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4111SSW0175 0021 HUTTON

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INTERNATIONAL MINE SERVICES LIMITED

A GEOLOGIC REPORT

ON

THE PROPERTY OF

(LION NICKEL MINES LTD.)

HUTTON TOWNSHIP, ONTARIO

August 15, 1969.

By:
Chester J. Kuryliw, B.Sc., M.Sc.
Consulting Geologist.



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Maps Accompanying this Report:

Plan of Geology, Scale 1" = 400'

SUMMARY AND CONCLUSIONS

Linecutting and detailed Geologic mapping has been completed on the 68 claim group. The Geologic mapping has to a large extent provided the information required to build up the general structural picture. Known exposures of uranium occurrences in the Mississagi conglomerate are located less than one-half mile to the south, to the south east and to the west of the claim group, and these project stratigraphically below the 68 claim group. The Uraniferous Conglomerate should be tested by diamond drilling on the Property to explore for valuable uranium deposits. The drill holes should be spotted to test the conglomerate at its shallower occurrences on the Property in the areas of lesser deformation. A total of 5000 feet of diamond drilling is recommended at an estimated total cost of \$45,000.00 for this preliminary test.


Chester J. Kuryliw,
Consulting Geologist.

INTRODUCTION

Linecutting on the 68 claim group started in the southwestern claims in November 1968 and was completed in June 1969 on the Northeastern part of the group. Picket lines were cut at 400 foot intervals and tied to well cut base lines. The picket lines were chained and marked every 100 feet along the lines. Most of the Geologic mapping was carried out early in May and June 1969, before the leaves were out on the thick bushes of Hazel and Scrub Maple in the area that later in the summer were found to effectively mask many outcrops. Geologic mapping was carried out not only along the lines but all visible outcrops were recorded so that the lines were used for location and guidance only. A scintillometer was also carried during mapping. Geologic mapping was carried out from dawn to dusk on May 2 to May 6, 1969, May 9 to May 15, 1969, June 29 to July 6, 1969. A total of 20 twelve-hour days (240 hours) was spent on actual field mapping. Preparation of the map and writing the report took 12 eight-hour days during June, July and August 1969. An assistant spent an additional four days on colouring the Geologic plans.

PROPERTY

The property covered by this report consists of 68 claims in Hutton Township, Sudbury Mining Division, Northern Ontario. These claims are described as follows:

<u>Lot No.</u>	<u>Con. No.</u>		<u>Claim No.</u>	
6	IV	153527	153485	152776
		152775	152778	152777
		152779	152780	
5	IV	153525	153526	152199
		152200	152202	152201
		152204	152203	
6	V	154752	153488	153487
		153486		
5	V	154751	154742	
		155658	155660	
4	V	154739	154731	154781
		154780	154702	154703
		154704	154701	155659
3	V	154728	154729	154727
		154726	154782	154725
		154705	154706	

PROPERTY...Continued

<u>Lot No.</u>	<u>Con. No.</u>		<u>Claim No.</u>	
2	V	154723	154724	
7	VI	154761 154762	154760	154759
6	VI	154757 154758	154756 154754	154755 154753
5	VI	154747 154748 154743	154746 154749 154750	154745 154744
4	VI	154735 154737 154738	154734 154733	154736 154732

LOCATION AND ACCESSIBILITY

The claim group is located 28 miles north of Sudbury, Ontario, in Hutton Township. It is situated 1 1/2 miles to the east of the producing Lowphos Iron Mine which is served by Highway 806 and a branch line of the Canadian National Railway. The C. N. R. main line passes through the centre of the claim group 12 miles north of Capreol where it follows the west bank of the Vermilion River. A Hydro Electric Power Line cuts near the southern portion of the claim group.

TOPOGRAPHY

In the area of the claim group the topography is relatively flat with most differences in elevation being in the order of 100 feet, with the exception of the Vermilion River Valley where some rock ridges and cliffs rise up to 300 feet above the valley.

