MAR 19770027: NORTHEASTERN ALBERTA

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NORCEN ENERGY RESOURCES LIMITED

19770027

FINAL REPORT

1977 EXPLORATION PROGRAM
QUARTZ MINERAL EXPLORATION PERMIT
6876120006

November, 1977

G. McWilliams

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SUMMARY

Norcen Energy Resources Limited, on behalf of the uranium joint venture with Campbell Chibougamau Mines Limited, E & B Explorations Limited and Ontario Hydro holds two blocks of Quartz Mineral Exploration Permits in Northeastern Alberta. The Archer permits which cover 179,200 acres include permits 208, 209, 210 and 211 which were acquired on January 28, 1976. The five Richardson Permits totalling 229,600 acres include permits 6 876 120002 to 6 876 120006 acquired on December 23, 1976.

A surface prospecting and geochemical survey conducted over the Archer permits during the summer of 1976 indicated that the edge of the Athabasca Formation was further west than anticipated. This survey also revealed that the pervasive cover of glacial overburden in the area prevented the useful application of any further surface prospecting in the area. In evaluating the situation, the authors felt that present exploration techniques limited the search for unconformity type Athabasca sandstone uranium deposits to areas where the unconformity between the Athabasca Formation and the underlying basement was less than 152.5 metres (500 feet) below the topographic surface. As a result, 2 permits 212 and 213 were surrendered to the Crown and the five Richardson permits were acquired.

The lack of outcrop and the far travelled nature of the overburden in Northeastern Alberta coupled with the importance of locating the margin of the Athabasca Formation indicated to the authors that a reconnaissance stratigraphic drilling program would be required to narrow search area. The 1977 drilling program over the permit areas was designed to:

a) define the edge of the Athabasca Formation

b) outline the areas where the combined thickness of Athabasca sandstone and overburden was less than 152.5 metres (500 feet).

c) examine the unconformity at the base of the Athabasca Formation

d) determine whether the Athabasca Formation in Norcen permit areas contained a favourable physical and chemical environment for uranium deposition.

e) examine the basement for its potential as a site for trapping uranium from supergene solutions percolating along the unconformity.

The Richardson permits lying to the west of the Richardson River, lie outside the margin of the Athabasca Formation. Drilling in these areas encountered 27.8 metres (91 feet) to 62.5 metres (205 feet) of overburden and 20.5 metres (74 feet) to 133 feet (70.6 metres) of Lower and Middle Devonian sandstone and mudstone overlying Archaean basement rocks.

INTRODUCTION

History

Exploration for uranium in northeastern Alberta was sparked by the announcement by Gulf Minerals of their discovery of a uranium deposit at Rabbit Lake, Saskatchewan in 1968. A massive land acquisition covering most of the Athabasca Sandstone Basin attracted various companies to conduct airborne spectrometer surveys in northeastern Alberta. The absence of outcrop in this area produced discouraging results and very little ground follow-up was attempted. The following list of companies were active in the area:

R.H. King, 1969

Pacific Silver Mines & Oil Ltd., 1969

Fort Reliance Limited & Ensign Oils Ltd., 1969

National Nickel

Geo X

Velocity Surveys

Meyers & Paulson, 1970

MacIntyre Mines, 1969

Canada Southern Petroleum, 1969

Anco Exploration Ltd., 1968

North Canadian Oils Ltd., 1969

Leal Mines, 1969

Radex Minerals, 1969

In 1974 Eldorado Nuclear acquired several permits in northeastern Alberta initiating a second phase of uranium exploration and prospecting. Norcen, under the name of its wholly owned subsidiary, Great Plains Development Company Limited, acquired 6 permits in January of 1976. Several other companies acquired permits and by June, 1976 most of the area available for acquisition over the Athabasca Formation in northeastern Alberta was covered by exploration permits. (Consult the accompanying map for details on the land status in northeastern Alberta and northwestern Saskatchewan).

