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PROSPECTING PROGRAM - 2000

prepared by

DENIS CHARTRE AND ROGER DUFRESNE

Prospectors

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Otto and Teck Townships

Chartre - Dufresne 1999 Property

Patented claims: #16527, #16528 in Teck Twp.
#16442 in Otto Twp.

Unpatented claims: 1186931, 1186932,

in Otto Twp

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Prospecting Proposal - 1999

Description of Property

The 1999 Chartre-Dufresne Teck - Otto Township Property consists of 3 patented claims: #16527 and 16528 in Teck Twp. and #16442 in Otto Twp; and 2 unpatented mining claims: #1186931 and 1186932; all claims are outlined in green AND PINK. (See annex "A") These claims are described as PCL 10191 CST (70.90 acres on the south boundary line of Teck Twp); the North West 1/4 of the North 1/2 Lot 4 Con VI, North West 1/4 of the North 1/2 Lot 5 Con VI, North East 1/4 of the North 1/2 Lot 5 Con VI, respectively.
(See Annexes "A" and "A-A")

The complete list of unpatented claims is provided at annex "A-3".

LOCATION

The 1999 Chartre-Dufresne Teck - Otto Township Property is located about 2 3/4 miles (4.4 K.) west of Kirkland Lake (Main St.) along Highway 66 and 2 miles (3.2 K.) south along Highway 112 to the Teck - Otto Twp. border. Highway 112 crosses claim #16442 (North West 1/4 in the North 1/2 of Lot 4 in Con VI) in Otto Twp. in Larder Lake Mining Division in the District of Temiskaming.

The Mineral Deposit Inventory (annex "B") data sheets give us the following for the Dyment-Kidston Property in Otto Township (this property is the nearest listed property to the Chartre-Dufresne 1999 Teck - Otto Property): Lalitude 48 degrees 5' 52''; Longitude: 80 degrees 3' 58''; U T M Zone: 17; Northing: 5327362; Easting: 569556 in the Kirkland Lake Resident Geologist Area.

GENERAL GEOLOGY

Howard Lovell reported (in Geology of the Eby and Otto Area District of Timiskaming 1972, by the Ontario Department of Mines and Northern Affairs Geological Report 99) the map-area (Map 2239) (See annex "A-10" is in the "Abitibi" belt (Goodwin 1966) of Precambrian volcanic, sedimentary, and intrusive rocks that extend from southwest of Timmins, Ontario, to Chibougamau, Quebec. There are representatives in the map-area (See annex "A-1A" (Map 2239) of every major division of rocks of the Precambrian stratigraphic column for the northern part of northeastern Ontario. Keewatin-type metavolcanic rocks underlie about two-thirds of Eby Township and one-quarter of Otto Township. They range in composition from basalt to rhyolite, and in metamorphic grade from lower greenschist facies to almandine-amphibolite facies.

Map 2239 Eby-Otto Area describe this section of Otto Twp. as having metavolcanics and Metasediments: particularly basalt and andesite.

L. S. Jensen and F. F. Langford reported (in Geology and Petrogenesis of the Archean Abitibi Belt in the Kirkland Lake Area 1985 by the Ontario Geological Survey, Miscellaneous Paper 123. The Kirkland Lake area is underlain by Archean volcanic, sedimentary, and intrusive rocks which are part of the Abitibi Greenstone Belt (approx. 800km long and 240 km wide). In places, the belt is cut by swarms of the north-trending Matachewan dikes. In the southern part of the Kirkland Lake area, the Archean rocks are unconformably overlain by Proterozoic sedimentary rocks of the Cobalt Group. Several diabase dikes of Keweenawan age cut all the above rocks. Also, in the Kirkland Lake area, the volcanic rocks of the Abitibi Greenstone Belt are preserved in a synclinorium located between the Lake Abitibi Batholith and the Round Lake Batholith. The axis of the synclinorium occurs midway between the 2 batholiths and plunges to the east. The northern and southern limbs of the synclinorium are cut by 2 large east-striking fault zones: the Destor - Porcupine Fault Zone, and the Kirkland Lake - Larder Lake Fault Zone, respectively.

STRUCTURAL GEOLOGY

Howard Lovell says that the Archean metavolcanics and metasediments are folded steeply, with attitudes conforming roughly to the nearest contacts of the Round Lake Batholith and the Otto Stock. Formations in the northern part of Otto Township strike generally east, conforming to the contact of the Otto Stock.

ECONOMIC GEOLOGY

One of the two earliest gold discoveries in the Kirkland Lake-Larder Lake area in 1906 was on the northwest shore of Otto Lake.

Surface prospecting can be one method used to provide rewarding drill targets.

Exploration for gold should be concentrated in the two northern concessions, in syenite, trachyte, and carbonate rocks.

Howard Lovell continues by saying (page 16 Geological Report 99) that three facies of iron formation are present in the map-area (Map 2239) (See Annex "A-1/A"): magnetite-chert, graphite-pyrite-pyrrhotite, and carbonate. Most of the exploration for gold has been concentrated in syenite, trachyte, and carbonate rocks along the Larder lake Fault, so most of the carbonate rocks have not been thoroughly explored.

Howard Lovell reported (in Annual Report of the Regional and Resident Geologists 1974, Miscellaneous Paper 60, 1975) that most of the gold probably originated from ultramafic rocks, syenitic rocks and clastic and chemically precipitated sedimentary rocks, most of which built up from the sea bottom to form an island arc. The principal host rocks of the gold mineralization are:

a) syenite and trachyte (some of the trachyte is tuffaceous), and related porphyritic rocks;
b) low grade Algoma-type iron formation of the sulphide and carbonate facies, with some of the carbonate rocks having a spatial and possibly genetic relationship to ultramafic rocks; and
c) Timiskaming-type metasediments, which additionally form the bulk of the country rocks.

ECONOMIC GEOLOGY (continued)

L. S. Jensen reported (page 119 Ontario Geological Survey Miscellaneous Paper 126 1985) that gold mineralization in the area mainly occurs in the Larder Lake and Temiskaming Groups. The gold mineralization closely follows the stratigraphy of the sedimentary rocks. Secondary and tertiary concentration of the gold is likely to have occurred in volcanic rocks which incorporated sedimentary material, and in quartz-carbonate veins, syenitic intrusions, in fractures and alteration zones.

L. S. Jensen continues by saying that in the Temiskaming Group, the gold in the Kirkland Lake camp occurs in quartz-filled fractures and alteration zones associated with the Kirkland Lake 'Break' and in the feldspar porphyries which cut the Timiskaming Group trachytes and sedimentary rocks.

S. M. Rowins, A. E. Lalonde and E. M. Cameron presented a paper re: the Geology of the Archean Murdock Creek Intrusion as part of Current Research Part C Geological Survey of Canada Paper 89-1C, p.313-323, 1989.
This intrusion is a composite syenitic pluton, of presumed late Archean age, immediately southwest of Kirkland Lake, in the southern part of the Abitibi belt in the Superior Structural Province. The pluton is one of a suite of late-tectonic syenitic intrusions within and adjacent to the Kirkland Lake-Larder Lake fault zone. The intrusions host about 97% of the gold mineralization in the camp. (according to Hodgson, 1986) (See annex " E ")

LOCAL GEOLOGY

L. S. Jensen reported in Genesis of Archean, Volcanic Hosted Gold Deposits 1980 (in the Ontario Geological Survey Miscellaneous Paper 97) that the dominant feature of the Kirkland Lake-Larder Lake area is the major fault system that appears to extend from Matachewan in the west through Noranda towards Val d'Or. In many places this fault system is obscured by only slight displacement of the younger Proterozoic rocks. The older the rocks, the greater is the displacement. This suggests that the fault system has been active since the initial deposition of volcanic and sedimentary rocks in the area without a doubt this same fault system has influenced the deposition of these rocks and their alteration along its length.

LOCAL GEOLOGY (continued)

Gold mineralization is found in several rock types: gold-bearing ultramafic intrusions, laval flows (komatiites), debris flows, felsic tuff, chert, iron formation, carbonaceous sedimentary rocks, argillite, conglomerate, porphyritic intrusions and granitic intrusions. The range of mineralization is much greater than that associated with massive suphide deposits. L. S. Jensen continues by saying that gold exploration should be concentrated near major fault zones which mark the tectonic boundary between volcanic piles or between volcanic piles and gneissic terrains which have sedimentary aprons.

W. S. Savage in Mineral resources and Mining Properties in the Kirkland Lake-Larder Lake Area (Mineral Resources Circular No. 3, reported that the formations of economic interest belong to the earlier Precambrian era: volcanics, sediments and intrusives. The Break is a strong wide carbonized shear zone, characterized by the presence of green mica and quartz stockworks. The Break or its branches appear to have had some influence on the localization of most of the ore bodies. From the southern part of Teck township the Break has been traced southwestward to where it is overlain by the later Cobalt series in Eby Township. The amount of displacement along the Break could be hundreds of feet or in miles says W. S. Savage. The Keewatin and Timiskaming series were then invaded by Algoman intrusives: stocks, dikes, irregular-shaped bodies of granite to diorite or lamprophyre. In Teck Township the most important of the intrusives are the syenite, augite syenite and syenite porphyry.

W. S. Savage continues by saying that following the emplacement of the intrusives, hot circulating solutions produced carbonate replacements along pre-existing faulted zones. This carbonatization was followed by the faulting which opened up channelways for the later solutions that produced the gold-bearing veins in the Kirland Lake camp. The Kirkland Lake Fault branches away from the Larder Lake Break in the vicinity of Kenogami Lake. Minor faults which branch off the "MAIN BREAK' have been important sources of ore.

HISTORY

1913 - John G. Mulligan staked claim #15871, completed all assessment work (200 days) for the Southeast 1/4 in the North 1/2 of Lot 4 Con VI in Otto Township; papers were sent to Toronto on October 3, 1913. (See Annex "H - 1")

1914 - A. G. Burrows and P. E. Hopkins reported in Report of the Ontario Bureau of Mines, Vol. XXIII, Part 2 - The Kirkland Lake and Swastika Gold Areas; they say that the ore deposits consist of quartz veins, sometimes five to seven feet wide. Values occur in shoots in the veins. The best veins occur in the greenstone near the contact with feldspar-porphyry.

1917 - W. Morrison staked claim #16442, completed all assessment work (200 days) for the Northwest 1/4 in the North 1/2 of Lot 4 Con VI in Otto Township; papers were sent to Toronto on March 1, 1917. (See Annex "H - 2")

1923 - A. G. Burrows and P. E. Hopkins reported in the Ontario Department of Mines, volume 32, Part IV, on page 50; the Canadian Kirkland Property (claim #6687) is located 1 3/4 miles to the north of our claim #16528. A shaft was put down in a mineralized zone of greywacke, consisting of quartz veinlets and greywacke impregnated with iron pyrites, copper pyrites, galena, and calcite. (See section of map #32e of the Kirkland-Larder Area) (scale is 1/2 mile = 1 inch)

1928 - E. W. Todd reported in Ontario Department of Mines, volume 37, part II; he makes reference to the McGinley-Teck Property on a map enclosed on the face to page 94. A short summary is provided. (Annex "H - 3" and Annex "H - 3A")

1937 - George A. Gray, Mining Engineer, reported on Claims #16527 and #16528 which lie East of the Lucky Cross Mine. (Annex "H - 4")

1937 - Mine Reports and Service Co. of Sudbury says that the claims are situated in an area where favorable gold assays can be expected. Results obtained from work done on claims #6955, #16527 and 16528 show that there are great possibilites of developing these claims into a successful gold mine. (Annex "H - 4")

1937 - Geo. C. Seaborn, Consulting Engineer, reported that the predominate rocks are Keewatin greenstones through which are intruded acid intrusives of a later age. These acid intrusives are responsible for any ore deposition and are important features to be located. These intrusives include feldspar porphyries, syenite, and quartz porphyries. A number of quartz veins were found on these claims. Grab samples were taken from old trenches on these veins; all returned low values in gold. Old trenches should be opened up and reevaluated. There is a definite shear zone on these claims. Geo. C. Seaborn continues by saying that a trenching program should be carried out in order to identify drill targets. The mineralized quartz veins on the property should be opened up and traced. (Annex "H - 4")

1944 - W. S. Savage, Resident Geologist, reported re: Todora Kirkland Prospecting Syndicate (9 unpatented and 2 patented claims: 52417, 52418, 52419, 52426 in the S 1/4 of lots 1 and 2 Con VI Eby Twp.; 52430, 52427, 52428, 52429, 16010, 9465 in the N of Lot 1 Con V and one claim in Otto Twp: 39855 in the SW 1/4 of the N 1/2 of lot 12 Con V). Old pits and trenches were found. Cpy, Mo and Au was found in quartz, up to 13.39 Cu

1949 - Chavigny Gold (J. A. Demers, President) reported gold values in Otto Township.

1950 - W. S. Savage, Resident Geologist, reported that Keewatin greenstones and their schistose deerivatives extend in a broad belt across concessions V and VI, Otto township (Mulligan Property). In the northeast corner of the township massive greenstones grade to the southwest into rocks of schistose character. The schist contain irregular lenses of massive greenstone and occasional bands of tuff and iron formation which conform to the strike and dip of the schistosity. The rock exposed in this railway cut is part of a band of fine grained schisted rusty black tuff which strikes southeast. (See annex "H - 5")

1962 - Ahola Gold, located in Lot 5 Con VI in Otto Twp. found silver, copper and zinc in samples taken. (See annex "H - 6")

1968 - The International Nickel Co. of Canada drilled a hole in the Northwest 1/4 of North 1/2 Lot 5 Con VI in Otto Twp. A broad zone of graphitic schist, chert, and tuff is interbedded with volcanic rocks in this part of Otto Township. It was reported that the zone is a type of iron formation containing pyrite nodules as well as blebs and stringers of pyrite and pyrrhotite. Some base metals are associated with the pyrite and pyrrhotite, and some are in carbonate veins cutting the iron formation. (See annex "H - 7")

1975 - H. A. Lee and S. A. Scott of Lee Geo-Indicators Limited completed a Basal Till Search for Gold in Otto Township on behalf of Lee-Canico-Tg Joint Venture. Gold clasts were found in basal till from which a gold train was delineated. Most of the clasts in the basal till show short transport. Also, most of the gold in basal till overlying the Otto stock is very coarse-grained and occurs in heavy mineral conventrates with abundant magnetite. A geological report was also completed. This property is located about 12 miles southwest of Kirkland Lake; Highway 11 passes close to the southwest corner of the Property. Rosegrove Road passes on the south of the Property. It was recommended that the east outcrop be stripped and bulk-sampled for gold.

1976 - R. J. Fraser reported for Noranda Exploration Co. Ltd. Geophysical surveys were performed on the Latour-Monfort Option in the North 1/2 of Lot 5 Con VI. Several magnetic anomalies were detected on the claim group. A very intense linear anomaly trending east-west through the southern part of the property is the principal feature. A geological survey explains that the more southerly highs are related to iron formation both oxide and sulphide facies and to the syenite related to the Round Lake alkalic intrusive complex. Also, a fault is assumed to trend up the creek. Some copper, zinc and nickel values were detected in two drill holes.

1978 - L. J. Cunningham reported on a VLF-EM survey on a block of 15 claims in Teck Township, east of Swastika. The survey failed to identify any conductive zone which can be reasonably interpreted as due to conductive overeburden. A magnetometer survey was completed over the same area in 1974; this survey did not provide any new information. A geological report is also provided. The consolidated rocks of the area are precambrian in age. The contact area is marked by highly deformed rocks. All of the sediments face and dip steeply south. Older units are a interlayered sequence of conglomerate and greywacke. An irregular horizon of syenite porphyry within the sediments extends across the central part of the property. The formations of economic interest belong to the earlier precambrian era and consist of volcanics, sediments and intrusives. The early precambrian volcanic and sedimentary formations are greatly deformed by folding and faulting. L. J. Cunningham talks about a development of polygonal jointing where many of the outcrops are laced by large and complex joints. Near the Trout Creek Shaft on claim #476232, a spectacular but small surface exposure produced 81 oz/ton; these values are associated with a pyritized carbonatized quart vein in syenite porphyry.

1979 - A. Campbell, G. Grabowski and F. Ploeger provide us with the Ontario Geological Survey Preliminary Map P.896 of Otto Township. This map provides with a compilation of work performed up to 1979, including the names of individuals working in Otto Township.
(See Annex "H - 8")

1980 - J. F. Stones reported for Minorex Limited on the Blanche River Property in Otto Township: 19 contiguous claims. Fieldwork was completed in order to follow up on and Airborne E.M. Survey (enclosed at annex " ") released in September 1979. Fieldwork consisted of detailed geological mapping, E.M. Survey and Proton Mag. Survey. The contact trends in an east-west direction; mafic and felsic metavolcanics and metasediments are in contact with the Otto Stock. Three moderately strong anomalies were detected, possibly caused by massive sulphides within the felsic tuffs. The mag. Survey detected magnetic felsic tuffs from the mafic to intermediate metavolcanics. Diamond drilling yielded some values in zinc and silver.

1981 - H. L. Lovell, Resident Geologist and G. P. Grabowski, Staff Geologist reported on the M. Dyment and J. Kidston gold occurrence. (See annex "H - 9")

1981 - L. M. Dyment reported on the Dyment-Kidston Group D, Vigrass Lake, Otto Township. A VLF-EM Survey was conducted on the property. Five anomalies were detected showing major shearing within the Larder Lake group of rocks. Diamond drilling is recommended. A HLEM was also conducted on these claims; two anomalies were found. A Geological Survey was completed on these same claims; carbonates (green, grey and orange-brown in colour) associated with disseminated sulphide, were found.

1982 - L. M. Dyment reported on work completed on the "Gravel Pit Claims", also known as the Dyment-Kidston Group C claims. A VLM-EM Survey was completed; 6 conductors were detected. An airborne survey located 11 conductors. Best conductor is identified as Conductor B where evidence of banded chert was found to the south. Assays of Copper, zinc and silver were obtained within the argillites.

1990 - L. M. Dyment reported 5 anomalies as a result of a VLF Survey. Mechanical and Manual Stripping Program was completed on the gravel- pit claims in Otto Township. Copper, silver and zinc values were reported. A 505-foot hole was also drilled. Some silver, zinc and nickel samples were determined.

1990 - J. Roth of Stratagex Ltd, reported for Battle Mountain (Canada) Inc regarding a Magenetic and HLEM survey. Results of these surveys indicate several east-west trending faults, possible favourable locations for gold mineralization. The second survey defined 16 possible conductive zones. Most of the conductors are judged to be graphitic origin.

1990 - W. Benham of Battle Mountain (Canada) Inc. reported on geological mapping, overburden stripping, channel sampling and diamond drilling on the Vigrass Lake Property. Some weakly to moderately anomalous gold mineralization was found along the Larder Lake Fault and south of Vigrass Lake.

1990 - S. J. Carmichael reported on the Otto Township Gold Property for Fern Rivard. This ten-claim property is located east of Swastika in north central portion of the township. The property is underlain by mafic volcanics with carbonate alteration.

