
1831 10 to 21
1776 144 to 152
1776 128 to 130
1722 113 to 121
1722 60 to 68
1727 13 to 25
1709 122 to 125
1786 55 to 70
1786 132 to 147

3.2 GEOLOGICAL MAPPING

No detailed geological mapping was ever conducted in this area.

G.S.C. Publications.

Map 16, Firebag River Area by L.P. Tremblay, 1960

Memoir 313 Devonian Stratigraphy of Northeastern, Alberta and north-eastern Saskatchewan by A.W. Norris, 1963

3.3 GEOPHYSICAL SURVEYS

The area is completely covered by aero-magnetic maps surveyed by the Geological Survey of Canada at a scale of 1:62,360

4. GENERAL GEOLOGY

4.1 REGIONAL GEOLOGY

Rocks underlying the area of investigation belong to the Churchill structural province, which contains a wide variety of Cambrian units. During the lower Proterozoic (Aphebian) several northeast trending troughs were formed in the Archean basement. These troughs were filled with sediments derived from the Archean uplands bordering its rims. Two subparallel troughs are differentiated at the present time, the Wollaston Lake and Virgin River Fold Belts.

More recent theories recognize only the one major fold belt which include the Wollaston and Virgin River domains

as less metamorphic equivalents of the structural high metamorphic cental zone. Major tectonic lineaments separate this fold belt from the Archean basement.

After the Hudsonian orogeny the metamorphic complex was peneplained and, during the Helikian, the Athabasca sandstone was deposited.

4.2 STATIGRAPHY

Archean rocks:	orthogneiss, paragneiss, granite gneiss, migmatites
Lower Proterozoic:	(Virgin River Fold Belt) metaarkose, meta-quartzite biotite-hornblende-garnet-sillimanite-corderite gneiss, calc silicate rock, felsic and mafic meta volcanics.
Middle Proterozoic:	basal conglomerates and sandstone (Athabasca Formation)
Intrusive Rocks:	granites, diorites and post-Athabasca diabase.

In the very southwest part of the area of investigation the following strata occur:

Middle Devonian:	shale and reef dolomites
Upper Devonian:	argillaceous limestone and shale

Undivided Cretaceous: sandstone, sands, oil-sands.

4.3 STRUCTURE AND METAMORPHISM

Structural deformation and metamorphism of the Lower Proterozoic Sediments are the result of the Hudsonian orogeney.

Several periods of folding are known. Tight isoclinal folding with northeast trending axes is the major structural feature representing the youngest period of folding. Where older east-west folds are evident, arcuate-shaped and even closed interferference type outcrop patterns can be found as a result of both folding periods.

Metamorphism ranges from lower greenschist to upper amphibolite facies.

Several generations of faults are present. Axial plane faulting (NE) is a major feature within the Lower Proterozoic troughs contemporary with the Hudsonian orogenesis. Post Athabasca Block faulting has taken place.

4.4 ECONOMIC GEOLOGY

Significant uranium deposits have been found in the past few years in the vicinity of the unconformity between the Lower Proteroic assemblage and the overlying Middle Proterozoic-Athabasca Sandstone. Two hundred km northeast of the area of investigation, Gulf Minerals found the Rabbit Lake Deposit in 1968 and Mokta (Canada) Ltd. discovered their de-

posits 70 km north in the years 1968 -1972.

Knipping (IAEA-SM-138/38) assumes supergene origin for the uranium emplacement at Rabbit Lake. The hypothetical process is described by him as follows:

" Uraniferous water circulated through the porous host rock which acted as a trap during a certain geological time interval when changing ph-Eh values produced the exact conditions for precipitation of quadrivalent uranium. The movement of the waters was downward or at least the main component was descending and not ascending ".

5. LOCAL GEOLOGY

No outcrops were observed within the three permits 179, 180 and 181, but by extrapolating geological data from Saskatchewan it is assumed that mesozoic sedimentary rocks cover the southern part of the permits, while Athabasca-Sandstone underlies the northern part of it. (Map # 1).

6. INVESTIGATIONS

The following exploration methods were applied:

1) Airborne Radiometric Survey by helicopter.
2) Geological Mapping from helicopter.
3) Lake bottom sediment sampling.
4) Surficeal Geological Studies.