Drilling

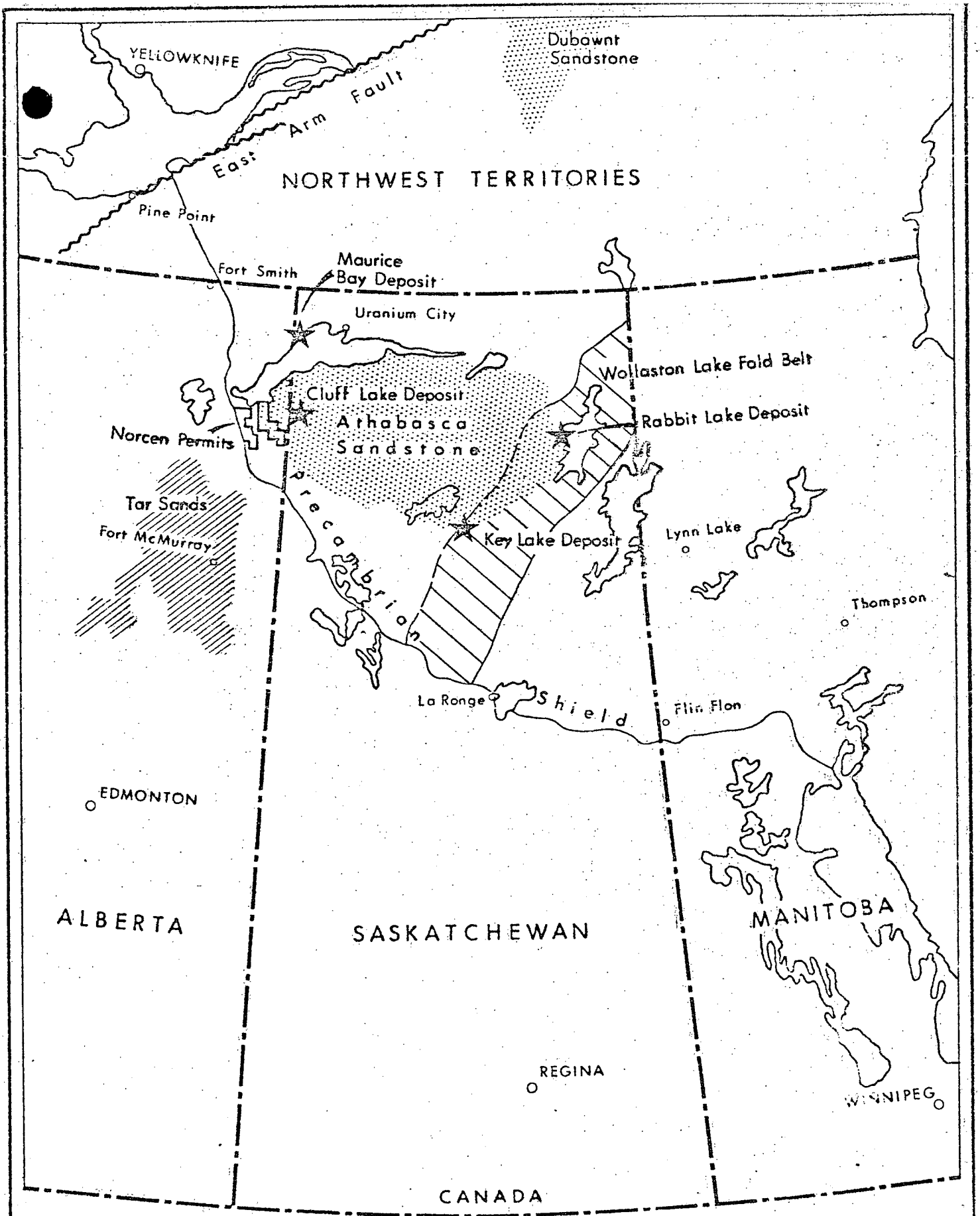
The 1977 exploration program on the Norcen Quartz Mineral Exploration permits consisted of eight diamond drill holes. One hole was drilled on each of the five Richardson Permits and three holes on the four Archer permits. Drilling commenced on August 18 and the last hole completed on September 29, 1977. The drill was mobilized from Leduc to Fort McMurray via truck and from Fort McMurray to Embarras via barge down the Athabasca River. The winter road southeast to Embarras provided good access to the first four drill sites. The drill mounted on a Nodwell trailer and a camp consisting of three 10 x 18 foot tents mounted on trailers provided good mobility. Moves and crew changes to the four holes not accessible by road were carried out with a Bell 206B helicopter from a base camp located at the Embarras air strip.