1991 - J. J. St. Jean completed a geology, geophysical and geochemical surveys on 4 claims located in Northeastern Otto Township (Lot 3 Con VI). Massive flows of greenstones which are basatic in composition were found. Rock and soil samples yielded some values in copper, nickel and zinc.

1997 - J. Whyte reported re: Queenston's Property in the Kirkland Lake Camp that Queenston has concentrated much of its effort along downplunge extension of the McBean which operated on mineralization in a felsic dyke. Below the pit a much wider altered and deformed zone was found with typical green carbonate in its footwall and more gold mineralization hosted in volcanics and dyke rocks in the hangingwall. The green carbonate combined with felsic dykes is the source of the mineralization.

PROSPECTING PROGRAM - 2000

Stripping and trenching

Part I of the stripping and trenching included the application for a Ministry of Transportation entrance permit, installation of a culvert and the stripping of Area # 1.

Trenching and stripping was done with a John Deer, Model 455E, Crawler by Mr. Al Smaill.

Mr. Dave Guindon, District Geologist with the Ministry of Northern Development and Mines in the Kirkland Lake Region visited the property on July 5, 2000.

NOTE: The following represents my own notes during the property visit.

The rocks were described as Mafic (intermediate) metavolcanic intrusive.

Area # 1 was described as Pillows with magnesium tholeiite.
(see enclosed sketch , Annex "J-2")

The rusty outcrop near the the track (200 ft. north of the track) is described as biotite with black mica.

There is also a zinc showing.

Dave took samples for assay; a complete report will follow.

PROSPECTING PROGRAM – 2000

Conclusion

The follow-up program should include prospecting in order to locate more old trenches, shear zone and mineralized quartz veins. (These were the recommendations of Geo. C. Seaborn, Consulting Engineer in 1937)

Submitted by:

Denis Chartre, Prospector
Roger Dufresne, Prospector

Ontario Ministry of Northern Development and Mines
Mines and Minerals Division

G-3719 - TECK - LARDER LAKE Division

PAN

help

Zoom Tools
help

Zoom Level GO

APR. 1 0 1998
APR. 1 0 1999

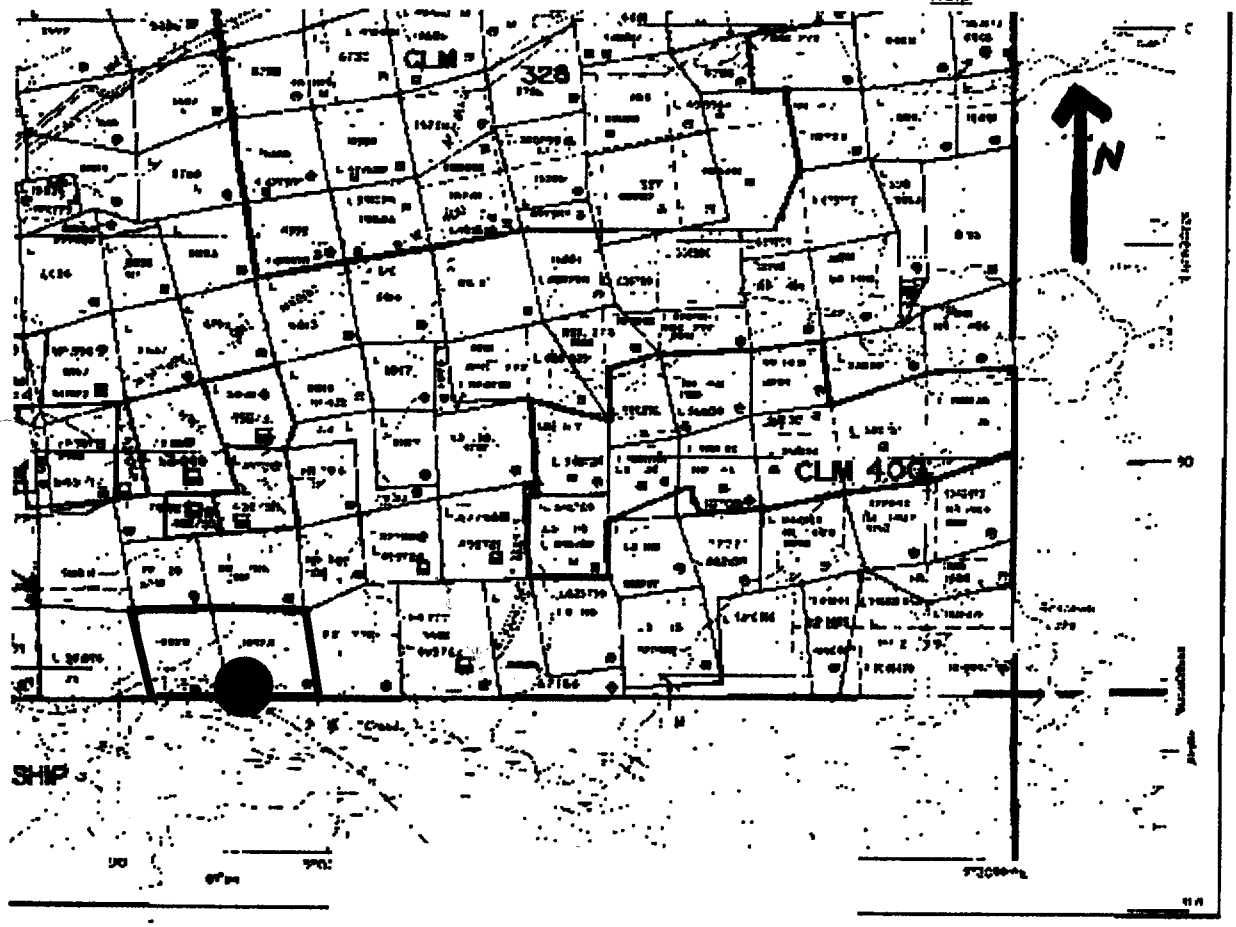
Adjacent Map

help

Order Hard Copy Map help

Order Form

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Chartre - Dufresne
Otto - Teck
1999 Property

SCALE: 1 INCH = 40 CHAINS
1/2 INCH = 1/4 MILE

Ontario

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Ontario Ministry of Northern Development and Mines
Mines and Minerals Division

M-0379 - OTTO - LARDER LAKE Division

PAN help

Zoom Tools help

Zoom Level GO

APR. 1 0 1998

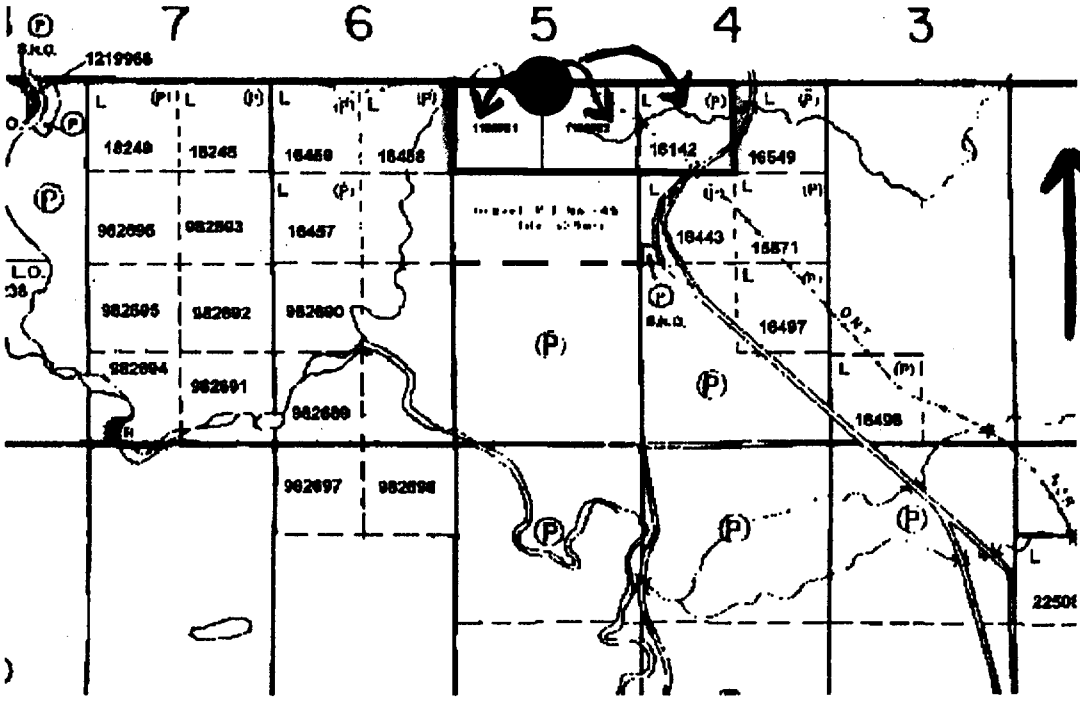
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Adjacent Map help

Order Hard Copy Map help

Order Form

Downl Scale i Dc



SCALE: 1 INCH = 40 CHAINS

1/2 INCH = 1/4 MILE

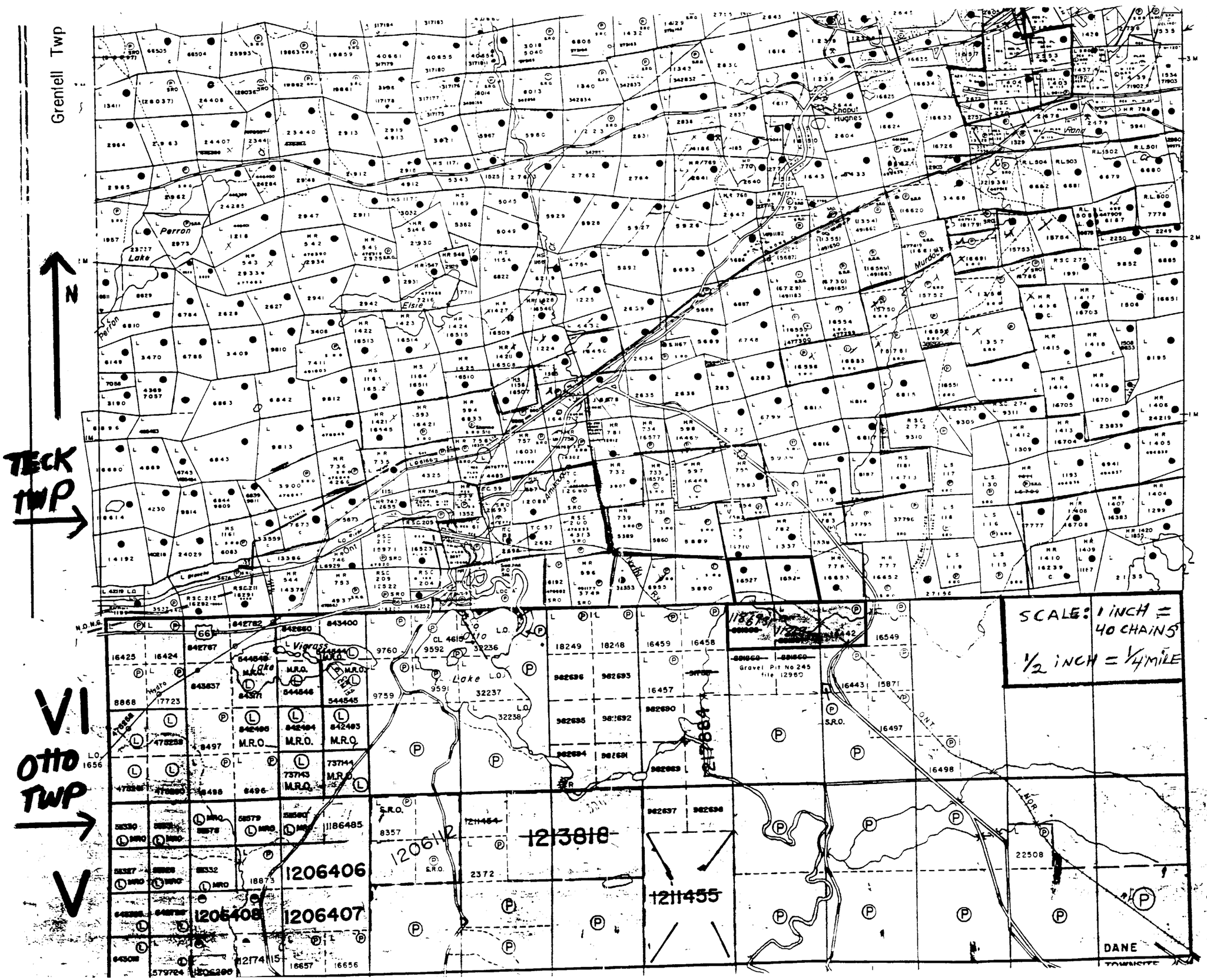
Chartre - Dufresne
✓Otto - Teck
1999 Property

This site n
Comments and

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This information is provided as
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ANNEX "A"


Grenfell Twp
Lehe Twp
TECK TWP
OTTO TWP
VI
V
N
Perron Lake
Elsie
Murdock
Chaput Hughes
Vigrass Lake
Otto Lake
Gravel Pit No 245 File 12960
SCALE: 1 INCH = 40 CHAINS
1/2 INCH = 1/4 MILE
DANE

Province of Ontario

Transfer/Deed of Land

ANNEX "A-A"

A

Form 1 -- Land Registration Reform Act

FOR OFFICE USE ONLY

0303465

CERTIFICATE OF RECEIPT
RECEPISSE
TIMISKAMING (54) HAILEYBURY

'98 OCT 1 AM 11 47

LAND REGISTRAR / REGISTRATEUR

(1) Registry ☐ Land Titles ☒ (2) Page 1 of 4 pages

(3) Property Identifier(s) Block Property Additional: See Schedule ☐

(4) Consideration ~~Three Thousand Three Hundred and Sixty~~ ~~12/100~~ Five hundred and twenty six 46/100 Dollars $ ~~3,360.12~~ 526.46

(5) Description This is a: Property Division ☐ Property Consolidation ☐

Pcl. 2509 Timiskaming NW 1/4 N 1/2 Lot 4
Concession 6
Township of Otto

New Property Identifiers

Additional: See Schedule ☐

Executions

Nil

Additional: See Schedule ☐

(6) This Document Contains: (a) Redescription New Easement Plan/Sketch ☐ (b) Schedule for: Description ☐ Additional Parties ☐ Other ☒

(7) Interest/Estate Transferred
Fee Simple

(8) Transferor(s) The transferor hereby transfers the land to the transferee and certifies that the transferor is at least eighteen years old and that

The property transferred is not ordinarily occupied by me and my spouse, who is not separated from me, as our family residence.

Name(s)	Signature(s)	Date of Signature Y M D
RIVARD, Fernand Joseph Lucien		1998 09 30

(9) Spouse(s) of Transferor(s) I hereby consent to this transaction

Name(s)	Signature(s)	Date of Signature Y M D

(10) Transferor(s) Address for Service 876 Government Road West, Box 1091, Kirkland Lake, Ont. P2N 2C9

(11) Transferee(s)

	Date of Birth Y M D
CHARTRE, Jean Joseph Denis	1951 06 21
CHARTRE, Jean Joseph Paul	1951 06 21
DUFRESNE, Roger Joseph	1942 04 19

as tenants in common - each as to one-third

(12) Transferee(s) Address for Service SEE SCHEDULE

Planning Act--OPTIONAL

(13) Transferor(s) The transferor verifies that to the best of the transferor's knowledge and belief, this transfer does not contravene section 50 of the Planning Act.

Date of Signature Y M D

Signature

Date of Signature Y M D

Signature

Solicitor for Transferor(s) I have explained the effect of section 50 of the Planning Act to the transferor and I have made inquiries of the transferor to determine that this transfer does not contravene that section and based on the information supplied by the transferor, to the best of my knowledge and belief, this transfer does not contravene that section. I am an Ontario solicitor in good standing.

Date of Signature Y M D

Name and Address of Solicitor

Signature

Affix Statement by Solicitor for Transferee(s) here if necessary

(14) Solicitor for Transferee(s) I have investigated the title to this land and to abutting land where relevant and I am satisfied that the title records reveal no contravention as set out in subclause 50 (22) (c) (ii) of the Planning Act and that to the best of my knowledge and belief this transfer does not contravene section 50 of the Planning Act. I act independently of the solicitor for the transferor(s) and I am an Ontario solicitor in good standing.

Name and Address of Solicitor

Date of Signature Y M D

Signature

(15) Assessment Roll Number of Property

Cty	Mun.	Map	Sub.	Par	
54	80	010	020	33800	~~Not Assigned~~

(16) Municipal Address of Property
not assigned

(17) Document Prepared by:
R.A. Dinnen
Barrister & Solicitor
P.O. Box 250
Kirkland Lake, Ont.
P2N 3H7

R Gordon

FOR OFFICE USE ONLY

Fees and Tax	
Registration Fee	
Land Transfer Tax	
Total	

An ExperText Systems Ltd. Form

11/92

Additional Property Identifier(s) and/or Other Information

BOX (12) Transferees' Address for Service

CHARTRE, Jean Joseph Denis - 10 Swastika Avenue, Box 53, Swastika, Ontario POK 1TO

CHARTRE, Jean Joseph Paul - 16 Madden Avenue, Box 53, Swastika, Ontario POK 1TO

DUFRESNE, Roger Joseph - 14 Wright Hargreaves Avenue, Kirkland Lake, Ontario P2N 1B2

FOR OFFICE USE ONLY

DYE & DURHAM CO. INC. - Form No. 500
Amended 1991

Affidavit of Residence and of Value of the Consideration
Form 1 – Land Transfer Tax Act

Refer to all instructions on reverse side.

IN THE MATTER OF THE CONVEYANCE OF *(insert brief description of land)* Pcl. 2509 Timiskaming NW 1/4 N 1/2 Lot 4 Concession 6 Township of Otto

BY *(print names of all transferors in full)* FERNAND JOSEPH LUCIEN RIVARD

TO *(see instruction 1 and print names of all transferees in full)* JEAN JOSEPH DENIS CHARTRE, 1/3 JEAN JOSEPH PAUL CHARTRE 1/3 and ROGER JOSEPH DUFRESNE 1/3

I, *(see instruction 2 and print name(s) in full)* JEAN JOSEPH DENIS CHARTRE, JEAN JOSEPH PAUL CHARTRE and ROGER JOSEPH DUFRESNE

MAKE OATH AND SAY THAT:

1. I am *(place a clear mark within the square opposite that one of the following paragraphs that describes the capacity of the deponent(s)): (see instruction 2)*

- ☐ (a) A person in trust for whom the land conveyed in the above-described conveyance is being conveyed;
- ☐ (b) A trustee named in the above-described conveyance to whom the land is being conveyed;
- ☒ (c) A transferee named in the above-described conveyance;
- ☐ (d) The authorized agent or solicitor acting in this transaction for *(insert name(s) of principal(s))* _____ described in paragraph(s) (a), (b), (c) above; *(strike out references to inapplicable paragraphs)*
- ☐ (e) The President, Vice-President, Manager, Secretary, Director, or Treasurer authorized to act for *(insert name(s) of corporation(s))* _____ described in paragraph(s) (a), (b), (c) above; *(strike out references to inapplicable paragraphs)*
- ☐ (f) A transferee described in paragraph( ) *(insert only one of paragraph (a), (b) or (c) above, as applicable)* and am making this affidavit on my own behalf and on behalf of *(insert name of spouse)* _____ who is my spouse described in paragraph ( ) *(insert only one of paragraph (a), (b) or (c) above, as applicable)* and as such, I have personal knowledge of the facts herein deposed to.