6.1 AIRBORNE SURVEY

According to the original layout of the 1974 program the survey was started in grid pattern employing a line spacing of o.5 miles. Soon, however, this proved unsatis-

factory for the following reasons:

1) The proposed areas to be surveyed were too large because of the uncertain position of the unconformity.

2) The SW rim of the Athabasca Basin is 90% covered by lacustrine sediments, outwash plains and muskeg. The unconformity itself is nver (¦) exposed. The chances of locating radiometric anomlies is sand plains is nil.

Therefore the approach was changed as follows:

1) Airborne mapping for closer delineation of the unconformity.

2) Subsequent structural flying and surveying within the area four miles up and eight miles down the glacial strike of the discordance.

Under structural flying is understood:

a) all kinds of glacial and post glacial drainage systems

b) rivers and creeks

c) drumlins.

d) eskers

e) ridges

f) lake shore lines

g) muskegs

h) outcrops and boulder trains.

Using these criteria the area of investigation was reduced considerably.

The airborne survey was terminated when it was realized that the Helikian discordance was not exposed within the permits.

For the survey a GAM - 2S from Scintrex was used.

6.1.1 Helicopter

For the survey, a Helicopter, BELL G4A. from Athabasca Airways Ltd. , Prince Albert, was used. Survey speed was approximately 60 mph, maintaining an altitude between 100 and 150 feet above ground.

6.2 GEOCHEMICAL SURVEY

Lake bottom sediment sampling has been carried out in the permits, using helicopter and fixed-wing for transportation. All samples were assayed for U_3O_8, Zn, Cu, and Ni.

To retrieve the samples a dart sampler was used. The larger and deeper lakes were sampled using a fixed wing aircraft. For the smaller ones, the helicopter was used.

7. RESULTS

7.1 RADIOMETRIC ANOMALIES

No radiometric anomalies were found during the survey. Appendix I lists all sample descriptions shown on Map #2.