Drilling Summary

Hole #3

Location: Tp. 103 R7 Sec. 35 NW West of the 4th Meridian
Permit No. 6876120006 N.T.S. Ref. 74E
Started: Aguust 25, 1977 Completed: August 26, 1977

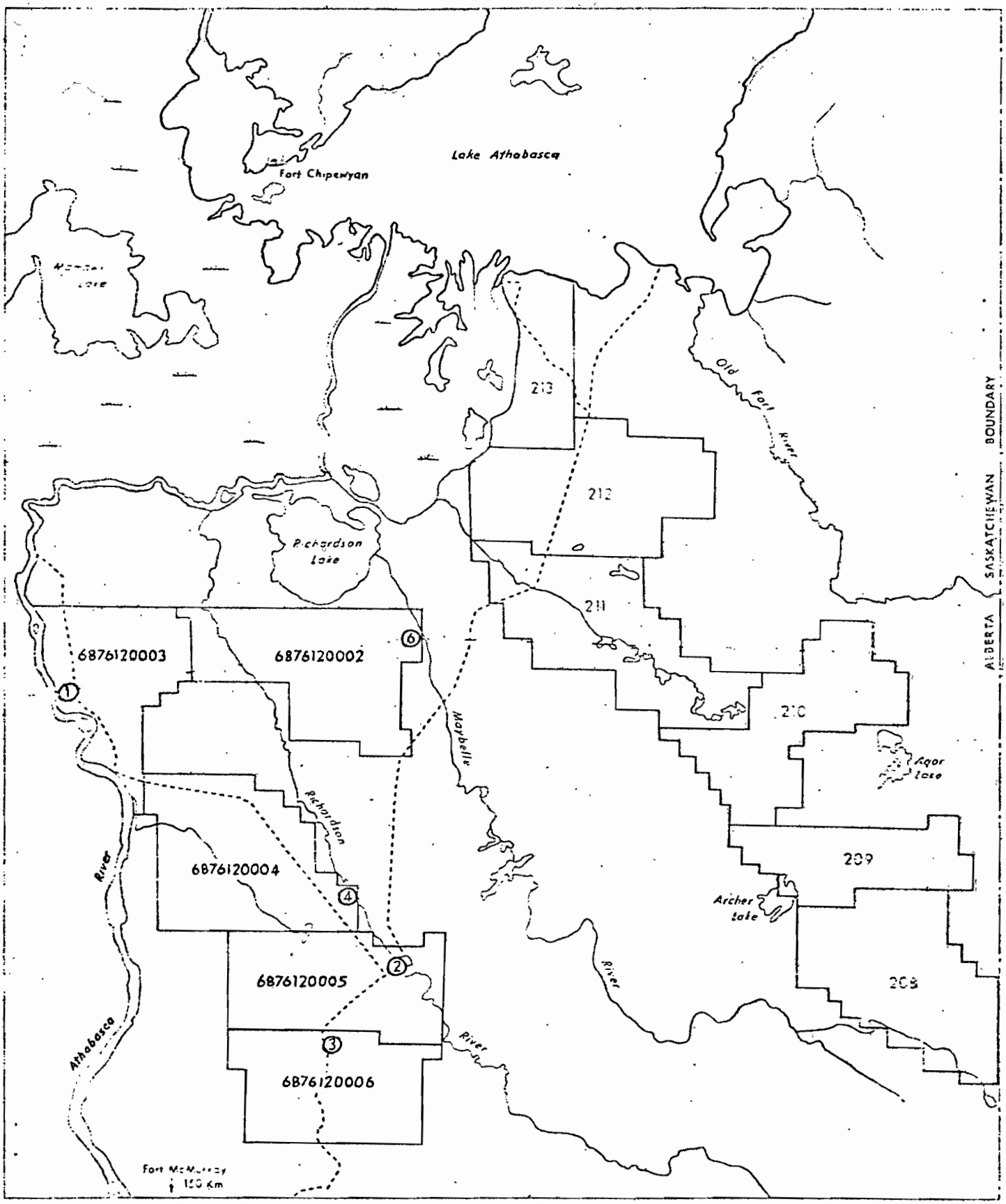
0-91	feet	0-27.8 metres	-	overburden
91-160	feet	27.8-48.8 metres	-	dolomite
160-172	feet	48.8-52.5 metres	-	mudstone
172-197	feet	52.5-60.1 metres	-	mudstone sandstone
197-225	feet	60.1-68.6 metres	-	granitic gneiss



LOCATION OF ATHABASCA SANDSTONE TYPE URANIUM DEPOSITS

FIG. 1

19770027



1977 00 27

FIGURE 2

LOCATION OF DRILL SITES

0 5 15 Km.