2. ***(To be completed where the value of the consideration for the conveyance exceeds $400,000).***

I have read and considered the definition of "single family residence" set out in clause 1(1)(ja) of the Act. The land conveyed in the above-described conveyance

- ☐ contains at least one and not more than two single family residences.
- ☐ does not contain a single family residence.
- ☐ contains more than two single family residences. *(see instruction 3)*

Note: **Clause 2(1)(d) imposes an additional tax at the rate of one-half of one per cent upon the value of consideration in excess of $400,000 where the conveyance contains at least one and not more than two single family residences.**

3. I have read and considered the definitions of "non-resident corporation" and "non-resident person" set out respectively in clauses 1(1)(f) and (g) of the Act and each of the following persons to whom or in trust for whom the land is being conveyed in the above-described conveyance is a "non-resident corporation" or a "non-resident person" as set out in the Act. *(see instructions 4 and 5)* NONE

4. **THE TOTAL CONSIDERATION FOR THIS TRANSACTION IS ALLOCATED AS FOLLOWS:**

(a) Monies paid or to be paid in cash	$ 399.75	
(b) Mortgages (i) Assumed *(show principal and interest to be credited against purchase price)*	$ NIL	
(ii) Given back to vendor	$ NIL	
(c) Property transferred in exchange *(detail below)*	$ NIL	
(d) Securities transferred to the value of *(detail below)*	$ NIL	
(e) Liens, legacies, annuities and maintenance charges to which transfer is subject	$ 126.71	
(f) Other valuable consideration subject to land transfer tax *(detail below)*	$ NIL	
(g) VALUE OF LAND, BUILDING, FIXTURES AND GOODWILL SUBJECT TO LAND TRANSFER TAX *(Total of (a) to (f))*	$ 526.46	$ 526.46
(h) VALUE OF ALL CHATTELS - items of tangible personal property *(Retail Sales Tax is payable on the value of all chattels unless exempt under the provisions of the "Retail Sales Tax Act", R.S.O. 1990, c.454, as amended)*		$ NIL
(i) Other consideration for transaction not included in (g) or (h) above		$ NIL
(j) TOTAL CONSIDERATION		$ 526.46

All Blanks Must Be Filled In. Insert "Nil" Where Applicable.

5. If consideration is nominal, describe relationship between transferor and transferee and state purpose of conveyance. *(see instruction 6)* _____

6. If the consideration is nominal, is the land subject to any encumbrance? _____

7. Other remarks and explanations, if necessary. _____

Sworn before me at the Town of Kirkland Lake
in the District of Timiskaming
this 30th day of September 19 98

A Commissioner for taking Affidavits, etc.

Denis Chartre
JEAN JOSEPH DENIS CHARTRE
Paul Chartre
JEAN JOSEPH PAUL CHARTRE
Roger J. Dufresne
ROGER JOSEPH DUFRESNE
(Signature(s))

Property Information Record

A. Describe nature of instrument Transfer

B. (i) Address of property being conveyed *(if available)* not assigned

(ii) Assessment Roll No. *(if available)* ~~not assigned~~ 54-80-070-020-33800

C. Mailing address(es) for future Notices of Assessment under the Assessment Act for property being conveyed (see instruction 7) SEE SCHEDULE

D. (i) Registration number for last conveyance of property being conveyed *(if available)* _____

(ii) Legal description of property conveyed. Same as in D.(i) above. Yes ☐ No ☐ Not known ☐

R.A. Dinnen
P.O. Box 250
Kirkland Lake, Ontario P2N 3H7

For Land Registry Office Use Only

Registration No.

Registration Date | Land Registry Office No.

School Tax Support (Voluntary Election) See reverse for explanation

(a) Are all individual transferees Roman Catholic ? Yes ☐ No ☐

(b) If Yes do all individual transferees wish to be Roman Catholic Separate School Supporters ? Yes ☐ No ☐

(c) Do all individual transferees have French Language Education Rights ? Yes ☐ No ☐

(d) If Yes, do all individual transferees wish to support the French Language School Board (where established)? Yes ☐ No ☐

NOTE: As to (c) and (d) the land being transferred will be assigned to the French Public School Re... Sector unless otherwise directed in (a) and (b).

Additional Property Identifier(s) and/or Other Information

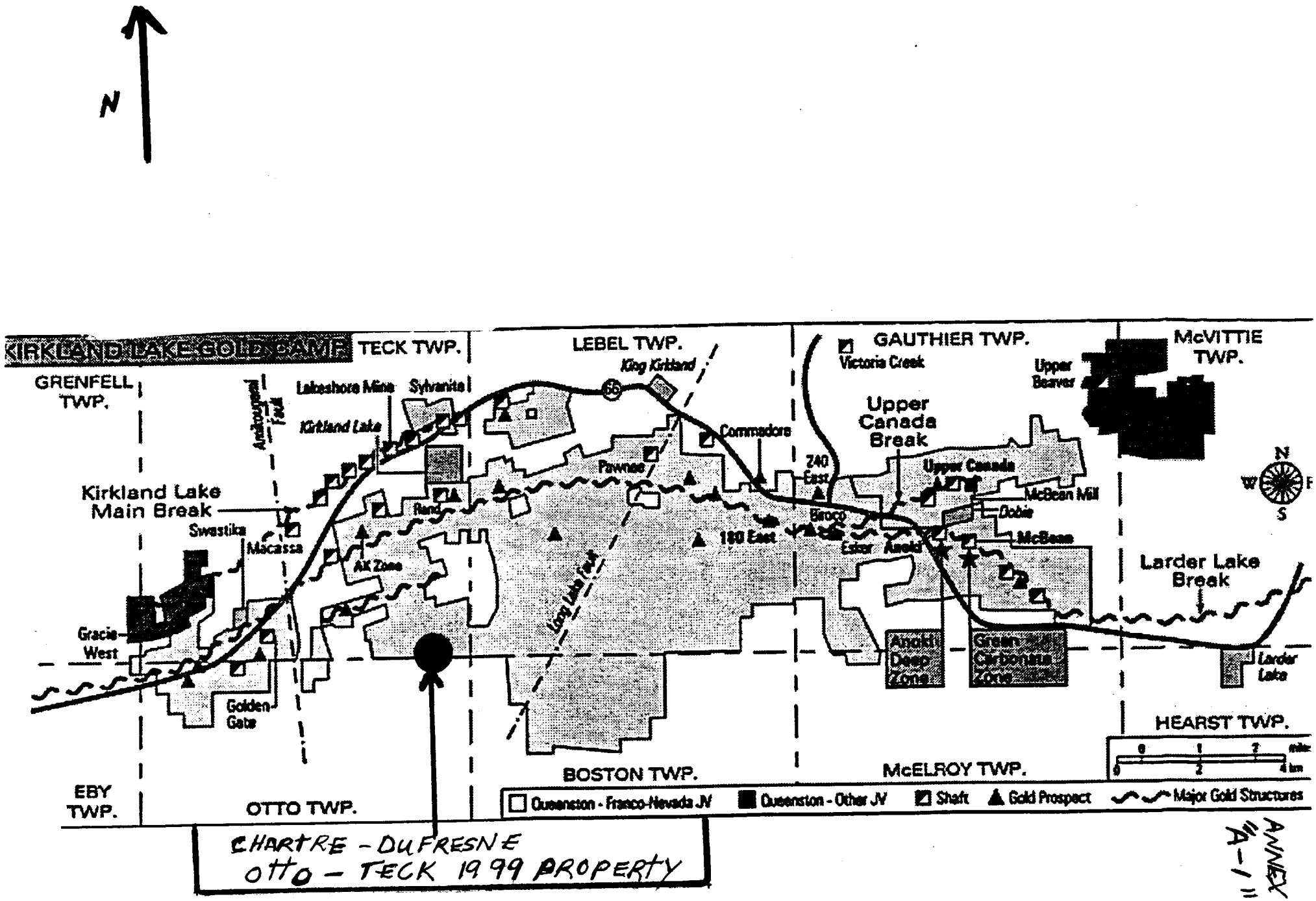
PROPERTY INFORMATION RECORD - C. Mailing Addresses for future Notices of Assessment under the Assessment Act for property being conveyed

CHARTRE, Jean Joseph Denis - 10 Swastika Avenue, Box 53, Swastika, Ontario POK 1TO

CHARTRE, Jean Joseph Paul - 16 Madden Avenue, Box 53, Swastika, Ontario POK 1TO

DUFRESNE, Roger Joseph - 14 Wright Hargreaves Avenue, Kirkland Lake, Ontario P2N 1B2

FOR OFFICE USE ONLY


N
KIRKLAND LAKE GOLD CAMP
TECK TWP.
LEBEL TWP.
GAUTHIER TWP.
McVITTIE TWP.
GRENFELL TWP.
Lakeshore Mine
Sylvanite
Kirkland Lake
Anticlinorium Fold
King Kirkland
Victoria Creek
Upper Beaver
Upper Canada Break
Commodore
Pawnee
240 East
Upper Canada
McBean Mill
Dobie
Kirkland Lake Main Break
Swastika
Macassa
AK Zone
180 East
Estor
Arnold
McBean
Larder Lake Break
Gracie West
Golden Gate
Long Lake Fault
Anoki Deep Zone
Larder Lake
HEARST TWP.
BOSTON TWP.
McELROY TWP.
EBY TWP.
OTTO TWP.
Queenston - Franco-Nevada JV
Queenston - Other JV
Shaft
Gold Prospect
Major Gold Structures
CHARTRE - DUFRESNE
OTTO - TECK 1999 PROPERTY
ANNEX "A-1"

(MATACHEWAN OR NIPISSING)

6 *Diabase.*

INTRUSIVE CONTACT

FELSIC INTRUSIVE ROCKS (ALGOMAN)

5a *Granite, porphyritic granite, granodiorite.*
5b *Granodioritic gneiss.*
5c *Syenite and trachyte.*
5d *Mafic syenite and mafic trachyte.*

INTRUSIVE CONTACT

EARLY MAFIC AND ULTRAMAFIC ROCKS (HAILEYBURIAN, EARLY ALGOMAN, AND KEEWATIN)

4a *Serpentinite, peridotite.*
4b *Gabbro, diorite.*

INTRUSIVE CONTACT

METASEDIMENTS (TIMISKAMING AND KEEWATIN)

3a *Conglomerate.*
3b *Quartzite, greywacke.*
3c *Tuff, agglomerate, minor amounts of trachyte agglomerate, breccia.*

UNCONFORMITY AND INTERBEDDING

FELSIC METAVOLCANICS (KEEWATIN)

2a *Rhyolite, dacite.*
2b *Iron formation, silicic tuff, agglomerate.*
2c *Dacite porphyry, amygdaloidal and spherulitic dacite.*

MAFIC METAVOLCANICS AND METASEDIMENTS

1 *Unsubdivided mafic volcanics.*
1a *Basalt, andesite.*
1b *Chloritic mafic tuff, agglomerate.*
1c *Altered (bleached, carbonatized) volcanic and sedimentary rocks.*
1d *Amphibolite, garnet-epidote amphibolite, amphibolite gneiss.*
1e *Andesite porphyry, amygdaloidal and spherulitic dacite.*
1g *Biotite-garnet-pyroxene amphibolite.*

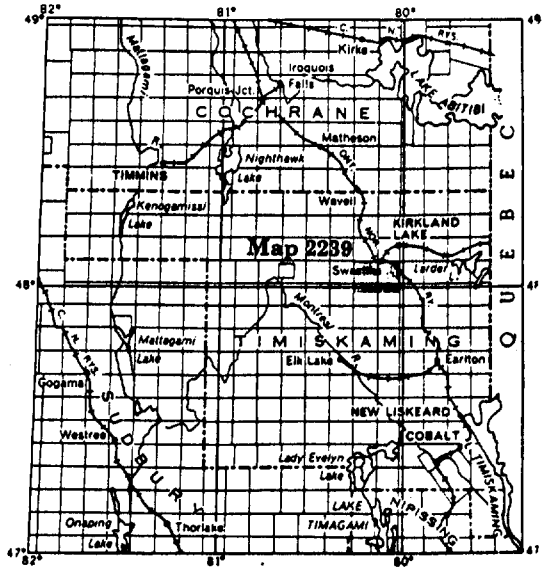
Au	*Gold*
carb	*Carbonate*
Cu	*Copper*
gf	*Graphite*
hem	*Hematite*
mag	*Magnetite*
ne	*Nepheline*
q	*Quartz*
qc	*Quartz-carbonate*
S	*Sulphide mineralization*
Zn	*Zinc*

---

[a] *Unconsolidated deposits. Cenozoic deposits are represented by the lighter coloured parts on the map.*

[b] *Bedrock geology. Outcrops and inferred extensions of each rock map unit are shown. Where in places a formation is too narrow to show colour and must be represented in black, a short black bar appears in the appropriate block.*

ANNEX "A-14"



Scale, 1 inch to 50 miles

N. T. S. reference 41P/16, 42A/1

LEGEND

CENOZOIC[a]

PLEISTOCENE AND RECENT

Silt, clay, sand, gravel.

UNCONFORMITY

PRECAMBRIAN[b]

PROTEROZOIC

LATE MAFIC INTRUSIVE ROCKS (NIPISSING OR KEWEENAWAN)

9 *Diabase.*

INTRUSIVE CONTACT

HURONIAN

COBALT GROUP

GOWGANDA FORMATION

8a *Conglomerate.*
8b *Arkose, greywacke, argillite.*

UNCONFORMITY

ALKALIC INTRUSIVE ROCKS

7a *Coarse-grained syenite, syenite porphyry, pegmatite.*
7b *Mafic syenite, syenite contaminated by country rocks.*
7c *Medium-grained syenite, aplite dikes.*
7d *Syenite with numerous xenoliths and autoliths.*
7e *Lamprophyre.*
7f *Quartz syenite, granite.*
7g *Diorite.*

INTRUSIVE CONTACT

LIST OF PROPERTIES

EBY TOWNSHIP

1. *Baldwin Consolidated Mines Limited.*
2. *Barker, Mrs. Cora K.*
3. *Cain, Mrs. Donna.*
4. *Dominion Gulf Company [circa 1952].*
5. *Fishkin, Morris.*
6. *Hansen, Aage.*
7. *Johnson, Angus [circa 1938].*
8. *Kaplan, M., and Hahn, R. J.*
9. *Keevil Mining Group Limited.*
10. *Lemu Investments.*
11. *Mundy [circa 1938].*
12. *Preston Mines Limited.*
13. *Rogick, Martin; Clark, Amelia; and Elliott, Richard.*
14. *Stewart, W.*
15. *Strome, Diane C.*
16. *Sylvanite Gold Mines Limited [circa 1945].*
17. *Taylor Gold Mines Limited.*
18. *Todora Kirkland Prospecting Syndicate [circa 1948].*
19. *Vagolaide, Ago and Ellen.*
20. *Walters, George W.*

OTTO TOWNSHIP

21. *Bottrell, Mrs. Helen.*
22. *Chavigny Gold Mines Limited.*
23. *Cochrane, W. M.*
24. *Gateford Mines Limited.*
25. *International Nickel Company of Canada Limited, The.*
26. *Simpson, William.*
27. *Strome, Diane C.*
28. *Todora Kirkland Prospecting Syndicate [circa 1948].*

Date in square brackets, refers to last major work.

SOURCES OF INFORMATION

Geology of Eby Township, the three southern concessions of Otto Township and the northern part of Marquis Township by H. L. Lovell and assistants, 1967 and 1968.

Geology of the northern halves of lots 8, 9, 10, 11 and 12, concession VI, Otto Township from O.D.M. Map No. 1945-1, Township of Teck.

Geology of concession V and remainder of concession VI, Otto Township by K. D. Lawton and assistants, 1955; field maps and notes compiled by John Ramsden and H. L. Lovell, 1965.

Geology of concession IV, Otto Township, by John Ramsden, 1965.

Geology is not tied to surveyed lines.

Geological and geophysical maps and reports of mining companies.

Geological Survey of Canada Aeromagnetic maps 289G and 1506G.

Preliminary maps P. 448 Eby Township and P. 501 Otto Township and northern part of Marquis Township. Scale 1 inch to ¼ mile issued 1968 and 1969 respectively.

Cartography by C. A. Love and assistants, Ontario Department of Mines and Northern Affairs, 1971.

Base map derived from maps of the Forest Resources Inventory, Ontario Department of Lands and Forests, with revisions by H. L. Lovell.

Magnetic declination in the area was approximately 9°27'W in 1969.

SYMBOLS

Glacial striae.

Esker.

Small bedrock outcrop.

Area of bedrock outcrop.

Bedding, top unknown; (inclined, vertical).

Lava flow; top (arrow) from pillow and packing.

Schistosity; (horizontal, inclined, vertical).

Gneissosity, (horizontal, inclined, vertical).

Geological boundary, observed.

Geological boundary, position interpreted.

Fault; (observed, assumed). Sp... cates down throw side, arrows i... horizontal movement.

Lineament.

Jointing; (horizontal, inclined, v...

Drag folds with plunge.

Anticline, syncline, with plunge.

Drill hole; (vertical, inclined).

Vein, vein network. Width in inch...

Shaft; depth in feet.

MA — *Magnetic attraction.*

RA — *Radioactivity.*

Motor road. Provincial highway nu... encircled where applicable.

Other road.

Trail, portage or winter road.

Building.

Township boundary, approximate ... tion only.

Surveyed line, approximate position ...

Property boundary, approximate pos... only.