REGIONAL GEOLOGY

Table of Formations (After Jas. E. Thomson, 1969)

PRECAMBRIAN

Post Huronian System

- Basic Intrusives - Olivine diabase dykes
- Killarnean - Metamorphic complex
- Basic Intrusives - Gabbro, diorite
(including Nipissing diabase)
- Sudbury nickel eruptive

Huronian System

- Cobalt Group - Lorrain formation
- Gowganda formation
- Bruce Group - Serpent formation
- Espanola formation
- Bruce formation
- Mississagi formation

-- Great Unconformity --

Pre-Huronian System

- Acid Intrusives - Granitic Complex
- Sedimentary Group - Chelmsford formation
- (Including - McKim formation
- "Timiskaming" and - Ramsey Lake formation
- "Sudbury" series) - Wanapitei formation
- Volcanic Group - Onaping formation
- (Including
- "Keewatin" Series - Stobie formation

The general geology of the Elliot Lake, Agnew Lake, Hutton Township Area, consists of a pre-Huronian basement complex made up of volcanic, sedimentary and granitic rocks overlain with great unconformity by a sedimentary group of Huronian age. The base of the Huronian system consists of radioactive quartz-pebble conglomerate with quartzite or argillite interbeds. These grade upwards into quartzite and arkose by diminution of the number of conglomerate interbeds. This conglomerate-argillite-quartzite sequence, constitutes the Mississagi formation. The radioactive quartz-pebble conglomerate occurs at intervals along the base of the Huronian,

REGIONAL GEOLOGY...Continued

apparently along paleo stream valleys and deltas. In the area of Hutton Township the Huronian rocks have been deformed and faulted to a greater extent than in the Elliot Lake area.

The Sedimentary rocks of the Huronian age are intruded by masses of diabase and gabbro.

LOCAL GEOLOGY

TABLE OF FORMATIONS

PLEISTOCENE & RECENT

Sand, Gravel, Clay

Unconformity

PRECAMBRIAN

HURONIAN

COBALT GROUP

GOWGANDA FORMATION

8b Finely Bedded Argillite

8a Greywacke

Unconformity

BRUCE GROUP

SERPENT FORMATION

7a Pure Quartzite

BRUCE FORMATION

5c Limestone (Espanola?) (Bruce?)

5b Impure (Greywacke) Quartzite (Serpent Formation?)

5a Argillite

5 Conglomerate

MISSISSAGI FORMATION

4 Quartzite

4b Polymictic Conglomerate

PRE-HURONIAN

EARLY MAFIC INTRUSIVE ROCKS

3 Diabase

GRANITIC ROCKS

2 Porphyritic Granite

METAVOLCANICS

1 Massive Mafic Metavolcanic

LOCAL GEOLOGY...Continued

ROCK TYPES

(1) Massive Mafic Metavolcanics

These rocks occur in the southwestern portion of the property where the volcanics are dark greenish, massive, fine grained amphibolite that does not show any recognizable flow structures.

(2) Porphyritic Granite

Two small stocks of granite have been mapped, one occurs at the southwestern corner of the property, the other near the centre of the western edge of the property. Both stocks are composed of similar granite that is light greyish, coarse-grained and high in content of porphyritic feldspar.

(3) Diabase and Metadiabase

Several dykes up to 200 feet thick were mapped near the central part of the western edge of the property. The metadiabase is medium grained and has lost much of its diabasic texture so that it now resembles a metagabbro.

(4) Mississagi Formation

The Mississagi formation consists mainly of a medium to coarse grained white Quartzite that in places appears slightly tinged with yellowish to orange iron oxides from weathered pyrite. Coarse bedding and coarse cross-bedding are very common. It is near the base of this formation that uranium bearing oligomictic quartz pebble conglomerate occurs. The conglomerate may contain up to 80% quartz pebbles and it usually contains pyrite. On outcrops the weathered pyrite leaves a dark reddish stain to the conglomerate. The conglomerate varies from a few feet up to 100 feet in thickness. Several areas of outcrops of Mississagi quartzite occur on the property and this formation underlies most of the property at depth.