0 5 10 Miles

SCALE

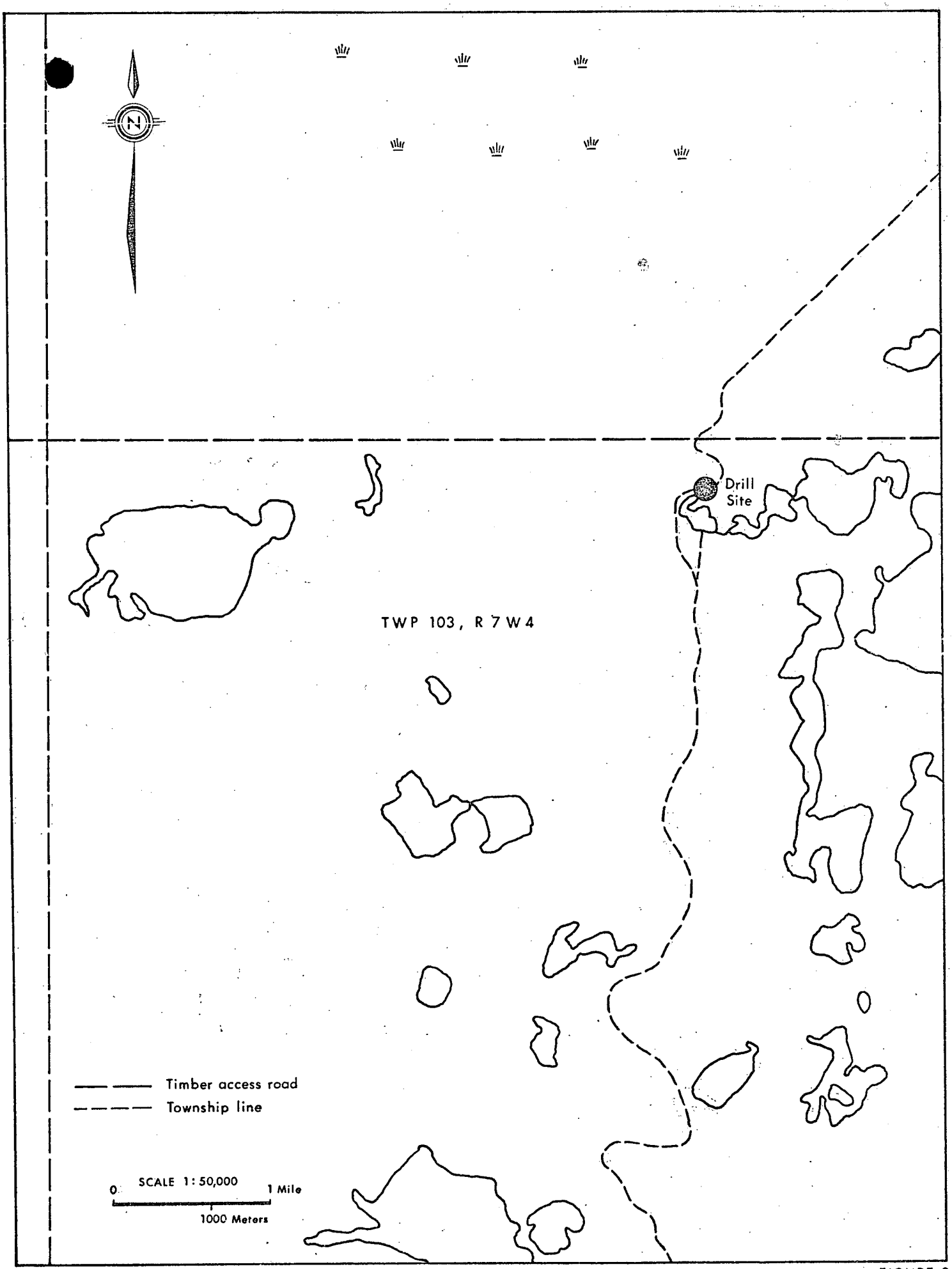


FIGURE 3

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REGIONAL GEOLOGY

The northeast corner of Alberta is occupied by 6,000 square miles of the Canadian Shield, consisting of a complex of igneous, metamorphic and sedimentary rocks ranging in age from 1.7 to 2.3 billion years and forming part of the Churchill Structural Province.