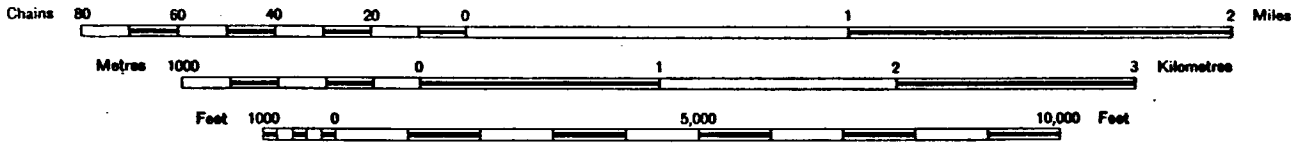
6 (12) — *Mining property; (surveyed, unsurveyed). See list of properties.*

Map 2239

EBY-OTTO AREA

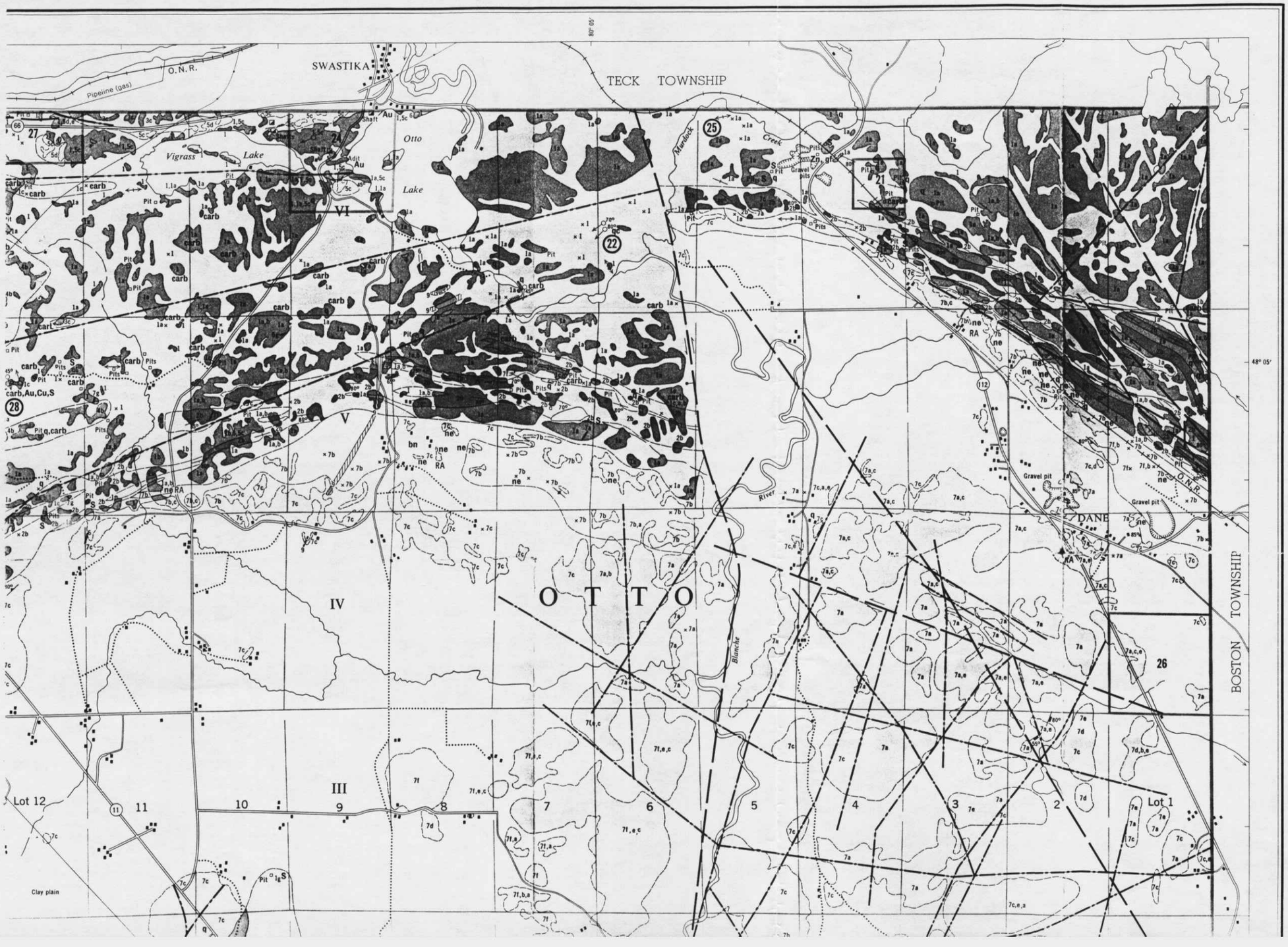
TIMISKAMING DISTRICT

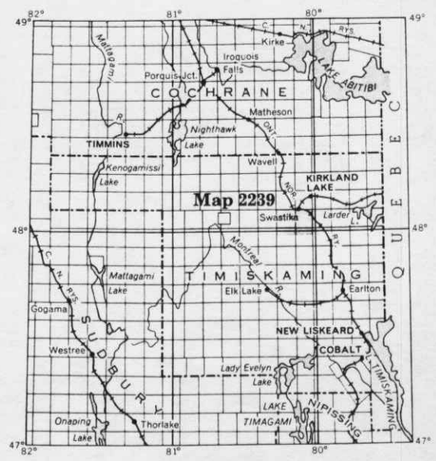
Scale 1:31,680 or 1 Inch to ½ Mile



'ARIO
NT OF MINES
ERN AFFAIRS
) BERNIER, *Minister*
. Thomson, *Director, Geological Branch*

Map 2239
Eby—Otto Area





Scale, 1 inch to 50 miles

N. T. S. reference 41P/16, 42A/1

LEGEND

CENOZOIC[a]

PLEISTOCENE AND RECENT

Silt, clay, sand, gravel.

UNCONFORMITY

PRECAMBRIAN[b]

PROTEROZOIC

LATE MAFIC INTRUSIVE ROCKS (NIPISSING OR KEWEENAWAN)

9 *Diabase.*

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ALKALIC INTRUSIVE ROCKS

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7b *Mafic syenite, syenite contaminated by country rocks.*
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7d *Syenite with numerous xenoliths and autoliths.*
7e *Lamprophyre.*
7f *Quartz syenite, granite.*
7g *Diorite.*

INTRUSIVE CONTACT

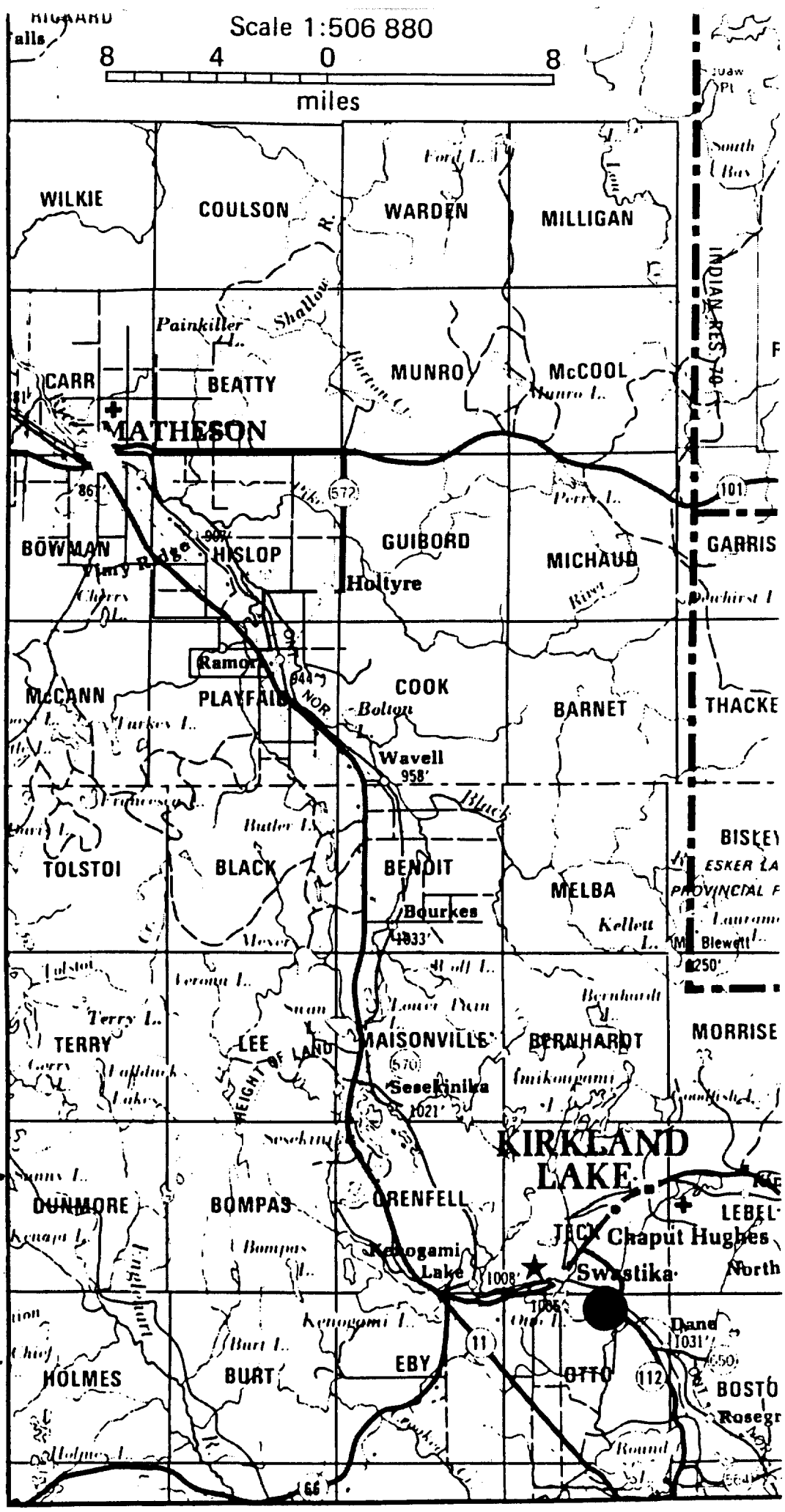
ARCHEAN

MAFIC INTRUSIVE ROCKS (MATACHEWAN OR NIPISSING)

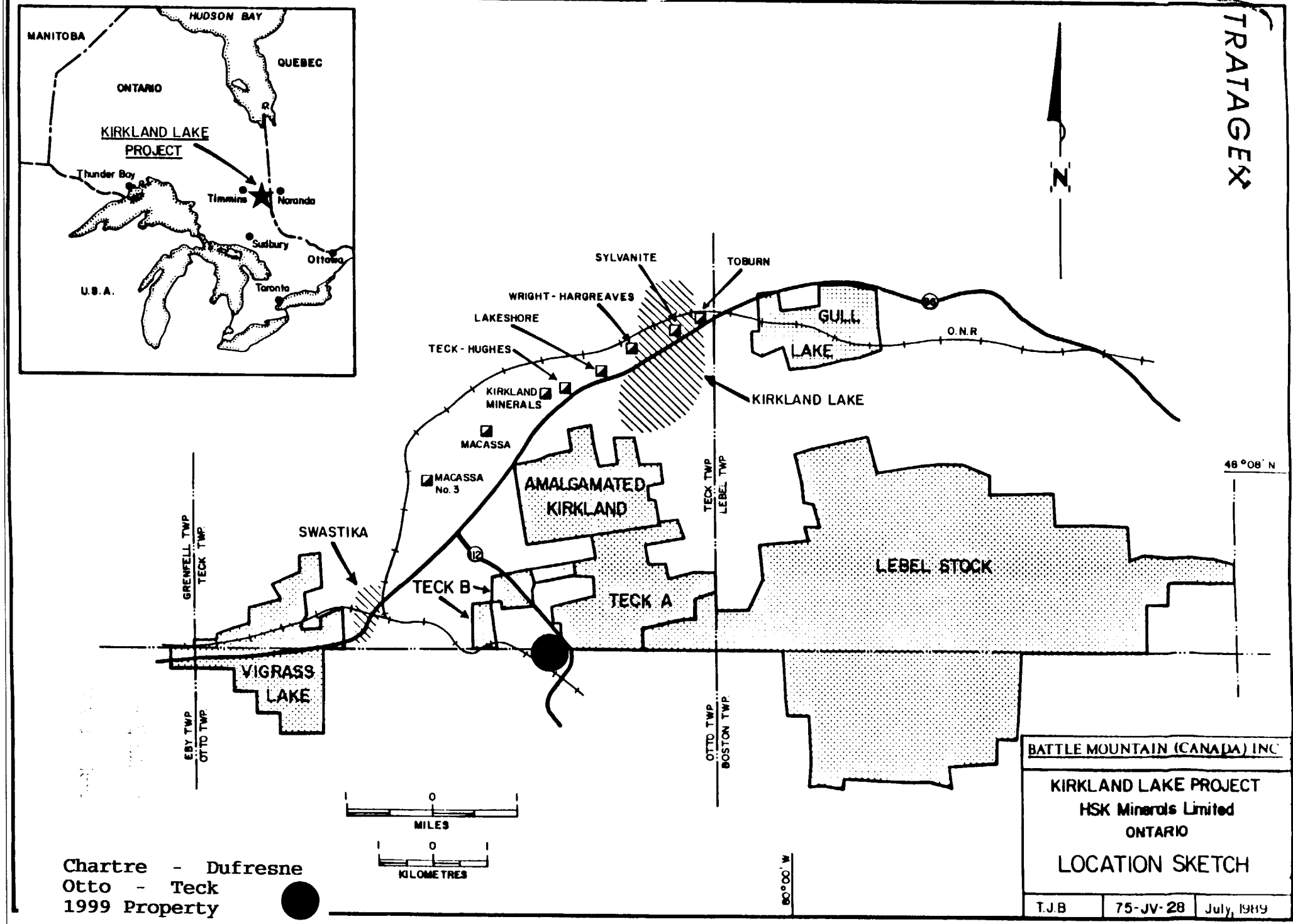
6 *Diabase.*

INTRUSIVE CONTACT

ANNEX "A-1B"



Chartre - Dufresne
Otto - Teck
1999 Property


HUDSON BAY
MANITOBA
QUEBEC
ONTARIO
KIRKLAND LAKE PROJECT
Thunder Bay
Timmins
Noranda
Sudbury
Ottawa
U.S.A.
Toronto
STRATAGEX
N
SYLVANITE
TOBURN
WRIGHT - HARGREAVES
LAKESHORE
TECK - HUGHES
KIRKLAND MINERALS
KIRKLAND LAKE
GULL LAKE
O.N.R
MACASSA
MACASSA No. 3
AMALGAMATED KIRKLAND
SWASTIKA
TECK B
TECK A
LEBEL STOCK
GRENFELL TWP
TECK TWP
EBY TWP
OTTO TWP
LEBEL TWP
BOSTON TWP
VIGRASS LAKE
48°08' N
80°00' W
0
MILES
0
KILOMETRES
Chartre - Dufresne
Otto - Teck
1999 Property
BATTLE MOUNTAIN (CANADA) INC
KIRKLAND LAKE PROJECT
HSK Minerals Limited
ONTARIO
LOCATION SKETCH
T.J.B
75-JV-28
July, 1989
ANNEX "A-1(c)"
FIGURE 1

Chartre - Dufresne
Otto - Teck
1999 Property

Robinson

Reed
Robinson

Reed
Robinson

Cyprus Zone
300,000 oz.Au

Figure 1. General Location of Claim Group
Showing Major Breaks; 1:50 000
Annex A-1D SCALE

ANNEX
A-1E

TECK
TOWNSHIP

N

ONTARIO NORTHLAND RAILWAY

AMALGAMATED
KIRKLAND
PROPERTY

AMIKOUGAMI CREEK

Perron Lake

Elsie Lake

NORTHERN ONTARIO NATURAL GAS CO. LTD.

HEPC TRANSMISSION LINE

VIGRASS
LAKE
PROPERTY

TECK "B"
PROPERTY

Blanche R.

Vigrass Lake

Otto Lake

ONTARIO NORTHLAND

Chartre - Dufresne
Otto - Teck
1999 Property

SCALE: 1 INCH = 40 CHAINS
½ INCH = 1/4 MILE

OTTO
TOWNSHIP

BLANCHE R.

T.C.P.L.

4M
3M
2M
1M
VI
V
IV
III

Amalgamated Kirkland Pr
2923

Eden Roc
Mineral Corp.
756

HSK. Minerals Ltd.
Teck A Property"
1193

Battle Mountain (Canada) Lt
Teck A Property"
2979

Rio Algom
Exploration Inc.
"Dyment-Kidston
Option"
2368

SA
G,SA
G
M
SA
M
G,SA
M
G
EM
SA.
M
G
M
G, EM
Cc
rg
EM, M
Gc
G
M
EM
ra
EM
P
M
H's
Group B
Group A
AM
AEM
MG
EM
Gc

Ltd.
Services Ltd.)

Lac Minerals Ltd.
"Claim L942970"
1547

Kirkland Golden Gate Mines Ltd.
1436

Willroy Mines
(Macassa Div.)
2838

Morgan, J.
3118

Jomi Minerals & Expediting Ltd.
" Dyment Kidston claims, Grs A & B "
1321

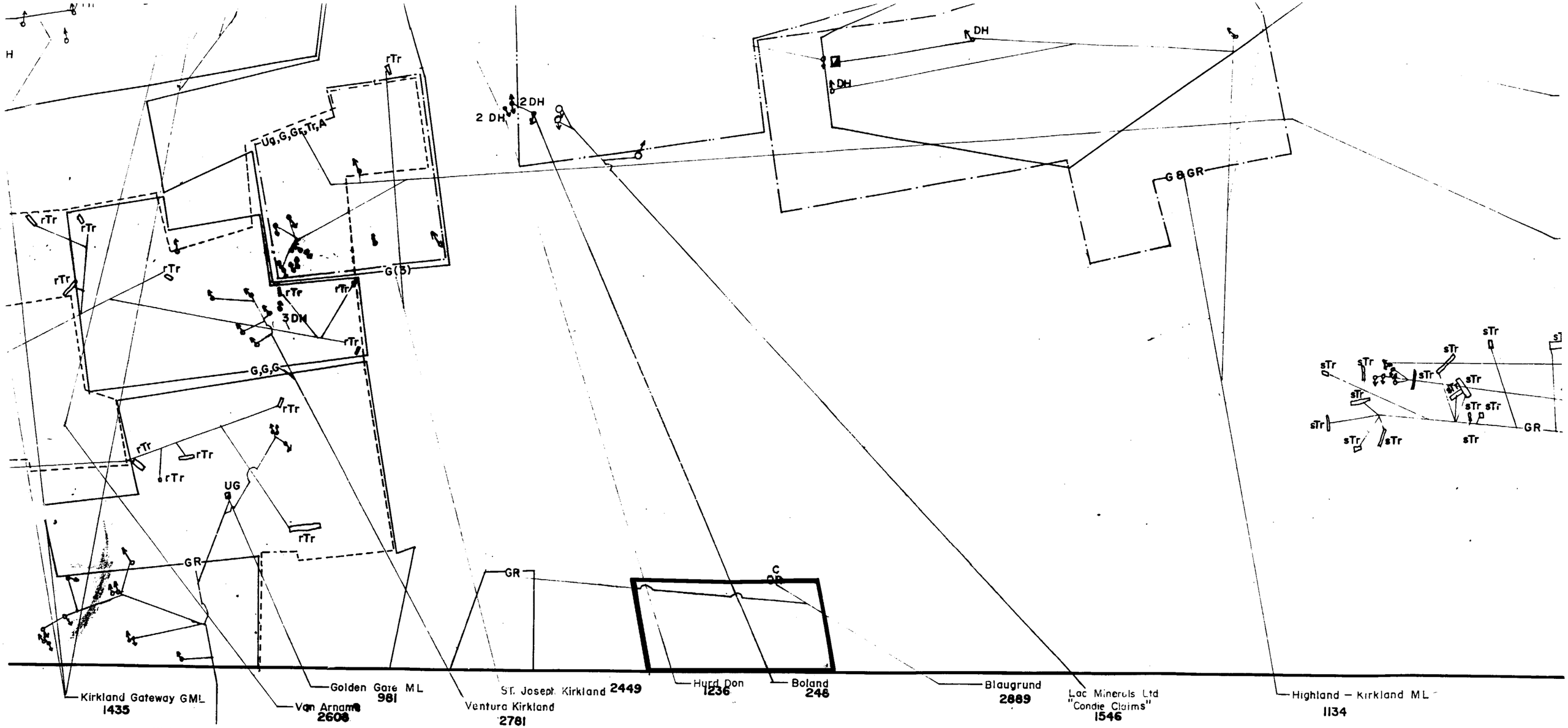
Labrador Exploration (Ont.) Ltd
" Dyment - Kidston "A&B" Project "
1469