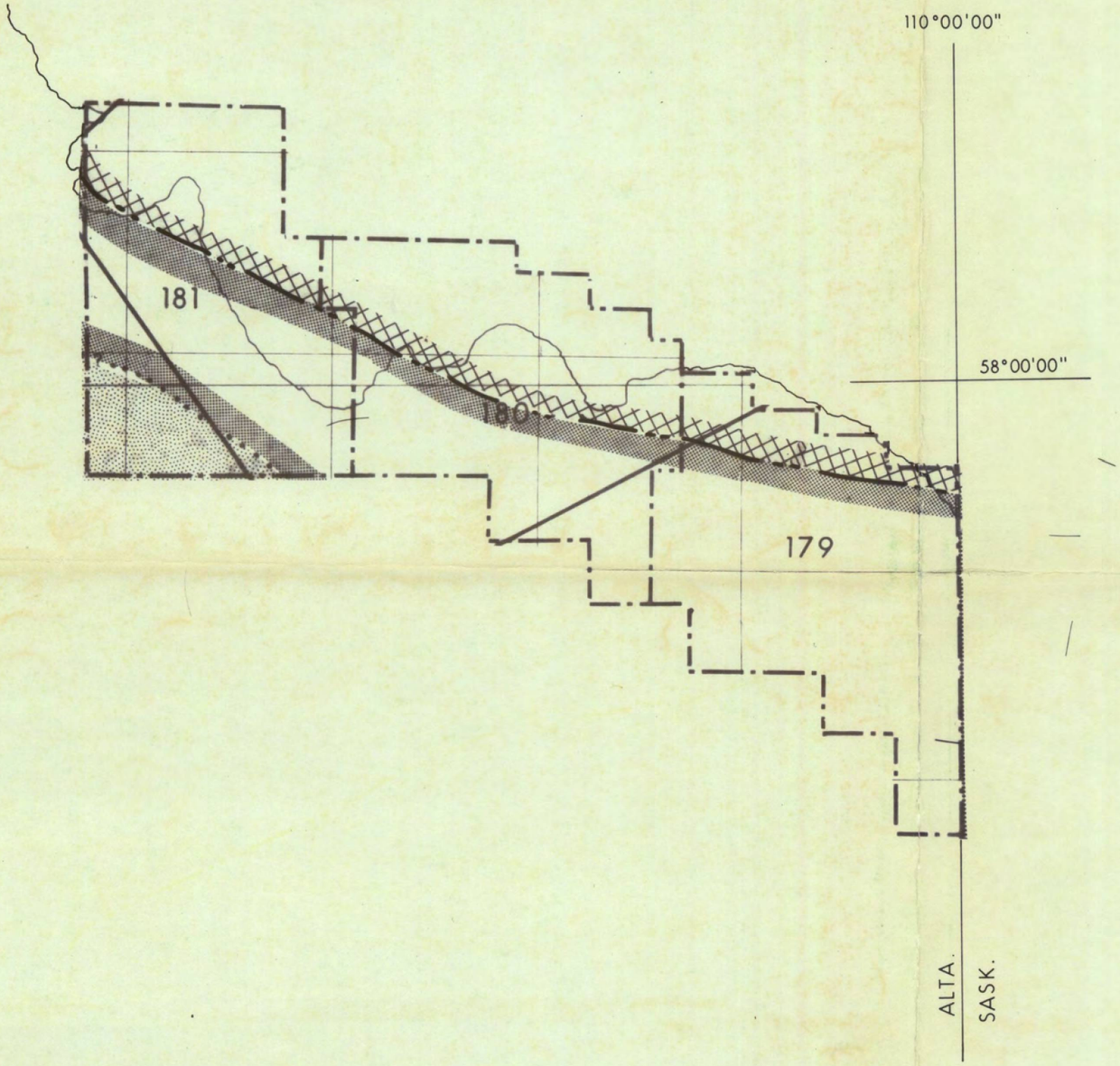
8. ASSESSMENT OF POTENTIAL

No Uranium potential can be given to permits 179, 180, and 181 since no Helikian discordance is exposed within the permits. As mentioned earlier in this report, Mesozoic sediments overlies the Athabasca Sandstone. No Proterozoic or older basement gneiss is exposed in the area.

9. RECOMMENDATIONS

It is recommended to terminate Uranium prospecying for vein type pitch-blende deposits with close relationship to the Helikian discordance, since no Helikian discordance exixts within permit # 179, 180, and 181.

SAMPLE NUMBER	DATE TAKEN		TAKEN BY	LOCATION	SAMPLE DESCRIPTION	DEPTH TAKEN	ASSAY VALUE			
	DAY	MONTH					U_3O_8	Zn	Cu	Ni
11174	24	July	DC	Maybelle Lake	brown mud	5 ft.	---	71	10	5
11229	26	"	"	Maybelle River	dark green mud	33 ft.	1.1	36	10	15
11230	"	"	"	4 mi. SE Harwood Lake	greenish mud	9 ft.	1.3	55	7	10
11232	"	"	"	Harwood Lake	green mud	22 ft.	---	38	8	12
11236	27	"	"	4 mi. W Harwood Lake	green mud	9 ft.	---	75	10	11
11241	"	"	"	1 mi. NE Nash Lake	greenish mud	28 ft.	2.0	67	8	4
11242	"	"	"	4 mi. SW Nash Lake	greenish mud	14 ft.	1.7	52	7	5
11243	"	"	"	4 mi. NE Doug Lake	green mud	10 ft.	0.7	44	8	11
11244	"	"	"	2 mi. NW Hauk Lake	green mud	22 ft.	---	120	8	10
11245	"	"	"	Hauk Lake	brown mud	8 ft.	1.8	59	7	5



LEGEND

- HELIKIAN ATHABASCA SANDSTONE FORMATION
- MESOZOIC SEDIMENTS
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- PERMIT BOUNDARY
- GEOLOGICAL BOUNDARY (ASSUMMED)

URANERZ EXPLORATION & MINING LTD.