South of Lake Athabasca lie rocks of the Athabasca Formation within the Athabasca intracratonic basin. This Formation covers an area of 40,000 square miles mainly in Saskatchewan and reaches a thickness of 6,000 feet. However, approximately 1,200 square miles of this Athabasca Sandstone occurs in Alberta and appears on islands in Lake Athabasca as well as small peninsula's located as Shelter Point and Fidler Point on the north shore of Lake Athabasca.

The Athabasca Formation is considered to belong to the Paleohelikian Era (1.3 - 1.7 billion years).

DESCRIPTION OF THE ATHABASCA FORMATION

The formation consists of quartz sandstone with minor interbeds of shale and siltstone and a basal gritty sandstone conglomerate unit. The formation lies in an oval shaped basin coverin in excess of 98,800 square kilometres (38,000 square miles) in northwestern Saskatchewan and approximately 31,000 square kilometres (12,000 square miles) in northeastern Alberta. The formation dips toward the centre of the basin where it reaches a thickness of 1,800 metres (6,000 feet). A pronounced unconformity underlies the Athabasca Formation and in some localities probably depending on the composition of the Archaean basement rocks a regolith is developed.

DESCRIPTION OF THE PALEOZOIC FORMATIONS OVERLAPPING THE PRECAMBRIAN SHIELD IN NORTHEASTERN ALBERTA

A wedge of middle and upper Devonian rock unconformably overlaps the edge of the Precambrian Shield in northeastern Alberta. These rocks are not found in outcroppings due to a thick blanket of glacial outwash which covers all of the Norcen permit areas. The closest exposure of these formations occur on the southwest shore of Lake Claire 25.6 kilometres (16 miles) to the northwest and along the banks of the Firebag River 16 kilometres (10 miles) south of the permit area. The author of this report is unfamiliar with Devonian stratigraphy and with the limited drill hole information available has made no attempt at correlating the Devonian rocks with the established stratigraphy of the area. A comprehensive report on the Devonian stratigraphy of northeastern Alberta and northwestern Saskatchewan has been compiled by A.W. Norris (1963).

Description of the Paleozoic Formations in the Norcen Core.

The glacial outwash covering the Paleozoic rocks ranges in thickness from 27.8 metres (91 feet) to 62.5 metres (205 feet) with an average thickness over the four holes of 49 metres (146 feet). The thickness of Paleozoic rocks ranged from 22.6 metres (74 feet) to 40.5 metres (133 feet) with an average thickness of 32.4 metres (106.2 feet) in the four holes drilled. The strata encountered in the four holes varied considerably from one hole to the next. For details in the stratigraphy the reader should refer to the drill logs in the appendix. In general the sequence from top to bottom consists of dolomite, dolomitic mudstone, mudstone gypsum, mudstone sandstone grading down into a coarse rubbly sandstone unconformably overlying the granitic basement complex.

Dolomite is generally massive to laminated, brown in colour forming beds up to 4.3 metres (14 feet) thick. Locally the dolomite shows a wide range in colour from grey to dark brown. Fossils, although not prolific, do occur in the form of crinoid stems and brachiopods.

Mudstones show a considerable range in colour, colours include grey, grey brown, dark brown, red brown and green grey. Mudstones occur interbedded with sandstone, dolomite and gypsum in beds ranging from several centimetres (1 inch) to .3 metres (1 foot).

Gypsum, occurs within the mudstones in thin beds ranging from less than a centimetre (2.5 inches) up to 15 centimetres (6 inches).

Sandstones occur at the bottom of the sequence overlying the unconformity. The best section of the sandstone was encountered in hole number 2 where a sandstone mudstone unit graded down into a very coarse immature rubbly sandstone 4 metres (13 feet) thick. This coarse, grey, poorly sorted, unstratified unit is composed of angular to subrounded quartz and feldspar grains up to 5 millimetres (.2 inches) in diameter. This coarse sandstone unit grades down into a regolithic unit 3 metres (9.9 feet) thick composed of broken fragments of granite gneiss and chert in a coarse sandy matrix which overlies a weathered fractured paragneiss.

No anomalous radioactivity was encountered in the Paleozoic rocks, readings of 1.5 times background were recorded over the rubbly sandstone encountered in hole number 2.

CONCLUSIONS

The primary objective of the 1977 drilling program in northeastern Alberta was to outline the western margin of the Athabasca Formation. Drilling results indicate that Permit 6876120006 lies outside the margin of the Athabasca Basin. The marine Devonian sediments overlying the Archean Basement in this area do not represent a prime exploration target for uranium exploration.