H.S.K. Minerals Ltd.
"Lebel Stock Property"
1190

TECK

COMPILATION MAPS
"A-2"

(2 of 3)
TECK


H
rTr
Ug,G,Gr,Tr,A
G(5)
3DH
G,G,G
UG
GR
2 DH
2DH
DH
DH
G & GR
C
GR
sTr
GR
Kirkland Gateway GML
1435
Kirkland Golden Gate Mine
1436
Van Arnam
2608
Golden Gate ML
981
Ventura Kirkland
2781
St. Joseph Kirkland 2449
Hurd Don
1236
Boland
248
Blaugrund
2889
Lac Minerals Ltd
"Condie Claims"
1546
Highland – Kirkland ML
1134

TECK

10

Jomi Minerals & Expediting Ltd. "Dyment-Kidstone" Group D 1320

Homestake Explorations Ltd. "Vigrass Lake Property" 1183

Noranda Exploration Co. Ltd. "Otto 1-79" 2045

Golden Crescent Resources Ltd. 979

Kirkland Golden Gate Mines Ltd. 1436

(The) International Nickel Co. of Canada Ltd. 1280

Jomi Minerals & Expediting Ltd. "Dyment-Kidstone Group C" 1319

H.S.K. Minerals Ltd. "Lebel Stock Property" 1190

Queenston Gold Mines Ltd. "Teck Project" 2324

Minorex Ltd "Blanche River" Property 1892

Noranda Exploration Co. Ltd. 2095

Minorex Ltd. "Murdock Creek" Property 1893

Kelly-Kirkland Mines Ltd. 1355

Gateford Mines Ltd. 915

Chavigny Gold Mines Ltd. 481

Ahola Gold 10

Mulligan, Mrs. Agnes 1934

Rivard, F. 2393

H.S.K. Minerals Ltd. 1192

Zapudsky, D. 2880

Stewart, W. 2563

St. Jean, J. 3034

Allsopp, A.; Crozall, J. & E. 20

Reed, J. 2349

2910 Battle Mountain (Canada) Inc. "Kirkland Lake Project"

Noranda Exploration Co. Ltd. 2046

Mid-North Engineering Services Ltd. 1863

Allard, Conrad. 15

Battle Mountain (Canada) Inc. "Vigrass Lake" Property 3130

Little Long Lac Exploration 1635

Todora Kirkland Prospecting Syndicate 2701

Lenora Exploration Ltd. 1616

Sullivan, T. 2577

Birnie, B. 235

Gudrie, T. 1059

Tamminen, Toivo V. 2619

Rio Tinto Canadian Exploration Ltd. 2386

Argentex Resource Exploration Corp 134

Lee Geo-Indicators Ltd. "Lee-Canico-TG Joint Venture" 1606

Caibbe Otto Township Prop. 2980

Weiler, W. 3097.

OTTO TWP
COMPILATION
110A

QUEENSTON MINING INC.
KL 3582
KL 3907

RIVARD, F.
KL 3212
KL 3546

REED, JAMES D.
KL 3609
KL 3963

RIVARD, F.
KL 4333

ALLSOPP, ARNOLD
KL 4110

ROBINSON, D.
KL 4130 KL 4307
KL 4133 KL 4362

McCORRICK, DAN
KL 3447

W. BIRNIE
KL 3187

KL

OHO TWP

OMPILATION
110B

Mining Lands - Mining Claims Client Report

Larder Lake - Division 80

CLIENT: 127749 - DUFRESNE ROGER J.

TOWNSHIP / AREA	Claim Number	Recording Date	Claim Due Date	Status	Percent Option	Work Required	Total Applied	Total Reserve	Claim Bank
ALMA	L 1096959	1989-JUL-31	2004-JUL-31	A	100 % N	400	5600	9044	1600
CAIRO	L 1179885	1991-SEP-05	2002-SEP-05	A	100 % N	400	3600	0	0
CAIRO	L 1179886	1991-OCT-17	2003-OCT-17	A	100 % N	400	4000	0	0
CAIRO	L 1179887	1991-OCT-17	2001-OCT-17	A	100 % N	130	3470	0	0
CAIRO	L 1179888	1991-OCT-17	2001-OCT-17	A	100 % N	400	3200	0	0
CAIRO	L 1179889	1991-OCT-17	2001-OCT-17	A	100 % N	400	3200	0	0
CAIRO	L 1179890	1991-OCT-17	2001-OCT-17	A	100 % N	400	3200	0	0
CAIRO	L 1185634	1991-OCT-17	2001-OCT-17	A	100 % N	400	3200	0	0
CAIRO	L 1185635	1992-JUN-09	2002-JUN-09	A	100 % N	400	3200	0	0
CAIRO	L 1185636	1992-JUN-09	2001-JUN-09	A	100 % N	400	2800	0	0
EBY	L 1186492	1997-NOV-25	1999-NOV-25	A	100 % N	400	0	0	0
EBY	L 1205843	1998-APR-28	2000-APR-28	A	100 % N	400	0	0	0
EBY	L 1214382	1998-APR-28	2000-APR-28	A	100 % N	400	0	0	0
EBY	L 1214384	1997-NOV-25	1999-NOV-25	A	100 % N	400	0	0	0
EBY	L 1214385	1998-APR-28	2000-APR-28	A	100 % N	400	0	0	0
EBY	L 1225485	1997-NOV-25	1999-NOV-25	A	100 % N	400	0	0	0
FARR	L 1214380	1996-JUN-05	2001-JUN-05	A	100 % N	400	1200	13263	0
FARR	L 1214381	1996-JUN-05	2001-JUN-05	A	100 % N	400	1200	13263	0

FLAVELLE	L 821445	1984-NOV-29	2001-NOV-29	A	100 % N	320	6480	558	0
FLAVELLE	L 821446	1984-NOV-29	2001-NOV-29	A	100 % N	320	6480	558	0
FLAVELLE	L 821447	1984-NOV-22	2001-NOV-22	A	100 % N	320	6480	0	0
FLAVELLE	L 821449	1985-APR-04	2002-APR-04	A	100 % N	320	6480	557	0
FLAVELLE	L 821450	1985-APR-04	2000-APR-04	A	100 % N	320	5680	0	0
FLAVELLE	L 1014296	1987-NOV-12	2002-NOV-12	A	100 % N	83	5917	21	0
FLAVELLE	L 1014297	1988-JAN-18	2002-JAN-18	A	100 % N	360	5240	0	0
FLAVELLE	L 1014298	1988-JAN-18	2002-JAN-18	A	100 % N	360	5240	0	0
FLAVELLE	L 1045696	1988-OCT-31	2002-OCT-31	A	100 % N	360	5240	0	0
FLAVELLE	L 1046201	1988-JUL-11	2002-JUL-11	A	100 % N	360	5240	0	0
FLAVELLE	L 1046203	1988-JUL-11	2002-JUL-11	A	100 % N	360	5240	0	0
FLAVELLE	L 1046204	1988-OCT-31	2002-OCT-31	A	100 % N	360	5240	0	0
FLAVELLE	L 1046205	1988-OCT-31	2002-OCT-31	A	100 % N	360	5240	0	0
FLAVELLE	L 1112014	1989-AUG-14	2002-AUG-14	A	100 % N	360	4840	0	0
FLAVELLE	L 1112015	1989-AUG-14	2002-AUG-14	A	100 % N	360	4840	557	0
FLAVELLE	L 1112017	1989-OCT-31	2002-OCT-31	A	100 % N	360	4840	0	0
FLAVELLE	L 1112018	1989-DEC-11	2002-DEC-11	A	100 % N	60	5140	0	0
OTTO	L 1186931	1998-NOV-25	2000-NOV-25	A	100 % N	400	0	0	0
OTTO	L 1186932	1998-NOV-25	2000-NOV-25	A	100 % N	400	0	0	0

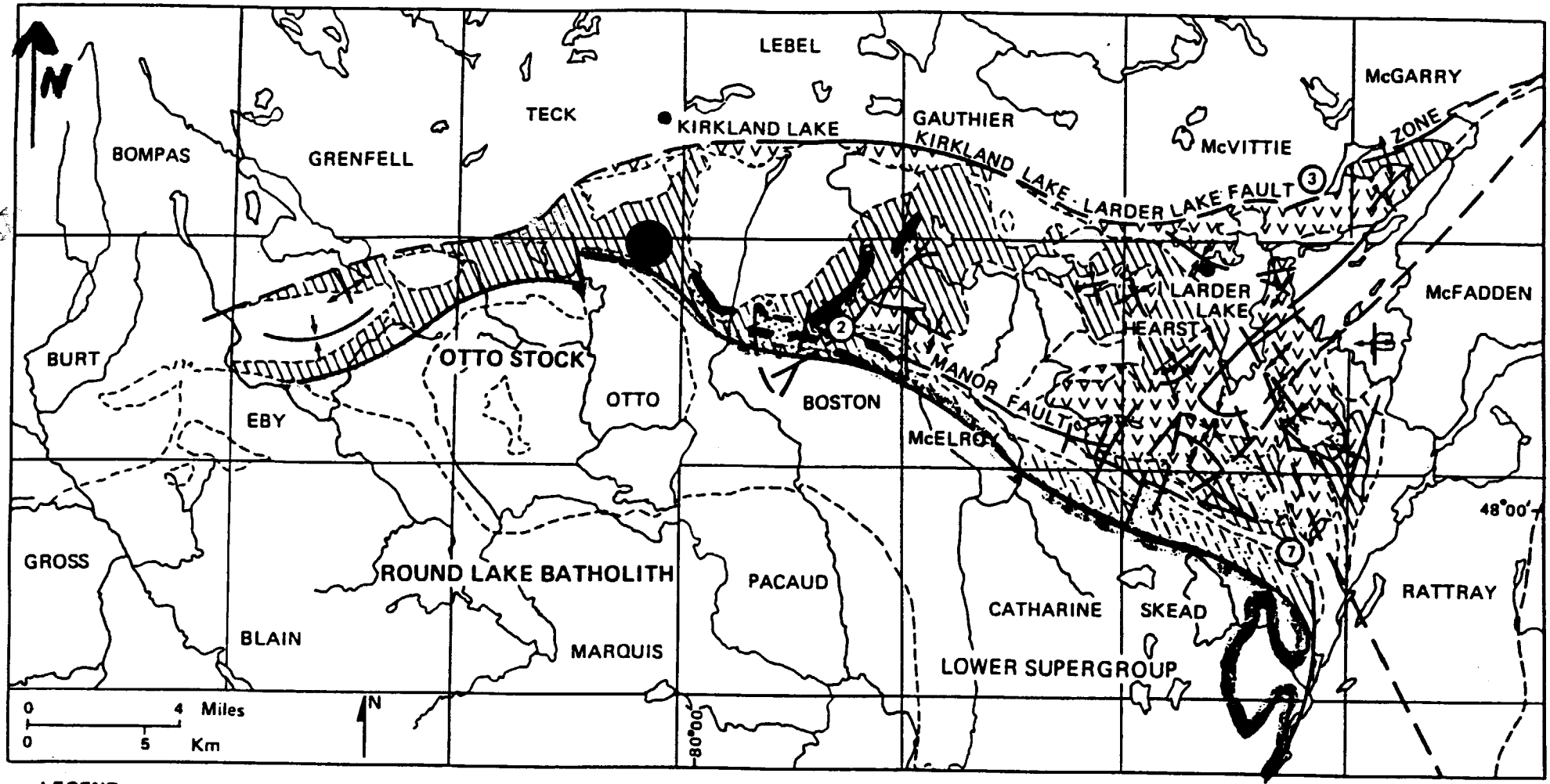
| **Back** | **Main Menu** | **Mining Lands** |

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Otto - Teck
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L.S. JENSEN AND F.F. LANGFORD



LEGEND

Fault | Syncline | Anticline | Geological Boundary | ② Location

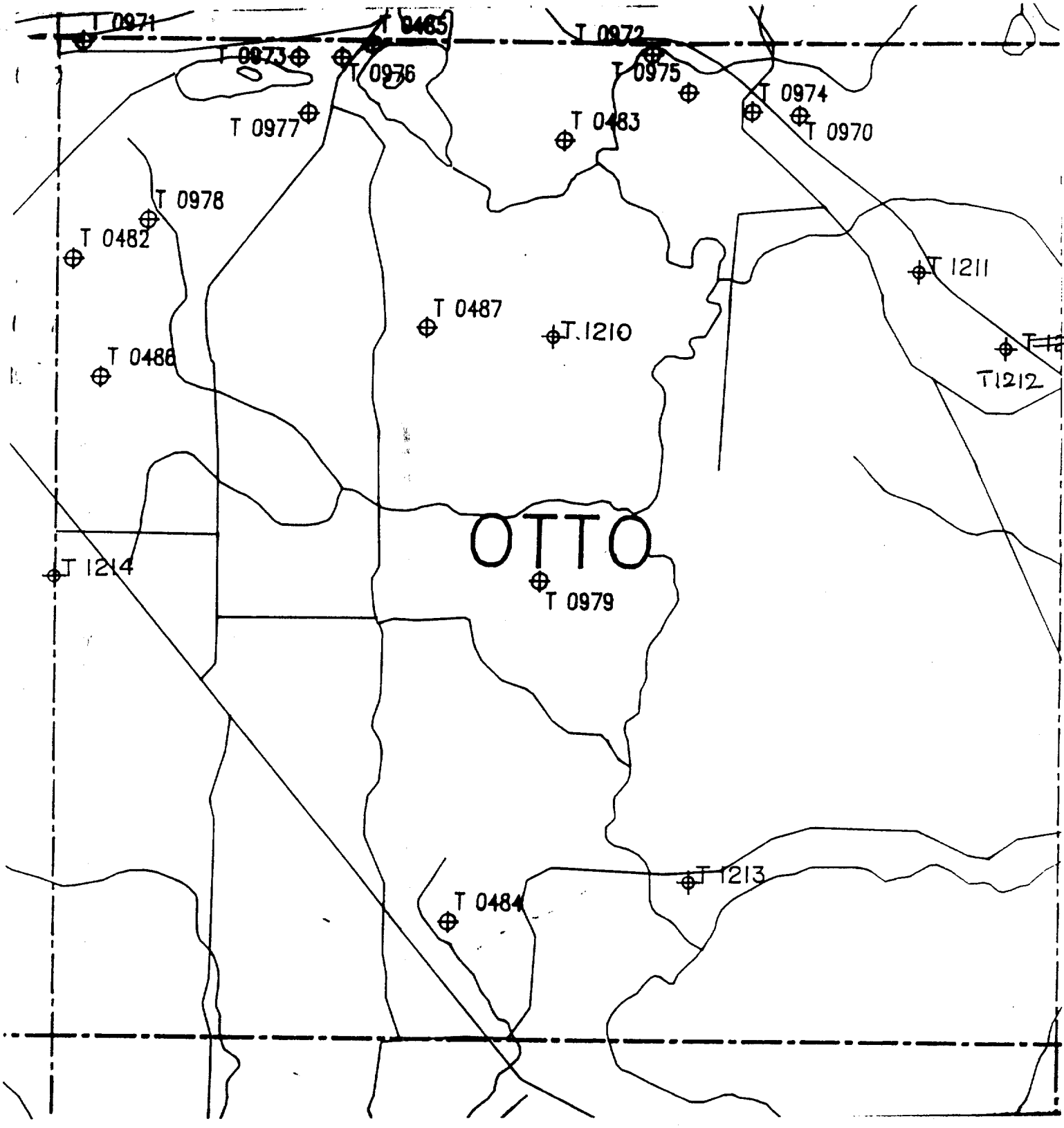
LARDER LAKE GROUP

Iron Formation | Turbiditic sedimentary rocks | Calc - alkalic felsic tuffs & tuff - breccia | Komatiitic & tholeiitic lavas

Figure 50. Map showing the distribution of the rock types of the Larder Lake Group.