In the area mapped, the uraniferous conglomerate occurs about 600 feet below the top of the Mississagi Formation.

(5) Bruce Formation

The Bruce formation conformably overlies the Mississagi formation. It is a conglomerate composed of a featureless medium grained greywacke matrix and from 5 to 20% pebbles, cobbles and boulders, predominantly of greyish granite or grey granite gneiss. Pebbles of felsite and

LOCAL GEOLOGY...Continued

(5) Bruce Formation...Continued

and a few of quartz were also noted. The base of the Bruce Conglomerate immediately above the Mississagi Quartzites was found to contain up to 2% fine disseminated pyrite. The outcrops show red iron oxide staining in conglomerate for several hundred feet above the base. Check scintillometer readings indicated about 60 C.P.S. above background in pyritic areas. Metamorphism of the greywacke matrix of the conglomerate occurred resulting in a high amphibole-chlorite greenish greywacke at the western part of the property to the Southwest of the Vermilion River Fault and a light brownish predominantly biotitic greywacke matrix on the eastern part of the property to the Northwest of the Vermilion River Fault. This formation is estimated to be 2000 feet thick. The Conglomerate formation also contains a band of impure greenish greywacke, Quartzite and bands of dark green argillite.

(5c) Espanola Formation - Limestone (Bruce Limestone?)

Only a few exposures of this formation were mapped. Its low resistance to erosion contributes to a scarcity of outcrops. This rock consists of alternating thin beds of limestone and sericitic siltstone and is highly contorted. The outcrops mapped indicate an estimated thickness in the order of 50 feet. This formation conformably overlies the Bruce Conglomerate and underlies the greenish impure Quartzite Formation.

(5b) Impure (Greywacke) Quartzite Formation

Immediately above the Espanola? Limestone is a medium grained impure quartzite that contains a small amount of greenish greywacke material. This member conformably overlies the Espanola formation (or the Bruce Conglomerate in the absence of the Espanola). It is estimated to be about 900 feet thick and it also contains a few narrow beds of Argillite and Conglomerate with grey granite gneiss pebbles near its base.

(7) Serpent Formation

The Serpent Formation consists of a pure cream-white medium grained quartzite that contains a few cross bedded horizons and several narrow yellowish sericitic beds of argillite. These beds greatly assisted in obtaining the attitude of the Quartzite during mapping. The Serpent Formation is estimated to be about 900 feet thick.

LOCAL GEOLOGY...Continued

(8) Gowganda Formation

Conformably, above the Serpent Formation lies the Gowganda Formation which consists mainly of finely bedded dark greenish argillite with some beds of Quartzite greywacke. This is a thick formation of which a portion (about 2000 feet thick) was mapped on the property.

STRUCTURAL GEOLOGY

The Structural Geology is known to be complex. During field mapping all recognizable attitudes of beds were mapped to assist in solving the Structural Geology. From sections based upon field mapping, a stratigraphic column with thicknesses of formations was derived. For reasons of economic Geology the stratigraphic column of Huronian sediments is here related to the Uraniferous Mississagi Conglomerate.

STRATIGRAPHIC COLUMN OF MAP AREA

	<u>Estimated Thickness of Formation</u>	<u>Estimated Total Thickness of Column</u>
Gowganda Formation	2000' (+)	4650'
Serpent Formation	900'	3550'
Impure Greywacke Quartzite Formation	900'	2650'
Espanola? Limestone Formation	50'	2600'
Bruce Conglomerate Formation	2000'	600'
Mississagi Formation	600'	0'
Uraniferous Mississagi Conglomerate	5-100'	

STRUCTURAL GEOLOGY...Continued

A study of the Plan of Geology, scale 1" = 400 feet, accompanying this report reveals that the property is divided into two main structural areas divided by the Vermilion River fault which trends northwesterly. There is a marked discontinuity in attitudes and metamorphism of Huronian rocks on each side of the strong fault.