SOUTHWEST ATHABASCA PROJECT

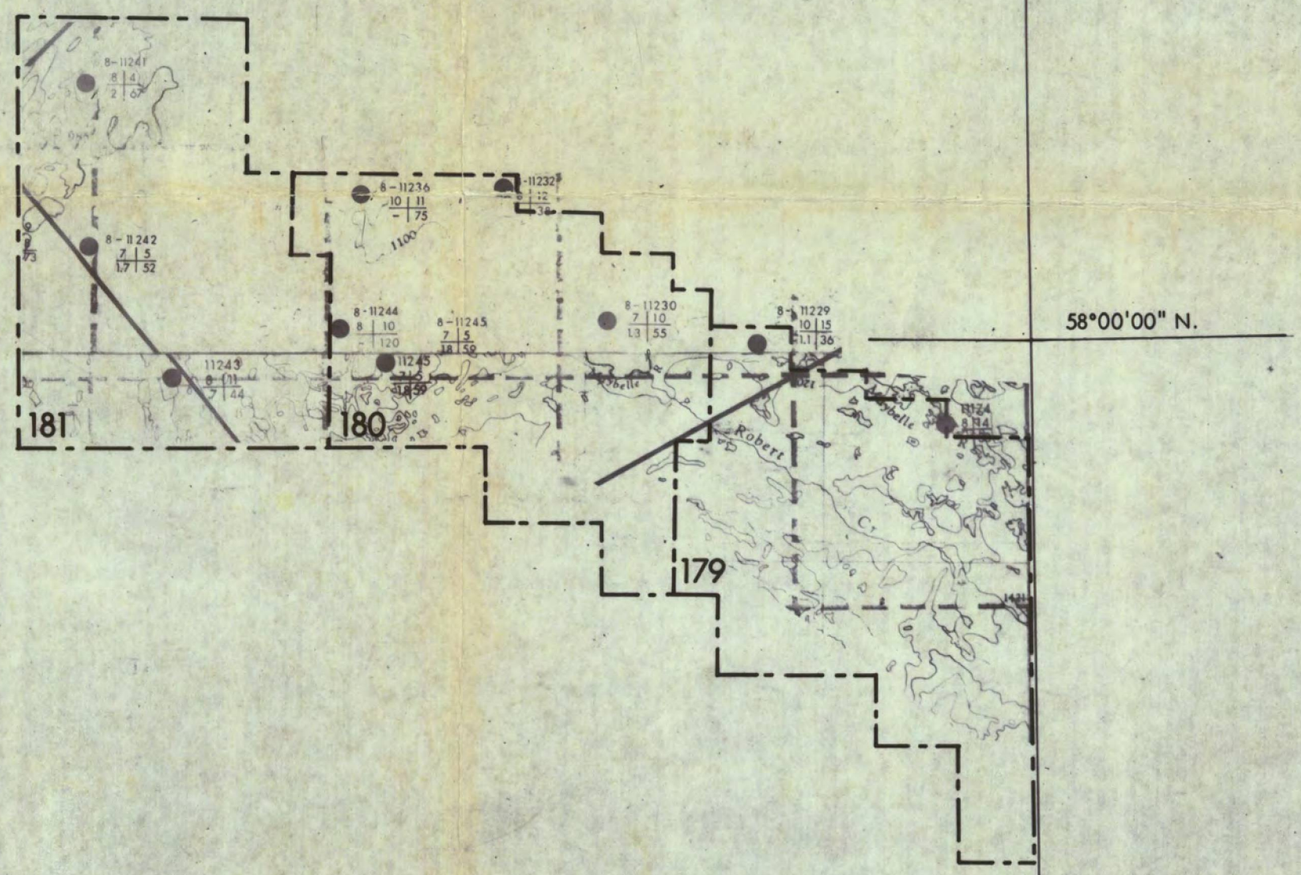
GEOLOGY AND DISPOSITION MAP IN ALBERTA PERMITS NOS. 179 - 180 - 181

COMPILED: K. THIEL	DATE: MAR. 1975	TENEMENT:	MAP No. 1
DRAWN: F. del Val	DATE:	PLAN No.	REPORT No.
LAST REVISION:		SCALE: 1" = 250,000	PROJECT No.
T.C.TO BONN:	REF: NTS 74E		FILE No.

1974 0004

110°00'00 W.

58°00'00" N.



ALBERTA

SASKATCHEWAN

LEGEND

Cu	Ni
U308	Zn

in ppm.

URANERZ EXPLORATION & MINING LTD.

SOUTHWEST ATHABASCA PROJECT

LAKE BOTTON SEDIMENTS SAMPLING MAP ALBERTA

PERMIT NOS. 179 - 180 - 181

COMPILED: K. L. THIEL	DATE: FEB. 1975	TENEMENT:	MAP No. 2
DRAWN: F. del Val	DATE: FEB. 1975	PLAN No.	REPORT No.
LAST REVISION:		SCALE: 1: 250,000	PROJECT No. 7152
T.C. TO BONN:	REF: NTS 74 E		

(1984) 1974-0004

REPORT ON PERMITS

179, 180, AND 181.

ALBERTA.

DR. K. THIEL

COPY #4

Missing all figures.

