MAR 19740004: ATHABASCA SANDSTONE BASIN

Received date: Dec 31, 1974

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Alberta

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19740004 ECONOMIC MINERALS FILE REPORT NO U-AF-110(1)

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

1.3 TIME OF INVESTIGATION

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

GAM-2 Spectrometer (Scintrex)
 TV-5 Spectrometer (McPhar)
 SPP-2 Scintillometer (SRAT)
 MAP-2 Magnetometer (Scintrex) rental
 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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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:

Lower Proterozoic:

Middle Proterozoic:

Intrusive Rocks:

orthogneiss, paragneiss, granite gneiss, migmatites (Virgin River Fold Belt) meta-arkose, meta-quartzite biotite-hornblende-garnetsillimanite-corderite gneiss, calc silicate rock, felsic and mafic meta volcanics. basal conglomerates and sandstone (Athabasca Formation) granites, diorites and post-Athabasca diabase.

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

Middle Devonian:

Upper Devonian:

shale and reef dolomites 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 deposits 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 0.5 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 rever (;) 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 U₃0₈, 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. <u>RESULTS</u>

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. <u>RECOMMENDATIONS</u>

It is recommended to terminate Uranium prospec**t**ing 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	DATE TAKEN		TAKEN	LOCATION	SAMPLE	DEPTH	ASSAY VALUE				
NUMBER	DAY	MONTH	ВҮ		DESCRIPTION	TAKEN	U ₃ 0 ₈	Zn	Cu	Ni	
11174	24	July	DC	Maybelle Lake	brown mud	5 ft.		71	10	5	
11229	26	11		Maybelle River	dark green	33 ft.	1.1	36	10	15	
11230	11	11	11	4 mi. SE Harwood Lake	greenish	9 ft.	1.3	55	7	10	
11232	11	11	**	Harwood Lake	green mud	22 ft.		38	8	12	
11236	27	π	11	4 mi. W Harwood Lake	green mud	9 ft.		75	10	11	
11241	11	11	11	l mi. NE Nash Lake	greenish	28 ft.	2.0	67	8	4	
11242	11	11	11	4 mi. SW Nash Lake	mud greenish mud	14 ft.	1.7	52	7	5	
11243		TT		4 mi. NE Doug Lake	green mud	10 ft.	0.7	44	8	11	
11244		11		2 mi. NW Hauk Lake	green mud	22 ft.		120	8	10	
11245	"	11	11	Hauk Lake	brown mud	8 ft.	1.8	59	7	5	
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This permit was cancelled and the Research Council

has not as yet received any reports for it.











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HELIKIAN ATHABASCA SANDSTONE FORMATION

MESOZOIC SEDIMENTS

APHEBIAN & ARCHEAN BASEMENT GNEISS

PERMIT BOUNDARY

GEOLOGICAL BOUNDARY (ASSUMMED)

URA	ANERZ EXPLO	ORATION & MIN	ING LTD.
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K. THIEL dei Val	IN PERMITS NO DATE: MAR. 1975 DATE:	ALBERTA OS. 179 - 180 - TENEMENT: PLAN NO. SCALE: 1" = 250,000	- 181 MAP No. 1 REPORT No. PROJECT No.

19740004



19740004



REPORT ON PERMITS

179, 180, AND 181.

ALBERTA.

DR. K. THIEL

(OPY #2 J.Summe 18-April-06 Missing Permit No. 175, Remit No. 180, Permit No. 181.

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7. RESULTS

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11245	11			Hauk Lake	brown mud	8 ft.	1.8	59	7	5
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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

PERMITS NOS. 179 - 180 - 181

THIEL	DATE: MAR. 1975	TENEMENT:	MAP No. 1	
el Val	DATE	PLAN No.	REPORT No.	1000
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	REF: NTS 74 E		FILE No.	

19740004



QUARTZ MINERAL EXPLORATION PERMIT NO. 1796

CANCELLEL

PREVIOUSLY TRANSFERRED TO INEXCO MINING COMPANY and SMD MINING CO. LTD % INEXCO MINING COMPANY % INEXCO DIL COMPANY (CANADA) LTD., 1000 AQUITAINE TOWER, 540 - 5th. AVENUE S.W., CALGARY, ALBERTA. T2P 0M2

> DATE OF ISSUE - MARCH 20, 1974 . AREA - 49,020 ACRES

> > NO LEASES, SELECTED



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19740004



REPORT ON PERMITS

179, 180, AND 181.

ALBERTA.

DR. K. THIEL

(OPY # 3 Missing Permit No. 179 (abb), Permit No. 180, Permit No. 181

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 the 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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Personnel engaged in the operation were: Uranerz Personnel

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

2. GENERAL INFORMATION

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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.

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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. <u>PREVIOUS SURVEYS AND ACTIVITIES</u>

3.1 <u>TOPOGRAHIC MAPPING</u>

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.