To the southwest of the Vermilion River fault the Huronian formations generally strike East-West and dip steeply to the south. Metamorphism consists of a chlorite-amphibole alteration of the greywacke matrix of the Bruce conglomerate. A Northerly trending fault with strong brecciation and quartz carbonate alteration shows an apparent displacement of 1200 feet northwards of the westerly block. Several minor folds are actually fault-produced drag folds.

To the northeast of the Vermilion River fault the formations strike Northwesterly and dip 70° - 35° North-easterly. Deformation is much less severe in this area, though block faults parallel to and branching off the Vermilion River fault have apparent vertical displacements of nearly ½ mile. Fold axis parallel these northwesterly trending faults indicating that folding and faulting was produced by the same tectonic forces.

The Metamorphism of the greywacke matrix of the Bruce Conglomerate and impure quartzite consists of alteration of the greywacke to a biotite-quartz-sericite matrix.

ECONOMIC GEOLOGY

"Nineteen occurrences of radioactive conglomerate are described (in the district of Sudbury). These are similar lithologically to the Uraniferous axes of Blind River, Elliot Lake area and lie at the same stratigraphic horizon." (Abstract Jas. E. Thomson 1960)

About 1500 feet to the south of claim 152203 in the southern boundary of the S-E claim group in Hutton Township, Uraniferous Conglomerates occur in the Mississagi quartzites. These were explored by Fano Mining and Exploration Incorporated in 1955. The exposures show a quartz pebble conglomerate that is rusty in appearance due to the weathering of pyrite. The Conglomerate is composed of 80% close-packed quartz pebbles. Over a broad area of the Conglomerate, the scintillometer indicated strong radioactivity of 10 to 20 times background. Similar occurrences of uranium occur about 2000 feet to the south of claim 154704 and another known occurrence almost $\frac{1}{2}$ mile west of claim 154733. No outcrops of Mississagi Conglomerate occur on the Lion Nickel claims. However, the Conglomerate does project stratigraphically at depth nearby to the S, S-E and W of the property which enhances the possibility that the conglomerate below the claim group will be uraniumiferous.

Exploration for Uranium in the Mississagi Conglomerate is warranted and must be done by diamond drilling. Much of the conglomerate horizon occurs at a projected depth of $\frac{1}{2}$ mile. At a few key locations where the upper portion of the Mississagi quartzites outcrop on the property there is an opportunity to test the conglomerates by shorter diamond drill holes (in the 1000 to 1500 foot depth range). The first drill holes should also provide stratigraphic information that will guide the spotting of successive drill holes.

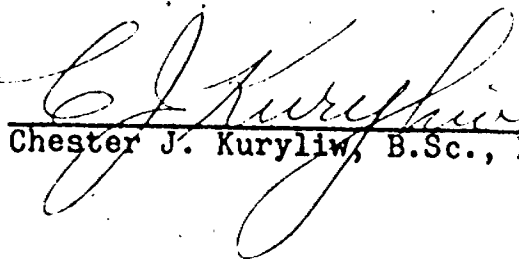
The central and northeastern part of the property near the Vermilion River Fault should be favoured in early exploration because deformation and faulting is not as intense there compared to the southwestern part of the property and the Uraniferous Conglomerate occurs nearest the surface.

RECOMMENDATIONS

That about 5000 feet of diamond drilling (3 to 5 diamond drill holes) be drilled to test the stratigraphic projection of the Mississagi Conglomerate for valuable uranium occurrences.

Estimated Costs

Diamond Drilling, Engineering, Assaying, etc.	\$40,000.00
Allowance for Contingencies	5,000.00
TOTAL	<u>\$45,000.00</u>


Chester J. Kuryliw, B.Sc., M.Sc.