RECOMMENDATIONS

No further work is recommended for this area. This permit should be surrendered to the crown on its anniversary date.

APPENDIX 1

Drill Logs

NORCEN ENERGY RESOURCES LIMITED

DIAMOND DRILL RECORD

PROPERTY: Richardson Permits — HOLE NO. R 3

SHEET NUMBER 1 — N.T.S. NO. 74 E — STARTED August 25, 1977

COLLAR TP 103 R7 Sec. 35 NW — CLAIM NO. Permit 687612006 — COMPLETED August 26, 1977

W of the 4th Meridian — BEARING — ULTIMATE DEPTH 225 ft./68.6

ELEVATION 945 ft./288 m — DIP -87 — PROPOSED DEPTH

Depth (ft/m)	Description	Mineral-ization	Core Recov.	Assay				
0-27.8	Overburden - glacial outwash							
	0-24.7 sand							
	24.7 - 27.8 sand and boulders							
27.8-34.2	Dolomitized Mudstone - massive locally laminated brown,		6.4					
	fossiliferous (crinoid stems) fractures filled							
	with tar.							
34.2-48.8	Dolomite - laminated, grey brown muddy, tar in fractures		14.6					
	and cavities							
48.8-51.6	Mudstone - brecciated light grey and dark brown angular		2.8					

(cont'd)

LOGGED BY — DRILLED BY — CORE STORED

NORCEN ENERGY RESOURCES LIMITED
DIAMOND DRILL RECORD

SHEET NO. 2 PROPERTY Richardson Permits HOLE NO. R 3

Depth (ft/m)	Description	Mineral-ization	Core Recov.	Assay				
	fragments, dark brown colour due to organic debris							
51.6-52.5	Mudstone - laminated light and dark brown laminations		0.9					
52.5-60.1	Mudstone Sandstone - grey massive mudstone grading into		7.6					
	3 to 25 cm thick beds of coarse gritty sandstone,							
	mudstone soft grey, sandstone angular quartz and							
	feldspar grains in a black matrix (colour due							
	to tar).							
60.1-60.7	Unconformity - angular blocks of granite gneiss separated		0.6					
	by bands of mudstone.							
60.7-68.6	Granitic Gneiss - highly sheared gneiss shearing at 35° to		7.9					
	core axis pyrite 3%, chloritic alteration calcite							
	and chlorite in shear planes rock appears to be							
	an altered diorite.							
68.6	End of hole dip test - 87°							