ANNEX "A-4"

ANNEX "B"


T 0971
T 0973
T 0976
T 0972
T 0975
T 0974
T 0970
T 0977
T 0483
T 0978
T 0482
T 1211
T 0487
T 1210
T 0486
T1212
OTTO
T 1214
T 0979
T 1213
T 0484

OTTO

CAT i

---------- Window #1 ----------

Deposit Name: TODORA

Compiled Date: 19810527
Update Date: 19910126

District: T
NTS: 42A01SE
Township: OTTO

MDI#: T 0482
SMDR#:
UTM Zone: 17
Northing: 5325658
Easting: 563604
Mining Area: KL
Resident Geologist Area: KL
How Located: P

Latitude: 48 4 59
Longitude: 80 8 46

Entity Code: S
Point Located: DDH JUST E OF PROPERTY 18 NEAR W TP BDRY, IN NW PART OF TP
Map Reference: OGS 1972, MAP 2239 EBY-OTTO AREA IN GR 99
Deposit Status Code: F
Compiler: JK
Map Scale Code: C

---------- Window #2 ----------

	Commodity	Qualifier	Stat	ComGrp	
1.	V	MINOR	F	M	Vanadium
2.	NI	MINOR	F	MB	Nickel
3.	CU	MINOR	F	MB	Copper
4.	AG	MINOR	F	M	Silver
5.	AU	PRINCIPAL	F	M	Gold
6.	MO	MINOR	F	M	Molybdenum

---------- Window #3 ----------

Ref#	References
1	OGS 1979, MDC 18, P161
2	OGS 1936, AR VOL 45 PT 1, P156-157
3	OGS 1972, GR 99, P24-25
4	RES/REG PROP RPT KL #406,400
5	AFRO WORK RPT KL #2701,1635

---------- Window #4 ----------

Alternate Names
1. SELECTED INTERNATIONAL
2. TODORA KIRKLAND
3. CHELTONIA

---------- Window #5 ----------

NTS Extension

---------- Window #6 ----------

Township Extension | Concession | Lot
1. EBY

---------- Window #7 ----------

Geological Province:

---------- Window #8 ----------

Rock Name | Class | Group | Era | Relation to Deposit
Supergroup | Group | Formation

---------- Window #9 ----------

Minerals
1. QRTZ Quartz
2. MGNT Magnetite
3. PYRT Pyrite
4. PYTT Pyrrhotite

---------- Window #10 ----------

Depth of Working | Mill Capacity | Mining Method | Reserves

---------- Window #11 ----------

Contiguous SMDR# | Contiguous Deposit

---------- Window #12 ----------

Subject | Comments

CAT

---------- Window #1 ----------

Deposit Name: CHAVIGNY

Compiled Date: 19810527

District: T
NTS: 42A01SE
Township: OTTO

MDI#: T 0483
SMDR#:
UTM Zone: 17
Northing: 5326824
Easting: 568358
Mining Area: KL
Resident Geologist Area: KL
How Located: P

Update Date: 19910126

Latitude: 48 5 35
Longitude: 80 4 55

Entity Code: S
Point Located: DDH CLOSEST TO PROPERTY 22, N CENTRAL PART OF T OWNSHIP

Map Reference: OGS 1972, MAP 2239 EBY-OTTO AREA IN GR 99
Deposit Status Code: F
Compiler: JK
Map Scale Code: C

---------- Window #2 ----------

Commodity	Qualifier	Stat	ComGrp
1. AU	PRINCIPAL	F	M Gold

---------- Window #3 ----------

Ref#	References
1	OGS 1979, MDC 18, P219
2	OGS 1972, GR 99, P26
3	OGS 1983, OFR 5467 #G0270
4	AFRO WORK RPT KL #481,2393
5	RES/REG PROP RPT KL #404

---------- Window #4 ----------

Alternate Names

---------- Window #5 ----------

NTS Extension

---------- Window #6 ----------

Township Extension Concession Lot

---------- Window #7 ----------

Geological Province:

---------- Window #8 ----------

Rock Name Class Group Era Relation to Deposit
Supergroup Group Formation

---------- Window #9 ----------

Minerals
1. CLRT Chlorite
2. PYRT Pyrite
3. QRTZ Quartz

---------- Window #10 ----------

Depth of Working Mill Capacity Mining Method Reserves

---------- Window #11 ----------

Contiguous SMDR# Contiguous Deposit

---------- Window #12 ----------

Subject Comments

CA'

---------- Window #1 ----------

Deposit Name: COCHRANE

Compiled Date: 19861006

District: T
NTS: 42A01SE
Township: OTTO

MDI#: T 0484
SMDR#:
UTM Zone: 17
Northing: 5319142
Easting: 567405
Mining Area: KL
Resident Geologist Area: KL
How Located: G

Update Date: 19910126

Latitude: 48 1 26
Longitude: 80 5 46

Entity Code: S
Point Located: MIDDLE OF SOUTHERNMOST PROP SYMB 23, S CENTRAL PART OF TP
Map Reference: OGS 1972, MAP 2239 EBY-OTTO AREA IN GR 99
Deposit Status Code: F Compiler: JK Map Scale Code: C

---------- Window #2 ----------

	Commodity	Qualifier	Stat	ComGrp	
1.	AG	MINOR	F	M	Silver
2.	PB	MINOR	F	MB	Lead
3.	CU	MINOR	F	MB	Copper
4.	AU	PRINCIPAL	F	M	Gold

---------- Window #3 ----------

Ref#	References
1	OGS 1972, GR 99, P26-27
2	NMINER 82-02-25, ARGENTEX HAS..,P5
3	OGS 1983, OFR 5467 #G0271
4	AFRO WORK RPT KL #508,2782

---------- Window #4 ----------

Alternate Names
1. ARGENTEX

---------- Window #5 ----------

NTS Extension

---------- Window #6 ----------

Township Extension Concession Lot

---------- Window #7 ----------

Geological Province:

---------- Window #8 ----------

Rock Name Class Group Era Relation to Deposit
Supergroup Group Formation

---------- Window #9 ----------

Minerals
1. CRBN Carbonate
2. PYRT Pyrite
3. QRTZ Quartz
4. HMTT Hematite

---------- Window #10 ----------

Depth of Working Mill Capacity Mining Method Reserves

---------- Window #11 ----------

Contiguous SMDR# Contiguous Deposit

---------- Window #12 ----------

Subject Comments

CAT

---------- Window #1 ----------

Deposit Name: SWASTIKA

Compiled Date: 19860414

District: T
NTS: 42A01SE
Township: OTTO

MDI#: T 0485
SMDR#:
UTM Zone: 17
Northing: 5327466
Easting: 566191
Mining Area: KL
Resident Geologist Area: KL
How Located: P

Update Date: 19910126

Latitude: 48 5 56
Longitude: 80 6 40

Entity Code: S
Point Located: SHAFT AT PROPERTY 24 NEAR N TP BDRY IN NW PART OF TP
Map Reference: OGS 1972, MAP 2239 EBY-OTTO AREA IN GR 99
Deposit Status Code: C
Compiler: JK
Map Scale Code: C

---------- Window #2 ----------

	Commodity	Qualifier	Stat	ComGrp	
1.	MO	MINOR	C	M	Molybdenum
2.	AG	MINOR	C	M	Silver
3.	PB	MINOR	C	M	Lead
4.	AU	PRINCIPAL	C	M	Gold

---------- Window #3 ----------

Ref#	References
1	OGS 1972, GR 99, P27
2	OGS 1912, AR VOL 21 PT 1, P151-152
3	OGS 1921, AR VOL 30 PT 2, P26-27
4	NMI FILE, 42A/1 AU 18
5	OGS 1983, OFR 5467 #G0272
6	RES/REG PROP RPT KL #405
7	AFRO WORK RPT KL #915,979
8	AFRO WORK RPT KL #1436,2324

---------- Window #4 ----------

Alternate Names
1. GATEFORD
2. CRESCENT KIRKLAND
3. KIRKLAND GOLDEN GATE

---------- Window #5 ----------

NTS Extension

---------- Window #6 ----------

Township Extension | Concession | Lot
1. TECK

---------- Window #7 ----------

Geological Province:

---------- Window #8 ----------

Rock Name | Class | Group | Era | Relation to Deposit
Supergroup | Group | Formation

---------- Window #9 ----------

Minerals
1. PYRT Pyrite
2. QRTZ Quartz

---------- Window #10 ----------

Depth of Working | Mill Capacity | Mining Method | Reserves

---------- Window #11 ----------

Contiguous SMDR# | Contiguous Deposit

---------- Window #12 ----------

Subject | Comments

CAT.

---------- Window #1 ----------

Deposit Name: OTTO-PT

Compiled Date: 19810528

District: T
NTS: 42A01SE
Township: OTTO

MDI#: T 0486
SMDR#:
UTM Zone: 17
Northing: 5324438
Easting: 563916
Mining Area: KL
Resident Geologist Area: KL
How Located: G

Update Date: 19910126

Latitude: 48 4 19
Longitude: 80 8 31

Entity Code: S
Point Located: "S" SYMBOL IN N PART LOT 12 CONC IV NEAR W CENTRAL TP BDRY
Map Reference: OGS 1972, MAP 2239 EBY-OTTO AREA IN GR 99
Deposit Status Code: F
Compiler: JK
Map Scale Code: C

---------- Window #2 ----------

	Commodity	Qualifier	Stat	ComGrp	
1.	NI	MINOR	F	MB	Nickel
2.	PT	PRINCIPAL	F	MP	Platinum
3.	AG	MINOR	F	M	Silver
4.	FE	MINOR	F	M	Iron
5.	AU	MINOR	F	M	Gold

---------- Window #3 ----------

Ref# References

1 OGS 1968, MRC 11, P475
2 OGS 1972, GR 99, P28
3 DEMR 1919,RPT 1919 PTE P18E-19E
4 AFRO WORK RPT KL #235,1059

---------- Window #4 ----------

Alternate Names

---------- Window #5 ----------

NTS Extension

---------- Window #6 ----------

Township Extension Concession Lot

1. BOSTON
2. EBY

---------- Window #7 ----------

Geological Province:

---------- Window #8 ----------

Rock Name Class Group Era Relation to Deposit
Supergroup Group Formation

---------- Window #9 ----------

Minerals

1. PYRT Pyrite
2. JSPR Jasper
3. PYTT Pyrrhotite
4. GRPT Graphite
5. MGNT Magnetite

---------- Window #10 ----------

Depth of Working Mill Capacity Mining Method Reserves

---------- Window #11 ----------

Contiguous SMDR# Contiguous Deposit

---------- Window #12 ----------

Subject Comments

---------- Window #1 ----------

Deposit Name: OTTO-RA

Compiled Date: 19810528

District: T
NTS: 42A01SE
Township: OTTO

MDI#: T 0487
SMDR#:
UTM Zone: 17
Northing: 5324919
Easting: 567114
Mining Area: KL
Resident Geologist Area: KL
How Located: G

Update Date: 19910126

Latitude: 48 4 34
Longitude: 80 5 56

Entity Code: P
Point Located: "RA" SYMBOL 1.2 KM NW OF FIRST "O" IN "OTTO"

Map Reference: OGS 1972, MAP 2239 EBY-OTTO AREA IN GR 99
Deposit Status Code: F Compiler: JK Map Scale Code: C

---------- Window #2 ----------

Commodity	Qualifier	Stat	ComGrp	
1. NEPH	PRINCIPAL	F	N	Nepheline syenite

---------- Window #3 ----------

Ref#	References
1	OGS 1972, GR 99, P29-30

---------- Window #4 ----------

Alternate Names

---------- Window #5 ----------

NTS Extension

---------- Window #6 ----------

Township Extension Concession Lot

---------- Window #7 ----------

Geological Province:

---------- Window #8 ----------

Rock Name	Class	Group	Era	Relation to Deposit
Supergroup	Group	Formation		

---------- Window #9 ----------

Minerals

1. MGNT Magnetite
2. BOTT Biotite
3. MSCV Muscovite
4. EPDT Epidote
5. GRNT Garnet
6. PRXN Pyroxene

---------- Window #10 ----------

Depth of Working	Mill Capacity	Mining Method	Reserves

---------- Window #11 ----------

Contiguous SMDR#	Contiguous Deposit

---------- Window #12 ----------

Subject	Comments

---------- Window #1 ----------

Deposit Name: BOTTRELL, H.

Compiled Date: 19910126

District: T
NTS: 42A01SE
Township: OTTO

MDI#: T 0970
SMDR#:
UTM Zone: 17
Northing: 5327147
Easting: 570617
Mining Area:
Resident Geologist Area: KL
How Located: P

Update Date: 19950602

Latitude: 48 5 44
Longitude: 80 3 6

Entity Code: S
Point Located: PIT SOUTH OF NUMBER SYMBOL 21 IN NE OTTO TP
Map Reference: OGS 1972 GR 99 MAP 2239
Deposit Status Code: F
Compiler: JM
Map Scale Code: C

---------- Window #2 ----------

Commodity	Qualifier	Stat	ComGrp
1. ZN	PRINCIPAL	F	Zinc
2. AG	MINOR	F	Silver
3. CU	MINOR	F	Copper

---------- Window #3 ----------

Ref#	References
1	OGS 1972, GR 99 P26
2	AFRO WORK RPT KL #1934

---------- Window #4 ----------

Alternate Names
1. MULLIGAN

---------- Window #5 ----------

NTS Extension

---------- Window #6 ----------

Township Extension Concession Lot

---------- Window #7 ----------

Geological Province:

---------- Window #8 ----------

Rock Name Class Group Era Relation to Deposit
Supergroup Group Formation

---------- Window #9 ----------

Minerals
1. PYRT Pyrite
2. PYTT Pyrrhotite
3. GRPT Graphite
4. CRBN Carbonate

---------- Window #10 ----------

Depth of Working Mill Capacity Mining Method Reserves

---------- Window #11 ----------

Contiguous SMDR# Contiguous Deposit

---------- Window #12 ----------

Subject Comments

---------- Window #1 ----------
Deposit Name: KELLY-KIRKLAND

Compiled Date: 19910126

District: T
NTS: 42A01SE
Township: OTTO

MDI#: T 0971
SMDR#:
UTM Zone: 17
Northing: 5327746
Easting: 563747
Mining Area:
Resident Geologist Area: KL
How Located: P

Update Date: 19950602

Latitude: 48 6 6
Longitude: 80 8 38

Entity Code: S
Point Located: PIT 500 FEET N OF NUMBER SYMBOL 27
IN NW OTTO TP
Map Reference: OGS 1972 GR 99 MAP 2239
Deposit Status Code: F Compiler: JM Map Scale Code: C

---------- Window #2 ----------
Commodity Qualifier Stat ComGrp
1. AU PRINCIPAL F Gold

---------- Window #3 ----------
Ref# References
1 NMI FILE 42A/01 AU PRELIMINARY
2 OGS 1972, GR 99 P23-24
3 NMINER 1939 P839
4 AFRO WORK RPT KL #1355

---------- Window #4 ----------
Alternate Names
1. STROME, D.

---------- Window #5 ----------
NTS Extension

---------- Window #6 ----------
Township Extension Concession Lot
1. EBY
2. GRENFELL

---------- Window #7 ----------
Geological Province:

---------- Window #8 ----------
Rock Name Class Group Era Relation to Deposit
Supergroup Group Formation

---------- Window #9 ----------
Minerals
1. QRTZ Quartz

---------- Window #10 ----------
Depth of Working Mill Capacity Mining Method Reserves

---------- Window #11 ----------
Contiguous SMDR# Contiguous Deposit

---------- Window #12 ----------
Subject Comments

---------- Window #1 ----------

Deposit Name: INCO

Compiled Date: 19910126

District: T | MDI#: T 0972 | Update Date: 19950602
NTS: 42A01SE | SMDR#:
Township: OTTO | UTM Zone: 17
Northing: 5327728
Latitude: 48 6 4 | Easting: 569202
Longitude: 80 4 14 | Mining Area:
Resident Geologist Area: KL
Entity Code: S | How Located: P
Point Located: DDH IN NE1/4 N1/2 LOT 5 CON VI OTTO TP

Map Reference: AFRO WORK RPT KL #1280 DDH LOC MAP
Deposit Status Code: F | Compiler: JM | Map Scale Code: A

---------- Window #2 ----------

Commodity	Qualifier	Stat	ComGrp
1. ZN	PRINCIPAL	F	Zinc
2. CU	MINOR	F	Copper
3. AG	MINOR	F	Silver

---------- Window #3 ----------

Ref#	References
1	OGS 1972, GR 99 P27
2	RES/REG PROP RPT KL #401
3	AFRO WORK RPT KL #10,1280,1319,2095

---------- Window #4 ----------

Alternate Names

---------- Window #5 ----------

NTS Extension

---------- Window #6 ----------

Township Extension | Concession | Lot

---------- Window #7 ----------

Geological Province:

---------- Window #8 ----------

Rock Name | Class | Group | Era | Relation to Deposit
Supergroup | Group | Formation

---------- Window #9 ----------

Minerals
1. GRPT Graphite
2. CHRT Chert
3. PYRT Pyrite
4. PYTT Pyrrhotite
5. CLRT Chlorite

---------- Window #10 ----------

Depth of Working | Mill Capacity | Mining Method | Reserves

---------- Window #11 ----------

Contiguous SMDR# | Contiguous Deposit

---------- Window #12 ----------

Subject | Comments

---------- Window #1 ----------

Deposit Name: IRSUGO

Compiled Date: 19910126

District: T | MDI#: T 0973 | Update Date: 19950602
NTS: 42A01SE | SMDR#:
Township: OTTO | UTM Zone: 17
Northing: 5327627
Latitude: 48 6 2 | Easting: 565801
Longitude: 80 6 58 | Mining Area:
Resident Geologist Area: KL
Entity Code: S | How Located: P
Point Located: SHAFT 400 FEET N OF E END OF VIGRASS LAKE ON N BDRY OTTO TP
Map Reference: OGS 1972 GR 99 MAP 2239
Deposit Status Code: F | Compiler: JM | Map Scale Code: C

---------- Window #2 ----------

Commodity	Qualifier	Stat	ComGrp
1. AU	PRINCIPAL	F	Gold
2. CU	MINOR	F	Copper

---------- Window #3 ----------

Ref#	References
1	NMI FILE 42A/01 AU PRELIMINARY
2	AFRO WORK RPT KL #1183
3	RES/REG PROP RPT KL #402

---------- Window #4 ----------

Alternate Names
1. H.S.K.

---------- Window #5 ----------

NTS Extension

---------- Window #6 ----------

Township Extension | Concession | Lot

---------- Window #7 ----------

Geological Province:

---------- Window #8 ----------

Rock Name | Class | Group | Era | Relation to Deposit
Supergroup | Group | Formation

---------- Window #9 ----------

Minerals
1. PYRT Pyrite
2. CRBN Carbonate
3. QRTZ Quartz
4. CLRT Chlorite

---------- Window #10 ----------

Depth of Working | Mill Capacity | Mining Method | Reserves

---------- Window #11 ----------

Contiguous SMDR# | Contiguous Deposit

---------- Window #12 ----------

Subject | Comments

---------- Window #1 ----------

Deposit Name: KLIP OVBD & BEDROCK SAMPLING

Compiled Date: 19910126

District: T | MDI#: T 0974 | Update Date: 19950602

NTS: 42A01SE | SMDR#:

Township: OTTO | UTM Zone: 17

Northing: 5327176

Latitude: 48 5 46 | Easting: 570165

Longitude: 80 3 28 | Mining Area:

Resident Geologist Area: KL

Entity Code: S | How Located: P

Point Located: RC HOLE 80-45 300 FEET S OF ONR TRACK AND 100 FEET E OF HWY 112 IN NE OTTO TP

Map Reference: OGS 1990 OFR 5737 SAMPLE SITE LOC MAP

Deposit Status Code: F | Compiler: JM | Map Scale Code: F

---------- Window #2 ----------

Commodity	Qualifier	Stat	ComGrp
1. ZN	PRINCIPAL	F	Zinc
2. CU	MINOR	F	Copper
3. AG	MINOR	F	Silver

---------- Window #3 ----------

Ref#	References
1	OGS 1990, OFR 5737 P C74
2	OGS 1984, OFR 5506

---------- Window #4 ----------

Alternate Names

---------- Window #5 ----------

NTS Extension

---------- Window #6 ----------

Township Extension | Concession | Lot

---------- Window #7 ----------

Geological Province:

---------- Window #8 ----------

Rock Name | Class | Group | Era | Relation to Deposit

Supergroup | Group | Formation

---------- Window #9 ----------

Minerals

1. PYRT Pyrite
2. GRPT Graphite

---------- Window #10 ----------

Depth of Working | Mill Capacity | Mining Method | Reserves

---------- Window #11 ----------

Contiguous SMDR# | Contiguous Deposit

---------- Window #12 ----------

Subject | Comments

---------- Window #1 ----------
Deposit Name: DYMENT-KIDSTON

Compiled Date: 19910126
District: T MDI#: T 0975 Update Date: 19950602
NTS: 42A01SE SMDR#:
Township: OTTO UTM Zone: 17
Northing: 5327362
Latitude: 48 5 52 Easting: 569556
Longitude: 80 3 57 Mining Area:
Resident Geologist Area: KL
Entity Code: S How Located: P
Point Located: STRIPPED AREA NW CORNER CLAIM 891869

Map Reference: AFRO WORK RPT KL #1319 SAMPLE LOC MAP
Deposit Status Code: F Compiler: JM Map Scale Code: A
---------- Window #2 ----------
Commodity Qualifier Stat ComGrp
1. ZN PRINCIPAL F Zinc
2. CU MINOR F Copper
3. AG MINOR F Silver
4. AU MINOR F Gold
---------- Window #3 ----------
Ref# References
1 RES/REG PROP RPT KL #401
2 AFRO WORK RPT KL #1319,2095
---------- Window #4 ----------
Alternate Names
1. KIDSTON-DYMENT
---------- Window #5 ----------
NTS Extension
---------- Window #6 ----------
Township Extension Concession Lot
---------- Window #7 ----------
Geological Province:
---------- Window #8 ----------
Rock Name Class Group Era Relation to Deposit
Supergroup Group Formation
---------- Window #9 ----------
Minerals
1. GRPT Graphite
2. CHRT Chert
3. QRTZ Quartz
4. PYRT Pyrite
5. CLRT Chlorite
---------- Window #10 ----------
Depth of Working Mill Capacity Mining Method Reserves

---------- Window #11 ----------
Contiguous SMDR# Contiguous Deposit
---------- Window #12 ----------
Subject Comments

---------- Window #1 ----------

Deposit Name: GOLDEN CRESCENT

Compiled Date: 19910126

District: T MDI#: T 0976 Update Date: 19950602
NTS: 42A01SE SMDR#:
Township: OTTO UTM Zone: 17
Northing: 5327632
Latitude: 48 6 2 Easting: 566210
Longitude: 80 6 39 Mining Area:
Resident Geologist Area: KL
Entity Code: S How Located: P
Point Located: DDH #88-16 9800 FEET W AND 700 FEET S OF NE CORNER OTTO TP
Map Reference: OGS 1972 GR 99 MAP 2239
Deposit Status Code: F Compiler: JM Map Scale Code: A

---------- Window #2 ----------

Commodity	Qualifier	Stat	ComGrp
1. CU	MINOR	F	Copper
2. AU	PRINCIPAL	F	Gold
3. MO	MINOR	F	Molybdenum

---------- Window #3 ----------

Ref#	References
1	RES/REG PROP RPT KL #405
2	AFRO WORK RPT KL #979

---------- Window #4 ----------

Alternate Names
1. GATEFORD
2. CRESCENT
3. GOLDEN GATE

---------- Window #5 ----------

NTS Extension

---------- Window #6 ----------

Township Extension Concession Lot

---------- Window #7 ----------

Geological Province:

---------- Window #8 ----------

Rock Name	Class	Group	Era	Relation to Deposit
Supergroup Group		Formation		

---------- Window #9 ----------

Minerals
1. QRTZ Quartz
2. PYRT Pyrite
3. CRBN Carbonate

---------- Window #10 ----------

Depth of Working Mill Capacity Mining Method Reserves

---------- Window #11 ----------

Contiguous SMDR# Contiguous Deposit

---------- Window #12 ----------

Subject Comments

---------- Window #1 ----------

Deposit Name: ALLSOPP, A.