REFERENCES

1. Ontario Department of Mines Geologic Report No. 1. 1960, "Uranium and Thorium Deposits at the Base of the Huronian System in the District of Sudbury."

by Jas. E. Thomson.

2. Ontario Department of Mines Preliminary Geological Map No. P.399, 1967, Hutton Township, District of Sudbury.

by H. D. Meyn.

3. Ontario Department of Mines Preliminary Geologic Map No. P.450, 1968, Creelman Township, District of Sudbury.

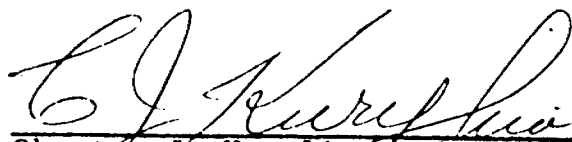
by H. D. Meyn.

DECLARATION

I hereby declare that I, CHESTER J. KURYLIW, of Wawa, Ontario, have continuously practiced as a Geologist for the past 20 years and that:

- (1) I have been awarded a degree of B. Sc. in Geology from the University of Manitoba in 1949, and an M. Sc. degree from that same University in 1966.
- (2) This report is based upon my detailed Geologic mapping and study of the property carried out at intervals from May to August 1969 and upon my familiarity with the Uranium ores underground at the Denison Mine, in Elliot Lake. Ontario Department of Mines information from publications was also used as cited in the "References".
- (3) I do not own any stock or interest in Lion Nickel Mines Ltd. nor do I expect to.

Wawa, Ontario.
August 15, 1969.