SUMMARY OF EXPENDITURES FOR 1977
QUARTZ MINERAL EXPLORATION PERMIT 6876120006

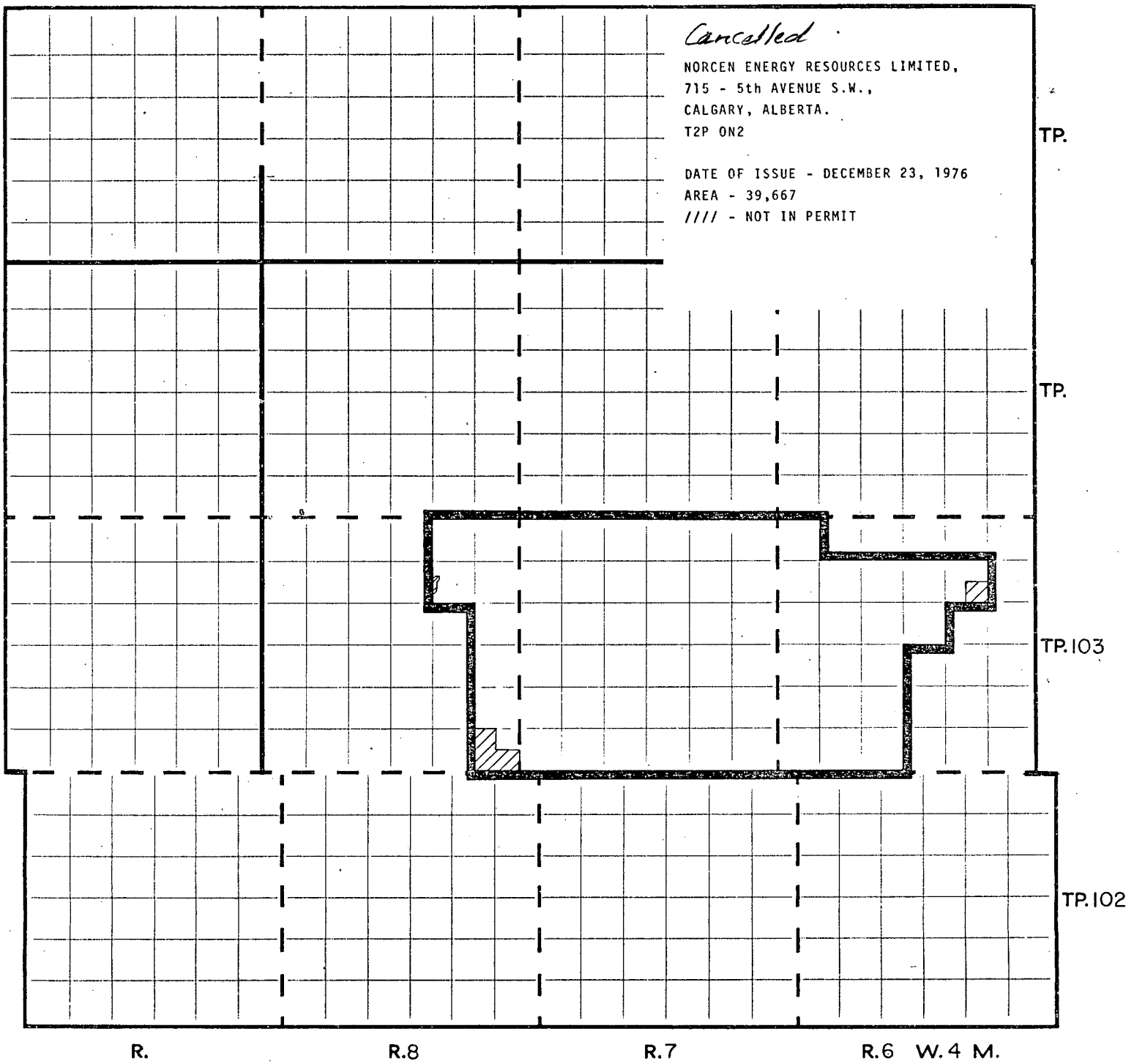
Drilling Costs

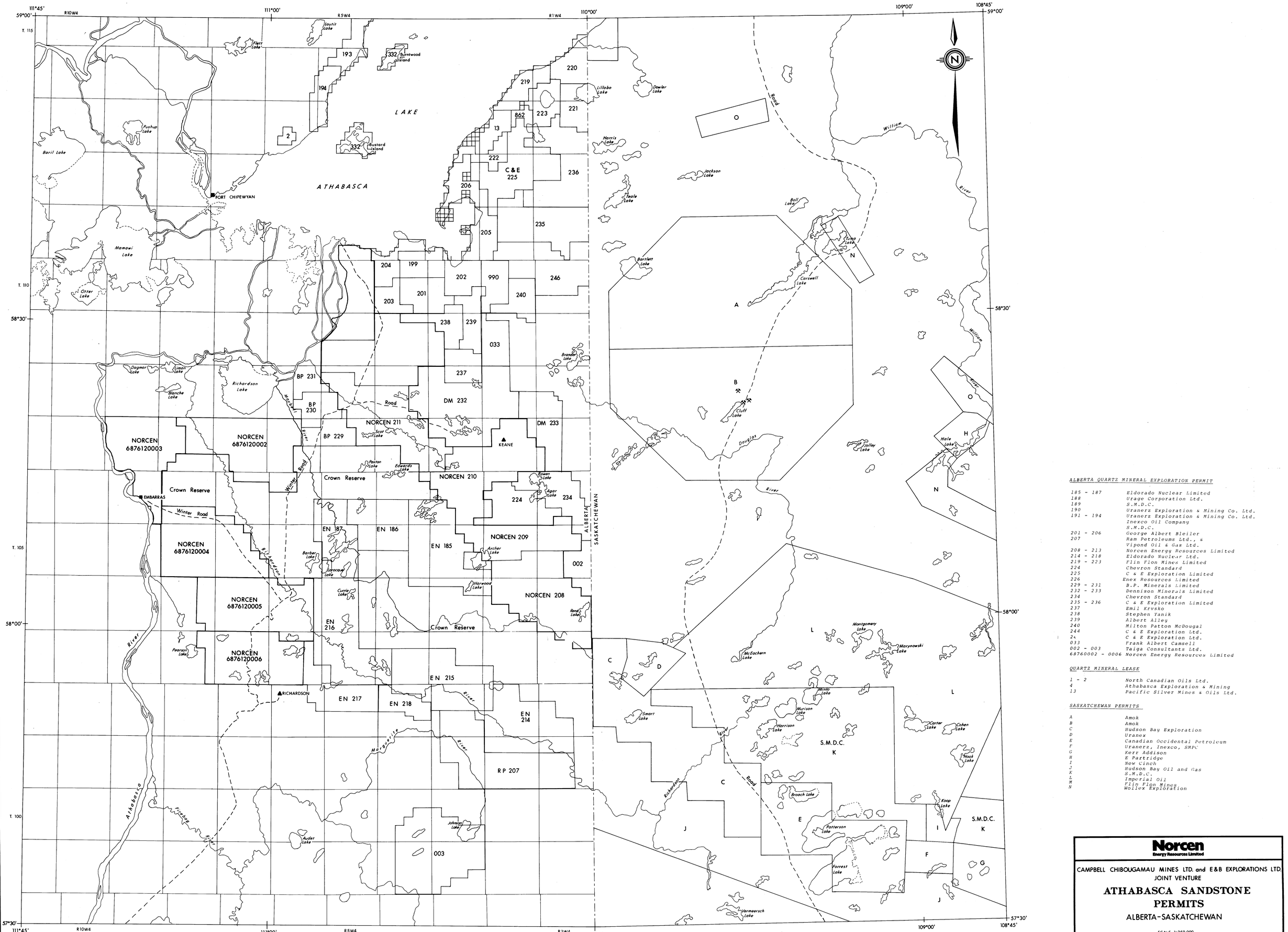
Mobilization and Demobilization	$ 591
Drilling Cost 225 feet 68.6 metres	$ 5,462
Additional Drilling Costs (labour, core boxes, etc.)	$ 53