Compiled Date: 19910126
Update Date: 19950602

District: T
NTS: 42A01SE
Township: OTTO

MDI#: T 0978
SMDR#:
UTM Zone: 17
Northing: 5326046
Easting: 564402
Mining Area:
Resident Geologist Area: KL

Latitude: 48 5 11
Longitude: 80 8 7

Entity Code: S
How Located: P
Point Located: PIT NE1/4 N1/2 LOT 11 CON V OTTO TP

Map Reference: OGS 1972 GR 99 MAP 2239
Deposit Status Code: F
Compiler: JM
Map Scale Code: A

---------- Window #2 ----------

Commodity Qualifier Stat ComGrp
1. MO PRINCIPAL F Molybdenum

---------- Window #3 ----------

Ref# References
1 AFRO WORK RPT KL #20

---------- Window #4 ----------

Alternate Names

---------- Window #5 ----------

NTS Extension

---------- Window #6 ----------

Township Extension Concession Lot

---------- Window #7 ----------

Geological Province:

---------- Window #8 ----------

Rock Name Class Group Era Relation to Deposit
Supergroup Group Formation

---------- Window #9 ----------

Minerals
1. GRPT Graphite
2. CRBN Carbonate
3. PYRT Pyrite

---------- Window #10 ----------

Depth of Working Mill Capacity Mining Method Reserves

---------- Window #11 ----------

Contiguous SMDR# Contiguous Deposit

---------- Window #12 ----------

Subject Comments

---------- Window #1 ----------

Deposit Name: JOMI

Compiled Date: 19910126
Update Date: 19950602

District: T
NTS: 42A01SE
Township: OTTO

MDI#: T 0977
SMDR#:
UTM Zone: 17
Northing: 5327090
Easting: 565901
Mining Area:
Resident Geologist Area: KL

Latitude: 48 5 44
Longitude: 80 6 54

Entity Code: S
How Located: P
Point Located: SAMPLE #77 900 FEET S OF SE SHORE OF VIGRASS LAKE
Map Reference: AFRO WORK RPT KL #1320 SAMPLE LOC MAP
Deposit Status Code: F
Compiler: JM
Map Scale Code: A

---------- Window #2 ----------

Commodity	Qualifier	Stat	ComGrp
1. AU	PRINCIPAL	F	Gold
2. W	MINOR	F	Tungsten

---------- Window #3 ----------

Ref#	References
1	RES/REG PROP RPT KL #402
2	AFRO WORK RPT KL #1183,1192,1320

---------- Window #4 ----------

Alternate Names
1. DYMENT-KIDSTON
2. KIDSTON-DYMENT
3. H.S.K.

---------- Window #5 ----------

NTS Extension

---------- Window #6 ----------

Township Extension Concession Lot

---------- Window #7 ----------

Geological Province:

---------- Window #8 ----------

Rock Name Class Group Era Relation to Deposit
Supergroup Group Formation

---------- Window #9 ----------

Minerals
1. QRTZ Quartz
2. PYRT Pyrite
3. CRBN Carbonate

---------- Window #10 ----------

Depth of Working Mill Capacity Mining Method Reserves

---------- Window #11 ----------

Contiguous SMDR# Contiguous Deposit

---------- Window #12 ----------

Subject Comments

---------- Window #1 ----------

Deposit Name: LEE-GEO INDICATORS

Compiled Date: 19910126

District: T
NTS: 42A01SE
Township: OTTO

MDI#: T 0979
SMDR#:
UTM Zone: 17
Northing: 5322621
Easting: 568229
Mining Area:
Resident Geologist Area: KL
How Located: P

Update Date: 19950602

Latitude: 48 3 19
Longitude: 80 5 4

Entity Code: S
Point Located: TILL SAMPLE LOCATION IN SE1/4 N1/2
LOT 7 CON III OTTO TP
Map Reference: AFRO WORK RPT KL #1606 SAMPLE LOC MAP
Deposit Status Code: F
Compiler: JM
Map Scale Code: A

---------- Window #2 ----------

Commodity	Qualifier	Stat	ComGrp
1. AU	PRINCIPAL	F	Gold

---------- Window #3 ----------

Ref#	References
1	AFRO WORK RPT KL #134,1606

---------- Window #4 ----------

Alternate Names
1. LEE-CANICO-TG JOINT VENTURE

---------- Window #5 ----------

NTS Extension

---------- Window #6 ----------

Township Extension
Concession
Lot

---------- Window #7 ----------

Geological Province:

---------- Window #8 ----------

Rock Name
Class
Group
Era
Relation to Deposit
Supergroup
Group
Formation

---------- Window #9 ----------

Minerals
1. PYRT Pyrite
2. QRTZ Quartz
3. CLRT Chlorite
4. PYTT Pyrrhotite

---------- Window #10 ----------

Depth of Working
Mill Capacity
Mining Method
Reserves

---------- Window #11 ----------

Contiguous SMDR#
Contiguous Deposit

---------- Window #12 ----------

Subject
Comments

---------- Window #1 ----------
Deposit Name: NEPH 1

Compiled Date: 19930227
District: T MDI#: T 1210 Update Date: 19930227
NTS: 42A01SE SMDR#:
Township: OTTO UTM Zone: 17
Northing: 5324880
Latitude: 48 4 32 Easting: 568440
Longitude: 80 4 52 Mining Area:
Resident Geologist Area: KL
Entity Code: S How Located: G
Point Located: NE SYMBOL 2000M SE OF OTTO LAKE

Map Reference: OGS 1971 MAP P717 GEOCHEMISTRY SERIES
Deposit Status Code: F Compiler: JK Map Scale Code: A
---------- Window #2 ----------
Commodity Qualifier Stat ComGrp
1. NEPH PRINCIPAL F Nepheline syenite
---------- Window #3 ----------
Ref# References
1 OGS 1912 AR VOL XXI PT I P256-265
2 OGS 1914 AR VOL 23 PT II
3 OGS 1923 AR VOL 32 PT IV P1-52
4 OGS 1972 GR 99
5 OGS 1983 OFR 5439
6 GSC 1922 MEM 131
---------- Window #4 ----------
Alternate Names
---------- Window #5 ----------
NTS Extension
---------- Window #6 ----------
Township Extension Concession Lot
---------- Window #7 ----------
Geological Province:
---------- Window #8 ----------
Rock Name Class Group Era Relation to Deposit
Supergroup Group Formation
---------- Window #9 ----------
Minerals
1. EPDT Epidote
2. GRNT Garnet
3. BOTT Biotite
4. MSCV Muscovite
5. MGNT Magnetite
6. SPHN Sphene
---------- Window #10 ----------
Depth of Working Mill Capacity Mining Method Reserves

---------- Window #11 ----------
Contiguous SMDR# Contiguous Deposit
---------- Window #12 ----------
Subject Comments

---------- Window #1 ----------

Deposit Name: NEPH 2

Compiled Date: 19930227

District: T
NTS: 42A01SE
Township: OTTO

MDI#: T 1211
SMDR#:
UTM Zone: 17
Northing: 5325550
Easting: 571910
Mining Area:
Resident Geologist Area: KL

Update Date: 19930307

titude: 48 4 52
ngitude: 80 2 4

Entity Code: S
How Located: G
Point Located: NE SYMBOL 1000M N OF THE TOWN OF DANE

Map Reference: OGS 1971 MAP P717 GEOCHEMISTRY SERIES
Deposit Status Code: F Compiler: JK Map Scale Code: A

---------- Window #2 ----------

Commodity	Qualifier	Stat	ComGrp
1. NEPH	PRINCIPAL	F	Nepheline syenite

---------- Window #3 ----------

Ref#	References
1	OGS 1912 AR VOL XXI PT I P256-265
2	OGS 1914 AR VOL 23 PT II
3	OGS 1923 AR VOL 32 PT IV P1-52
4	OGS 1972 GR 99
5	OGS 1983 OFR 5439
6	GSC 1922 MEM 131

---------- Window #4 ----------

Alternate Names

---------- Window #5 ----------

NTS Extension

---------- Window #6 ----------

Township Extension Concession Lot

---------- Window #7 ----------

Geological Province:

---------- Window #8 ----------

R k Name	Class	Group	Era	Relation to Deposit
Supergroup	Group	Formation		

---------- Window #9 ----------

Minerals
1. EPDT Epidote
2. MGNT Magnetite
3. BOTT Biotite
4. MSCV Muscovite
5. GRNT Garnet
6. SPHN Sphene

---------- Window #10 ----------

Depth of Working Mill Capacity Mining Method Reserves

---------- Window #11 ----------

Contiguous SMDR# Contiguous Deposit

---------- Window #12 ----------

Subject Comments

---------- Window #1 ----------

Deposit Name: NEPH 3

Compiled Date: 19930227

District: T
NTS: 42A01SE
Township: OTTO

MDI#: T 1212
SMDR#:
UTM Zone: 17
Northing: 5324860
Easting: 572700
Mining Area:
Resident Geologist Area: KL

.titude: 48 4 30
ɔngitude: 80 1 27

Update Date: 19930307

Entity Code: S
How Located: G
Point Located: NE SYMBOL 500M NE OF TOWN OF DANE

Map Reference: OGS 1971 MAP P717 GEOCHEMISTRY SERIES
Deposit Status Code: F
Compiler: JK
Map Scale Code: A

---------- Window #2 ----------

Commodity	Qualifier	Stat	ComGrp
1. NEPH	PRINCIPAL	F	Nepheline syenite

---------- Window #3 ----------

Ref#	References
1	OGS 1912 AR VOL XXI PT I P256-265
2	OGS 1914 AR VOL 23 PT II
3	OGS 1923 AR VOL 32 PT IV P1-52
4	OGS 1972 GR 99
5	OGS 1983 OFR 5439
6	GSC 1922 MEM 131

---------- Window #4 ----------

Alternate Names

---------- Window #5 ----------

NTS Extension

---------- Window #6 ----------

Township Extension Concession Lot

---------- Window #7 ----------

Geological Province:

---------- Window #8 ----------

ck Name Class Group Era Relation to Deposit
Supergroup Group Formation

---------- Window #9 ----------

Minerals
1. EPDT Epidote
2. MGNT Magnetite
3. BOTT Biotite
4. MSCV Muscovite
5. GRNT Garnet
6. SPHN Sphene

---------- Window #10 ----------

Depth of Working Mill Capacity Mining Method Reserves

---------- Window #11 ----------

Contiguous SMDR# Contiguous Deposit

---------- Window #12 ----------

Subject Comments

---------- Window #1 ----------
Deposit Name: OVERBURDEN DRILL HOLE 80-35

District: T
NTS: 42A01SE
Township: OTTO

Latitude: 48 1 43
Longitude: 80 4 11

MDI#: T 1213
SMDR#:
UTM Zone: 17
Northing: 5319675
Easting: 569365
Mining Area:
Resident Geologist Area: KL

Compiled Date: 19930227
Update Date: 19930227

Entity Code: S
How Located: P
Point Located: DRILL HOLE SYMBOL 80-35 6100M E AND 1500M N OF SW CORNER OF OTTO TP
Map Reference: OGS 1990 OFR 5737 OVERBURDEN DRILL HOLE LOC MAP
Deposit Status Code: G
Compiler: JK
Map Scale Code: E

---------- Window #2 ----------
Commodity Qualifier Stat ComGrp
1. AU PRINCIPAL G Gold

---------- Window #3 ----------
Ref# References
1 OGS 1981 OFR 5356
2 OGS 1990 OFR 5737

---------- Window #4 ----------
Alternate Names

---------- Window #5 ----------
NTS Extension

---------- Window #6 ----------
Township Extension
Concession Lot

---------- Window #7 ----------
Geological Province:

---------- Window #8 ----------
Rock Name Class Group Era Relation to Deposit
Supergroup Group Formation

---------- Window #9 ----------
Minerals

---------- Window #10 ----------
Depth of Working Mill Capacity Mining Method Reserves

---------- Window #11 ----------
Contiguous SMDR# Contiguous Deposit

---------- Window #12 ----------
Subject Comments

---------- Window #1 ----------
Deposit Name: OVERBURDEN DRILL HOLE 80-31

Compiled Date: 19930227

District: T
NTS: 42A01SE
Township: OTTO

MDI#: T 1214
SMDR#:
UTM Zone: 17
Northing: 5322740
Easting: 563330
Mining Area:
Resident Geologist Area: KL

Update Date: 19930227

Latitude: 48 3 24
Longitude: 80 9 1

Entity Code: S
How Located: P
Point Located: DRILL HOLE SYMBOL 80-31 5000M S AND 10M E OF NW CORNER OF OTTO TP
Map Reference: OGS 1990 OFR 5737 OVERBURDEN DRILL HOLE LOC MAP
Deposit Status Code: G
Compiler: JK
Map Scale Code: E

---------- Window #2 ----------
Commodity Qualifier Stat ComGrp
1. AU PRINCIPAL G Gold

---------- Window #3 ----------
Ref# References
1 OGS 1981 OFR 5356
2 OGS 1990 OFR 5737

---------- Window #4 ----------
Alternate Names

---------- Window #5 ----------
NTS Extension

---------- Window #6 ----------
Township Extension Concession Lot

---------- Window #7 ----------
Geological Province:

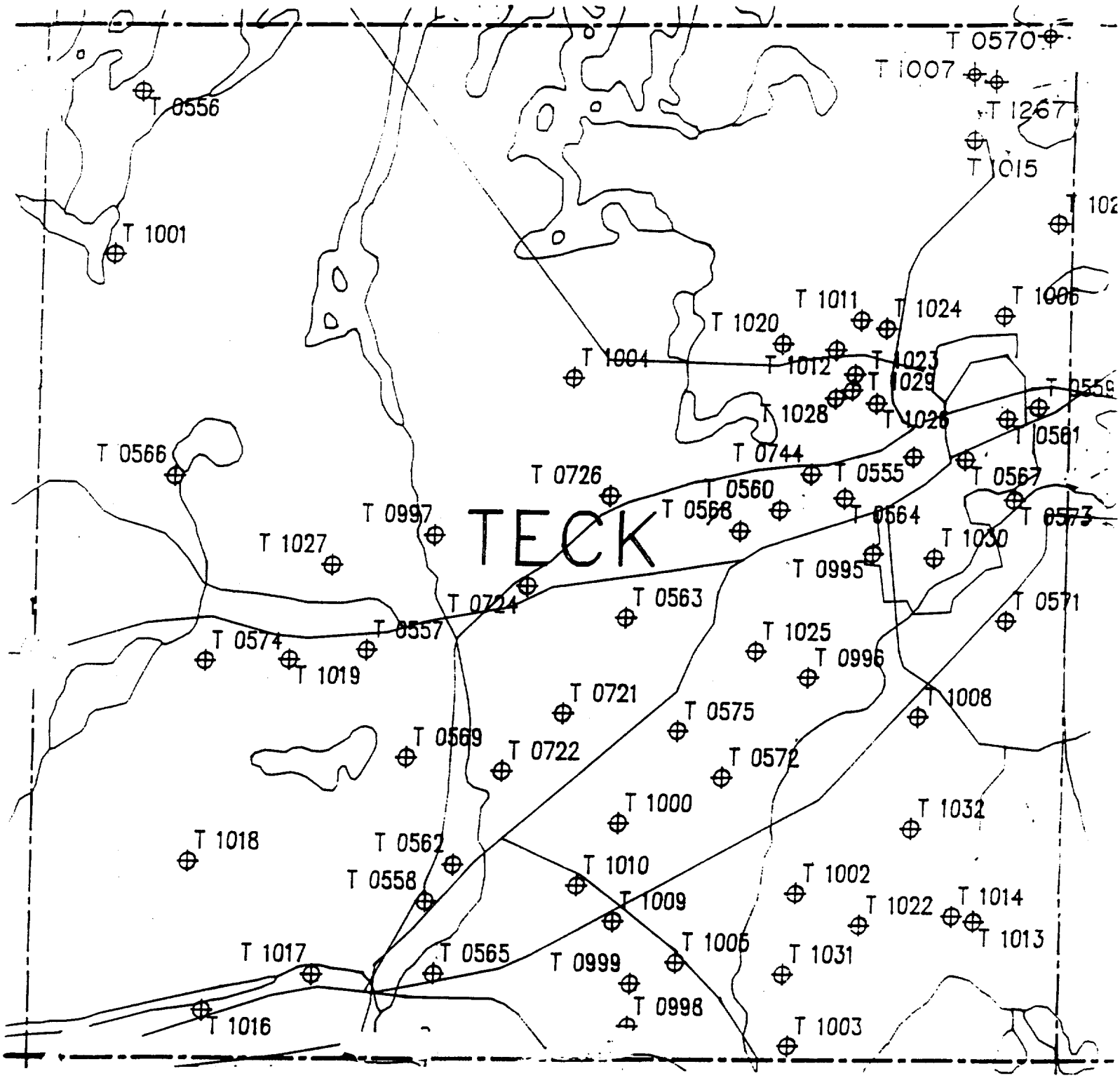
---------- Window #8 ----------
Rock Name Class Group Era Relation to Deposit
Supergroup Group Formation