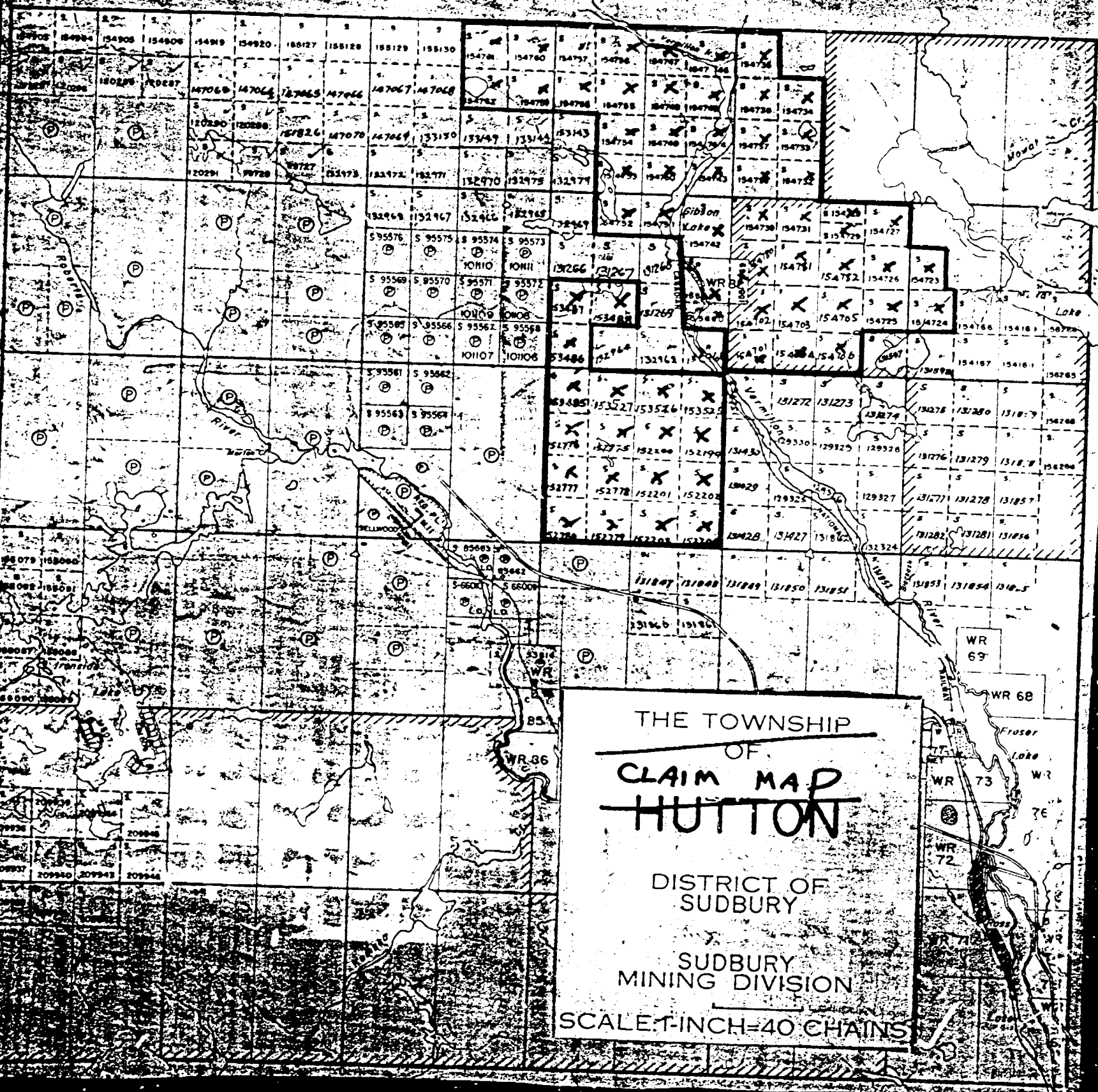


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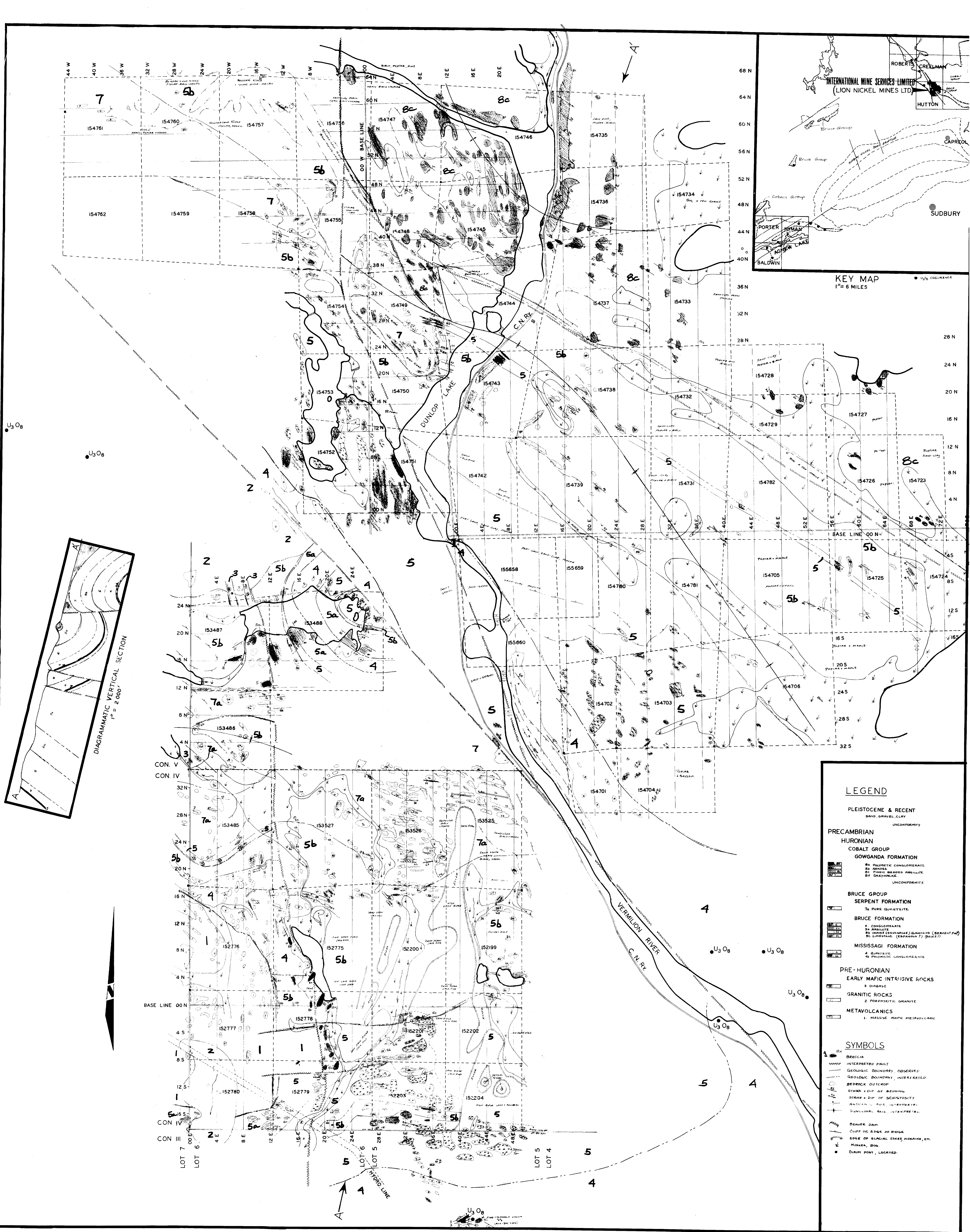
A Fellow of the Geological
Association of Canada.