Other Costs

Salaries geologist in the field and report writing 8 days	$ 572
Telephone (mobile radio telephone)	$ 78
Transportation (Norcen personnel)	$ 43
Shipping Core	$ 27
Accommodation	$ 42
Spectrometer Rental	$ 19
	$ 6,887

QUARTZ MINERAL EXPLORATION PERMIT NO. 6876120006





ALBERTA QUARTZ MINERAL EXPLORATION PERMIT

185 - 187	Eldorado Nuclear Limited
188	Urage Corporation Ltd.
189	S.M.D.C.
190	Uranerz Exploration & Mining Co. Ltd.
191 - 194	Uranerz Exploration & Mining Co. Ltd. Inexco Oil Company S.M.D.C.
201 - 206	George Albert Bleiler
207	Ram Petroleums Ltd., & Vipond Oil & Gas Ltd.
208 - 213	Norcen Energy Resources Limited
214 - 218	Eldorado Nuclear Ltd.
219 - 223	Flin Flon Mines Limited
224	Chevron Standard
225	C & E Exploration Limited
226	Enex Resources Limited
229 - 231	B.P. Minerals Limited
232 - 233	Dennison Minerals Limited
234	Chevron Standard
235 - 236	C & E Exploration Limited
237	Emil Krysko
238	Stephen Yanik
239	Albert Alley
240	Milton Patton McDougal
244	C & E Exploration Ltd.
24	C & E Exploration Ltd.
033	Frank Albert Camsell
002 - 003	Taiga Consultants Ltd.
68760002 - 0006	Norcen Energy Resources Limited

QUARTZ MINERAL LEASE

1 - 2	North Canadian Oils Ltd.
4	Athabasca Exploration & Mining
13	Pacific Silver Mines & Oils Ltd.

SASKATCHEWAN PERMITS

A	Amok
B	Amok
C	Hudson Bay Exploration
D	Uranex
E	Canadian Occidental Petroleum
F	Uranerz, Inexco, SMPC
G	Kerr Addison
H	E Partridge
I	New Cinch
J	Hudson Bay Oil and Gas
K	S.M.D.C.
L	Imperial Oil
M	Flin Flon Mines
N	Wollex Exploration

Norcen
Energy Resources Limited

CAMPBELL CHIBOUGAMAU MINES LTD. and E&B EXPLORATIONS LTD.
JOINT VENTURE

ATHABASCA SANDSTONE PERMITS

ALBERTA-SASKATCHEWAN

SCALE - 1:250,000

10 0 10 Miles

10 0 10 Kilometers

NTS: 74 E, F, K, L

NOVEMBER, 1977

1977027 Map #1. (161)