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11245	"	"	"	Hauk Lake	brown mud	8 ft.	1.8	59	7	5

QUARTZ MINERAL EXPLORATION PERMIT NO. [illegible]

This permit was cancelled and the Research Council has not as yet received any reports for it.

REPORT ON PERMITS

179, 180, AND 181.

ALBERTA.

DR. K. THIEL

COPY #5

Missing all figures.

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1, MAP-2 Magnetometer (Scintrex) rental

1, ETR-1 Emanometer (Scintrex)

1, Cessna 185 fixed-wing float plane

1 Beaver fixed-wing float plane

1, Bell G4A Helicopter

1, GMC Crew Cabin Truck, in operational base in La Ronge.

2. GENERAL INFORMATION

2.1 LOCALITY

Permits 179, 180, and 181 are contiguous mineral dispositions, each 49920 acres in size in northeastern Alberta within Townships 102, 103, 104, and 105 Ranges 1 to 4.

2.2 COMMUNICATION AND ACCESS

The only means of access to the area is by float-equipped aircraft from Fort McMurray, Alberta or Buffalo Narrows and La Ronge, Sask.

Due to the lack of lakes in this area transportation within the area is very restricted and done most conveniently by helicopters. La Ronge was operational base for this project.

3. PREVIOUS SURVEYS AND ACTIVITIES

3.1 TOPOGRAHIC MAPPING

The areas of investigation are covered by National Topograhic Survey sheets 74L and 74E at the scale of 1:250,000.

Airphotos, at a scale of 1:40,000, are available from the Alberta Research Council in Edmonton. Following flight line numbers and runs cover the area.

See enclosed Table.

TABLE I

Airphotos Covering Operational Area "B" in Alberta:

1831 55 to 61
1777 56 to 66
1831 23 to 30
1820 51 to 65
1813 96 to 9[illegible]
1813 153 to 153
1783 114 to 129
1783 49 to 62
1779 82 to 9[illegible]
1839 82 to 9[illegible]
1779 153 to 162
1780 79 to 9[illegible]
2126 25 to 29
2126 1 to 3
1831 10 to 21
1776 144 to 152
1776 120 to 130
1782 113 to 121
1782 60 to 63
1787 13 to 25
1709 122 to 125
1786 55 to 70
1786 132 to 147

3.2 GEOLOGICAL MAPPING

No detailed geological mapping was ever conducted in this area.

G.S.C. Publications.

Map 16, Firebag River Area by L.P. Tremblay, 1960

Memoir 313 Devonian Stratigraphy of Northeastern, Alberta and north-eastern Saskatchewan by A.W. Norris, 1963

3.3 GLOPHYSICAL SURVEYS

The area is completely covered by aero-magnetic maps surveyed by the Geological Survey of Canada at a scale of 1:62,360

4. GENERAL GEOLOGY

4.1 REGIONAL GEOLOGY

Rocks underlying the area of investigation belong to the Churchill structural province, which contains a wide variety of Cambrian units. During the lower Proterozoic (Aphebian) several northeast trending troughs were formed in the Archean basement. These troughs were filled with sediments derived from the Archean uplands bordering its rims. Two subparallel troughs are differentiated at the present time, the Wollaston Lake and Virgin River Fold Belts.

More recent theories recognize only the one major fold belt which include the Wollaston and Virgin River domains

as less metamorphic equivalents of the structural high metamorphic cental zone. Major tectonic lineaments separate this fold belt from the Archean basement.

After the Hudsonian orogeny the metamorphic complex was peneplained and, during the Helikian, the Athabasca sandstone was deposited.

4.2 STATIGRAPHY

Archean rocks:	orthogneiss, paragneiss, granite gneiss, migmatites
Lower Proterozoic:	(Virgin River Fold Belt) meta-arkose, meta-quartzite biotite-hornblende-garnet-sillimanite-corderite gneiss, calc silicate rock, felsic and mafic meta volcanics.
Middle Proterozoic:	basal conglomerates and sandstone (Athabasca Formation)
Intrusive Rocks:	granites, diorites and post-Athabasca diabase.

In the very southwest part of the area of investigation the following strata occur:

Middle Devonian:	shale and reef dolomites
Upper Devonian:	argillaceous limestone and shale

Undivided Cretaceous: sandstone, sands, oil-sands.

4.3 STRUCTURE AND METAMORPHISM

Structural deformation and metamorphism of the Lower Proterozoic Sediments are the result of the Hudsonian orogeney.