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TABLE I

Airphotos Covering Operational Area "B" in Alberta:

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

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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.

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4.2 STATIGRAPHY

Archean rocks:

Lower Proterozoic:

Middle Proterozoic:

Intrusive Rocks:

orthogneiss, paragneiss, granite gneiss, migmatites (Virgin River Fold Belt) metaaarkose, meta-quartzite biotite-hornblende-garnetsillimanite-corderite gneiss, calc silicate rock, felsic and and mafic meta volcanics. basal conglomerates and sandstone (Athabasca Formation) granites, diorites and post-Athabasca diabase.

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

shale

Middle Devonian:

shale and reef dolomites argillaceous limestone and

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Undivided Cretaceous:

sandstone, sands, oil-

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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 outcropepatterns 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.

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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 deposits 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:

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- 2) Geological Mapping from helicopter.
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According to the original layout of the 1974 program the survey was started in grid pattern employing a line spacing of 0.5 miles. Soon, however, this proved unsatis-

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factory for the following reasons:

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

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Lake bottom sediment sampling has been carried out in the permits, using helicopter and fixed-wing for transportation. All samples were assayed for U308, 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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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.

	SAMPI F	DATE TAKE	N	ТАКЕМ	LOCATION			ASS	AY V	ALUE	
	NUMBER	DAY	MONTH	BY	LUCATION	SAMPLE DESCRIPTION	DEPTH TAKEN	U ₃ 0 ₈	Zn	Cu	Ni
	11174	24	^r July	D.C	Maybelle Lake	brown mud	5 ft.		71	10	5
	11229	26	11	**	Maybelle River	dark greer	33 ft.	1.1	36	10	15
	11230	11	11	11 .	4 mi. SE Harwood Lake	mud greenish	9 ft.	1.3	55	7	10
	11232	TT	11	"	Harwood Lake	green mud	22 ft.		38	· 8	12
	11236	27	11	11	4 mi. W Harwood Lake	green mud	9 ft.		75	10	11
	11241	11	11	11	l mi. NE Nash Lake	greenish	28 ft.	2.0	67	8	4
	11242	11	**		4 mi. SW Nash Lake	greenish	14 ft.	1.7	52	7	5
	11243		"	п	4 mi. NE Doug Lake	green mud	10 ft.	0.7	44	. 8	11
	11244		11		2 mi. NW Hauk Lake	green mud	22 ft.		120	8	10
	11245	11		11	Hauk Lake	brown mud	8 ft.	1.8	59	7	5
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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

PERMITS	NOS.	179 -	180 -	181
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C. THIEL	DATE: MAR. 1975	TENEMENT:	MAP No. 1
el Val	DATE:	PLAN No.	REPORT No.
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REPORT ON PERMITS

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DR. K. THIEL

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INTRODUCTION

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The sole purpose of investigation was to locate uranium mineralization which might occur along the rime 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 wore subjected to investigation during the latter part of the summer. Personnel engaged in the operation were: Uramers Personnel

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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

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- 1, TV-5 Spectrometer (McPhar)
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- 1, MAP-2 Magnetometer (Scintrex) rental
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Beaver fixed-wing float plane

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 9						e e e e e e e e e e e e e e e e e e e
SAMPLE NUMBER	DATE TAKEN	TAKEN H FY	LOCATIO::	SAMPLE	DEPTIL	-ASSAY VALUE
11174 11229 11230 11232 11236 11241 11242 11243 11244 11245	24 * July 26 " " " 27 " " " " " " " " "	y DC "" "" "" "" ""	Maybelle Lake Maybelle River - mi. SE. Marwood Lake Harwood Lake 4 mi. W Harwood Lake 1 mi. NE Nash Lake 4 mi. SW Nash Lake 4 mi. NE Doug Lake 2 mi. NW Hauk Lake Hauk Lake	brown mud dark green mud green mud green mud greenish mud green mud green mud green mud brown mud	5 ft. 33 ft. 9 ft. 22 ft. 9 ft. 28 ft. 14 ft. 10 ft. 22 ft. 8 ft.	71 10 1.1 36 10 11 1.3 55 7 10 38 8 12 75 10 11 2.0 67 8 4 1.7 52 7 5 0.7 8 2 120 8 10 1.8 59 7 5

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QUARTZ MINERAL EXPLORATION PERMIT NO.

This permit was cancelled and the Research Council

has not as yet received any reparts for it.



REPORT ON PERMITS

179, 180, AND 181. ALBERTA.

DR. K. THIEL

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the permits.

considerably.

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

Helicopter

6.1.1

6.2

7.

7.1

8.

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.

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 U₃O₈, 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.

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RESULTS

RADIOMETRIC ANOMALIES

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

ASSESSMENT OF POTENTIAL

"o 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.



10.

9. RECOMMENDATIONS

اريه أجناعهت

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

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