A Member of the Canadian Institute
of Mining and Metallurgy.

CREELMAN TWP



THE TOWNSHIP
OF
**CLAIM MAP
HUTTON**
DISTRICT OF
SUDBURY
SUDBURY
MINING DIVISION
SCALE: 1-INCH=40 CHAINS



LEGEND

PLEISTOCENE & RECENT
 SAND, GRAVEL, CLAY
 UNCONFORMITY

PRECAMBRIAN
HURONIAN
COBALT GROUP
GOWGANDA FORMATION
 8A POLYMETIC CONGLOMERATE
 8B ANORTITE
 8C FINELY BEDDED ARGILLITE
 8D GREYWACKE
 UNCONFORMITY

BRUCE GROUP
SERPENT FORMATION
 7A PURE QUARTZITE

BRUCE FORMATION
 5 CONGLOMERATE
 5A ANORTITE
 5B IMPURE (QUARTZITE) QUARTZITE (SERPENT FAN)
 5C LIMESTONE (SERPENTIN?) QUARTZITE

MISSISSAGI FORMATION
 4 QUARTZITE
 4B POLYMETIC CONGLOMERATE

PRE-HURONIAN
EARLY MAFIC INTRUSIVE ROCKS
 3 DIABASE

GRANITIC ROCKS
 2 PORPHYRYTIC GRANITE

METAVOLCANICS
 1 MASSIVE MAFIC METAVOLCANIC

SYMBOLS
 15K BRECCIA
 INTERPRETED FAULT
 GEOLOGIC BOUNDARY, OBSERVED
 GEOLOGIC BOUNDARY, INTERPRETED
 BEDROCK OUTCROP
 STRIKE & DIP OF BEDDING
 STRIKE & DIP OF SCANTYNESS
 ANCLINAL AXIS, INTERPRETED
 SYNCLINAL AXIS, INTERPRETED
 BEAVER DAM
 CLIFF OR EDGE OF RIDGE
 EDGE OF GLACIAL ESCHER, MORAINE, ETC.
 MUSHKIE, B.M.
 CLAIM POST, LOCATED

INTERNATIONAL MINE SERVICES LIMITED
 (LION NICKEL MINES LTD.)
PLAN OF GEOLOGY
 HUTTON TWP. ONT.

63A-553 SCALE: 1" = 400'

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 May 13, 1969

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