Several periods of folding are known. Tight isoclinal folding with northeast trending axes is the major structural feature representing the youngest period of folding. Where older east-west folds are evident, arcuate-shaped and even closed interferference type outcrop patterns can be found as a result of both folding periods.

Metamorphism ranges from lower greenschist to upper amphibolite facies.

Several generations of faults are present. Axial plane faulting (NE) is a major feature within the Lower Proterozoic troughs contemporary with the Hudsonian orogenesis. Post Athabasca Block faulting has taken place.

4.4 ECONOMIC GEOLOGY

Significant uranium deposits have been found in the past few years in the vicinity of the unconformity between the Lower Proteroic assemblage and the overlying Middle Proterozoic-Athabasca Sandstone. Two hundred km northeast of the area of investigation, Gulf Minerals found the Rabbit Lake Deposit in 1968 and Mokta (Canada) Ltd. discovered their de-

posits 70 km north in the years 1968 -1972.

Knipping (IAEA-SM-138/38) assumes supergene origin for the uranium emplacement at Rabbit Lake. The hypothetical process is described by him as follows:

" Uraniferous water circulated through the porous host rock which acted as a trap during a certain geological time interval when changing ph-Eh values produced the exact conditions for precipitation of quadrivalent uranium. The movement of the waters was downward or at least the main component was descending and not ascending ".

5. LOCAL GEOLOGY

No outcrops were observed within the three permits 179, 180 and 181, but by extrapolating geological data from Saskatchewan it is assumed that mesozoic sedimentary rocks cover the southern part of the permits, while Athabasca Sandstone underlies the northern part of it. (Map # 1).

6. INVESTIGATIONS

The following exploration methods were applied:

1) Airborne Radiometric Survey by helicopter.
2) Geological Mapping from helicopter.
3) Lake bottom sediment sampling.
4) Surficeal Geological Studies.

6.1 AIRBORNE SURVEY

According to the original layout of the 1974 program the survey was started in grid pattern employing a line spacing of o.5 miles. Soon, however, this proved unsatis-

factory for the following reasons:

1) The proposed areas to be surveyed were too large because of the uncertain position of the unconformity.

2) The SW rim of the Athabasca Basin is 90% covered by lacustrine sediments, outwash plains and muskeg. The unconformity itself is nver (!) exposed. The chances of locating radiometric anomlies is sand plains is nil.

Therefore the approach was changed as follows:

1) Airborne mapping for closer delineation of the unconformity.

2) Subsequent structural flying and surveying within the area four miles up and eight miles down the glacial strike of the discordance.

Under structural flying is understood:

a) all kinds of glacial and post glacial drainage systems.

b) rivers and creeks

c) drumlins.

d) eskers

e) ridges

f) lake shore lines

g) muskegs

h) outcrops and boulder trains.

Using these criteria the area of investigation was reduced considerably.

The airborne survey was terminated when it was realized that the Helikian discordance was not exposed within the permits.

For the survey a GAM - 2S from Scintrex was used.

6.1.1 Helicopter

For the survey , a Helicopter, BELL G4A. from Athabasca Airways Ltd. , Prince Albert, was used. Survey speed was approximately 60 mph, maintaining an altitude between 100 and 150 feet above ground.

6.2 GEOCHEMICAL SURVEY

Lake bottom sediment sampling has been carried out in the permits, using helicopter and fixed-wing for transportation. All samples were assayed for U_3O_8, Zn, Cu, and Ni.

To retrieve the samples a dart sampler was used. The larger and deeper lakes were sampled using a fixed wing aircraft. For the smaller ones, the helicopter was used.

7. RESULTS

7.1 RADIOMETRIC ANOMALIES

No radiometric anomalies were found during the survey. Appendix I lists all sample descriptions shown on Map #2.

8. ASSESSMENT OF POTENTIAL

No Uranium potential can be given to permits 179, 180, and 181 since no Helikian discordance is exposed within the permits. As mentioned earlier in this report, Mesozoic sediments overlies the Athabasca Sandstone. No Proterozoic or older basement gneiss is exposed in the area.

9. RECOMMENDATIONS

It is recommended to terminate Uranium prospecying for vein type pitch-blende deposits with close relationship to the Helikian discordance, since no Helikian discordance exixts within permit # 179, 180, and 181.