---------- Window #9 ----------
Minerals

---------- Window #10 ----------
Depth of Working Mill Capacity Mining Method Reserves

---------- Window #11 ----------
Contiguous SMDR# Contiguous Deposit

---------- Window #12 ----------
Subject Comments


T 0570
T 1007
T 1267
T 0556
T 1015
T 1001
T 1011
T 1024
T 1020
T 1004
T 1012
T 1023
T 1029
T 1028
T 1026
T 0566
T 0744
T 0726
T 0555
T 0560
T 0567
T 0997
T 0568
T 0564
T 0573
T 1027
T 1030
T 0995
T 0724
T 0563
T 0571
T 0557
T 1025
T 0574
T 0996
T 1019
T 0721
T 1008
T 0575
T 0569
T 0722
T 0572
T 1000
T 1032
T 1018
T 0562
T 1010
T 0558
T 1002
T 1009
T 1022
T 1014
T 1017
T 0565
T 1006
T 1013
T 0999
T 1031
T 0998
T 1016
T 1003
TECK

---------- Window #1 ----------

Deposit Name: BLAUGRUND

Compiled Date: 19910201
Update Date: 19950602

District: T
NTS: 42A01SE
Township: TECK

MDI#: T 0998
SMDR#:
UTM Zone: 17
Northing: 5328148
Easting: 569108
Mining Area:
Resident Geologist Area: KL

Latitude: 48 6 17
Longitude: 80 4 18

Entity Code: S
How Located: P
Point Located: TRENCH IN NE CORNER CLAIM 16527
ON S BDRY TECK TP
Map Reference: OGS 1948 AR VOL 57 MAP 1945-1
Deposit Status Code: F
Compiler: JM
Map Scale Code: A

---------- Window #2 ----------

Commodity Qualifier Stat ComGrp
1. AU PRINCIPAL F Gold

---------- Window #3 ----------

Ref# References
1 OGS 1964, MDC 3 P75
2 AFRO WORK RPT KL #2889

---------- Window #4 ----------

Alternate Names
1. MCGINLEY

---------- Window #5 ----------

NTS Extension

---------- Window #6 ----------

Township Extension Concession Lot

---------- Window #7 ----------

Geological Province:

---------- Window #8 ----------

Rock Name Class Group Era Relation to Deposit
Supergroup Group Formation

---------- Window #9 ----------

Minerals
1. QRTZ Quartz
2. PYRT Pyrite

---------- Window #10 ----------

Depth of Working Mill Capacity Mining Method Reserves

---------- Window #11 ----------

Contiguous SMDR# Contiguous Deposit

---------- Window #12 ----------

Subject Comments

---------- Window #1 ----------

Deposit Name: BOISVERT

Compiled Date: 19910201

District: T
NTS: 42A01SE
Township: TECK

MDI#: T 0999
SMDR#:
UTM Zone: 17
Northing: 5328552
Easting: 569121
Mining Area:
Resident Geologist Area: KL

Update Date: 19950602

Latitude: 48 6 31
Longitude: 80 4 17

Entity Code: S
How Located: P
Point Located: PIT AT #3 POST CLAIM 7583 IN SOUTH CENTRAL TECK TP
Map Reference: OGS 1948 AR VOL 57 MAP 1945-1
Deposit Status Code: F
Compiler: JM
Map Scale Code: A

---------- Window #2 ----------

Commodity Qualifier Stat ComGrp
1. AU PRINCIPAL F Gold

---------- Window #3 ----------

Ref# References
1 OGS 1964, MDC 3 P75
2 AFRO WORK RPT KL #1321,1469

---------- Window #4 ----------

Alternate Names

---------- Window #5 ----------

NTS Extension

---------- Window #6 ----------

Township Extension Concession Lot

---------- Window #7 ----------

Geological Province:

---------- Window #8 ----------

Rock Name Class Group Era Relation to Deposit
Supergroup Group Formation

---------- Window #9 ----------

Minerals
1. QRTZ Quartz
2. PYRT Pyrite
3. PYTT Pyrrhotite
4. MGNT Magnetite
5. CLRT Chlorite

---------- Window #10 ----------

Depth of Working Mill Capacity Mining Method Reserves

---------- Window #11 ----------

Contiguous SMDR# Contiguous Deposit

---------- Window #12 ----------

Subject Comments

---------- Window #1 ----------

Deposit Name: BOLAND, C.

Compiled Date: 19910201
Update Date: 19950602

District: T
NTS: 42A01SE
Township: TECK

MDI#: T 1000
SMDR#:
UTM Zone: 17
Northing: 5330037
Easting: 568964
Mining Area:
Resident Geologist Area: KL
How Located: P

Latitude: 48 7 19
Longitude: 80 4 24

Entity Code: S
Point Located: DDH #S-63 IN NW CORNER OF CLAIM 859695

Map Reference: AFRO WORK RPT KL #1236 DDH LOC MAP
Deposit Status Code: F
Compiler: JM Map Scale Code: A

---------- Window #2 ----------

Commodity Qualifier Stat ComGrp
1. AU PRINCIPAL F Gold

---------- Window #3 ----------

Ref# References
1 OGS 1964, MDC 3 P75
2 AFRO WORK RPT KL #248,1236,1546

---------- Window #4 ----------

Alternate Names

---------- Window #5 ----------

NTS Extension

---------- Window #6 ----------

Township Extension Concession Lot

---------- Window #7 ----------

Geological Province:

---------- Window #8 ----------

Rock Name Class Group Era Relation to Deposit
Supergroup Group Formation

---------- Window #9 ----------

Minerals
1. PYRT Pyrite
2. CRBN Carbonate
3. CLCT Calcite
4. EPDT Epidote
5. CLRT Chlorite
6. HMTT Hematite

---------- Window #10 ----------

Depth of Working Mill Capacity Mining Method Reserves

---------- Window #11 ----------

Contiguous SMDR# Contiguous Deposit

---------- Window #12 ----------

Subject Comments

---------- Window #1 ----------

Deposit Name: CHAPUT

Compiled Date: 19910201
Update Date: 19950602

District: T
NTS: 42A01SE
Township: TECK

Latitude: 48 6 11
Longitude: 80 3 5

MDI#: T 1003
SMDR#:
UTM Zone: 17
Northing: 5327983
Easting: 570625
Mining Area:
Resident Geologist Area: KL

Entity Code: S
How Located: P

Point Located: DDH #DK-82-4 IN SW CORNER OF CLAIM 495722 ON SOUTH BDRY TECK TP

Map Reference: AFRO WORK RPT KL #1469 DDH LOC MAP

Deposit Status Code: F
Compiler: JM
Map Scale Code: A

---------- Window #2 ----------

Commodity	Qualifier	Stat	ComGrp
1. AG	MINOR	F	Silver
2. AU	PRINCIPAL	F	Gold
3. CU	MINOR	F	Copper
4. W	MINOR	F	Tungsten

---------- Window #3 ----------

Ref#	References
1	OGS 1928, AR VOL 37 PT2 P94
2	AFRO WORK RPT KL #1321,1469

---------- Window #4 ----------

Alternate Names
1. DYMENT-KIDSTON
2. KIDSTON-DYMENT

---------- Window #5 ----------

NTS Extension

---------- Window #6 ----------

Township Extension Concession Lot

---------- Window #7 ----------

Geological Province:

---------- Window #8 ----------

Rock Name Class Group Era Relation to Deposit
Supergroup Group Formation

---------- Window #9 ----------

Minerals
1. PYRT Pyrite
2. QRTZ Quartz
3. CRBN Carbonate
4. FCST Fuchsite
5. CLRT Chlorite

---------- Window #10 ----------

Depth of Working Mill Capacity Mining Method Reserves

---------- Window #11 ----------

Contiguous SMDR# Contiguous Deposit

---------- Window #12 ----------

Subject Comments

---------- Window #1 ----------

Deposit Name: DOMINION KIRKLAND

Compiled Date: 19910201

District: T
NTS: 42A01SE
Township: TECK

Latitude: 48 6 37
Longitude: 80 3 57

MDI#: T 1005
SMDR#:
UTM Zone: 17
Northing: 5328754
Easting: 569547
Mining Area:
Resident Geologist Area: KL

Update Date: 19950602

Entity Code: S
How Located: P
Point Located: STRIPPED AREA IN SE CORNER OF CLAIM 495738
ON S SIDE HWY 112 IN SE TECK TP
Map Reference: AFRO WORK RPT KL #1321 SAMPLE LOC MAP
Deposit Status Code: F
Compiler: JM
Map Scale Code: A

---------- Window #2 ----------

Commodity Qualifier Stat ComGrp
1. AU PRINCIPAL F Gold

---------- Window #3 ----------

Ref# References
1 OGS 1928, AR VOL 37 PT2 P94
2 RES/REG PROP RPT KL #3
3 AFRO WORK RPT KL #1321

---------- Window #4 ----------

Alternate Names
1. DYMENT-KIDSTON
2. KIDSTON-DYMENT

---------- Window #5 ----------

NTS Extension

---------- Window #6 ----------

Township Extension Concession Lot

---------- Window #7 ----------

Geological Province:

---------- Window #8 ----------

Rock Name Class Group Era Relation to Deposit
Supergroup Group Formation

---------- Window #9 ----------

Minerals
1. QRTZ Quartz
2. PYRT Pyrite
3. CRBN Carbonate
4. FCST Fuchsite
5. HMTT Hematite

---------- Window #10 ----------

Depth of Working Mill Capacity Mining Method Reserves

---------- Window #11 ----------

Contiguous SMDR# Contiguous Deposit

---------- Window #12 ----------

Subject Comments

---------- Window #1 ----------

Deposit Name: GIBSON

Compiled Date: 19910202
Update Date: 19950602

District: T
NTS: 42A01SE
Township: TECK

Latitude: 48 6 49
Longitude: 80 4 26

Entity Code: S
Point Located: DDH #DK-5 IN NE CORNER OF CLAIM 545717
S OF HWY 112
Map Reference: AFRO WORK RPT KL #1469 DDH LOC MAP
Deposit Status Code: F

MDI#: T 1009
SMDR#:
UTM Zone: 17
Northing: 5329130
Easting: 568943
Mining Area:
Resident Geologist Area: KL
How Located: P
Compiler: JM
Map Scale Code: A

---------- Window #2 ----------

Commodity	Qualifier	Stat	ComGrp
1. AU	PRINCIPAL	F	Gold
2. W	MINOR	F	Tungsten

---------- Window #3 ----------

Ref#	References
1	OGS 1928, AR VOL 37 PT2 P94
2	AFRO WORK RPT KL #1321,1469

---------- Window #4 ----------

Alternate Names
1. MITFORD
2. DYMENT-KIDSTON
3. KIDSTON-DYMENT
4. MACASSA

---------- Window #5 ----------

NTS Extension

---------- Window #6 ----------

Township Extension Concession Lot

---------- Window #7 ----------

Geological Province:

---------- Window #8 ----------

Rock Name Class Group Era Relation to Deposit
Supergroup Group Formation

---------- Window #9 ----------

Minerals
1. QRTZ Quartz
2. PYRT Pyrite
3. EPDT Epidote
4. CLRT Chlorite
5. MGNT Magnetite

---------- Window #10 ----------

Depth of Working Mill Capacity Mining Method Reserves

---------- Window #11 ----------

Contiguous SMDR# Contiguous Deposit

---------- Window #12 ----------

Subject Comments

---------- Window #1 ----------

Deposit Name: LAC MINERALS . .

Compiled Date: 19910202
Update Date: 19950602

District: T
NTS: 42A01SE
Township: TECK

MDI#: T 1010
SMDR#:
UTM Zone: 17
Northing: 5329461
Easting: 568597
Mining Area:
Resident Geologist Area: KL

Latitude: 48 7 0
Longitude: 80 4 42

Entity Code: S
How Located: P

Point Located: DDH #S-62 ON N BDRY OF CLAIM 842970
S OF HWY 112

Map Reference: AFRO WORK RPT KL #1547 DDH LOC MAP

Deposit Status Code: F
Compiler: JM
Map Scale Code: A

---------- Window #2 ----------

Commodity	Qualifier	Stat	ComGrp
1. AU	PRINCIPAL	F	Gold
2. CU	MINOR	F	Copper

---------- Window #3 ----------

Ref#	References
1	OGS 1928, AR VOL 37 PT2 P94
2	AFRO WORK RPT KL #1547

---------- Window #4 ----------

Alternate Names
1. WILLROY-MACASSA
2. GIBSON

---------- Window #5 ----------

NTS Extension

---------- Window #6 ----------

Township Extension
Concession
Lot

---------- Window #7 ----------

Geological Province:

---------- Window #8 ----------

Rock Name
Class
Group
Era
Relation to Deposit
Supergroup
Group
Formation

---------- Window #9 ----------

Minerals
1. QRTZ Quartz
2. PYRT Pyrite
3. CLRT Chlorite
4. CRBN Carbonate
5. MGNT Magnetite

---------- Window #10 ----------

Depth of Working
Mill Capacity
Mining Method
Reserves

---------- Window #11 ----------

Contiguous SMDR#
Contiguous Deposit

---------- Window #12 ----------

Subject
Comments

---------- Window #1 ----------

Deposit Name: LABRADOR

Compiled Date: 19910209

District: T
NTS: 42A01SE
Township: TECK

MDI#: T 1031
SMDR#:
UTM Zone: 17
Northing: 5328658
Easting: 570555
Mining Area:
Resident Geologist Area: KL

Update Date: 19950619

Latitude: 48 6 33
Longitude: 80 3 8

Entity Code: S
How Located: P

Point Located: DDH #DK-82-1 400 FEET S OF #1 POST OF CLAIM
495720 9200 FEET NW OF SE TECK TP CORNER

Map Reference: AFRO WORK RPT KL #1469 DDH LOC MAP

Deposit Status Code: F
Compiler: JM
Map Scale Code: A

---------- Window #2 ----------

Commodity	Qualifier	Stat	ComGrp
1. ZN	PRINCIPAL	F	Zinc
2. CU	MINOR	F	Copper
3. AG	MINOR	F	Silver

---------- Window #3 ----------

Ref#	References
1	RES/REG PROP RPT KL #3
2	AFRO WORK RPT KL #1321,1469

---------- Window #4 ----------

Alternate Names
1. DYMENT-KIDSTON
2. KIDSTON-DYMENT

---------- Window #5 ----------

NTS Extension

---------- Window #6 ----------

Township Extension Concession Lot

---------- Window #7 ----------

Geological Province:

---------- Window #8 ----------

Rock Name Class Group Era Relation to Deposit
Supergroup Group Formation

---------- Window #9 ----------

Minerals
1. PYRT Pyrite
2. PYTT Pyrrhotite
3. QRTZ Quartz
4. GRPT Graphite
5. CLRT Chlorite

---------- Window #10 ----------

Depth of Working Mill Capacity Mining Method Reserves

---------- Window #11 ----------

Contiguous SMDR# Contiguous Deposit

---------- Window #12 ----------

Subject Comments

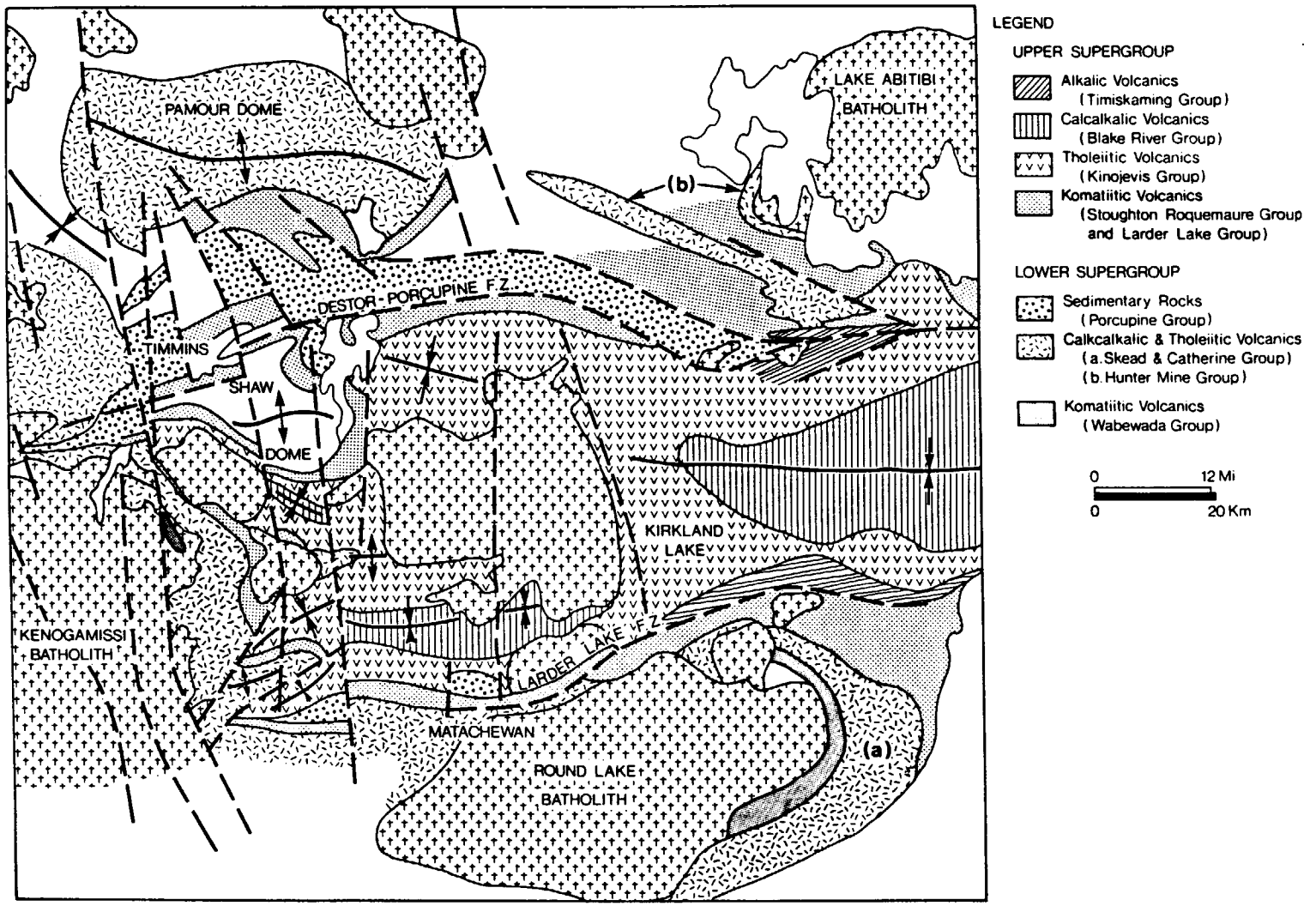
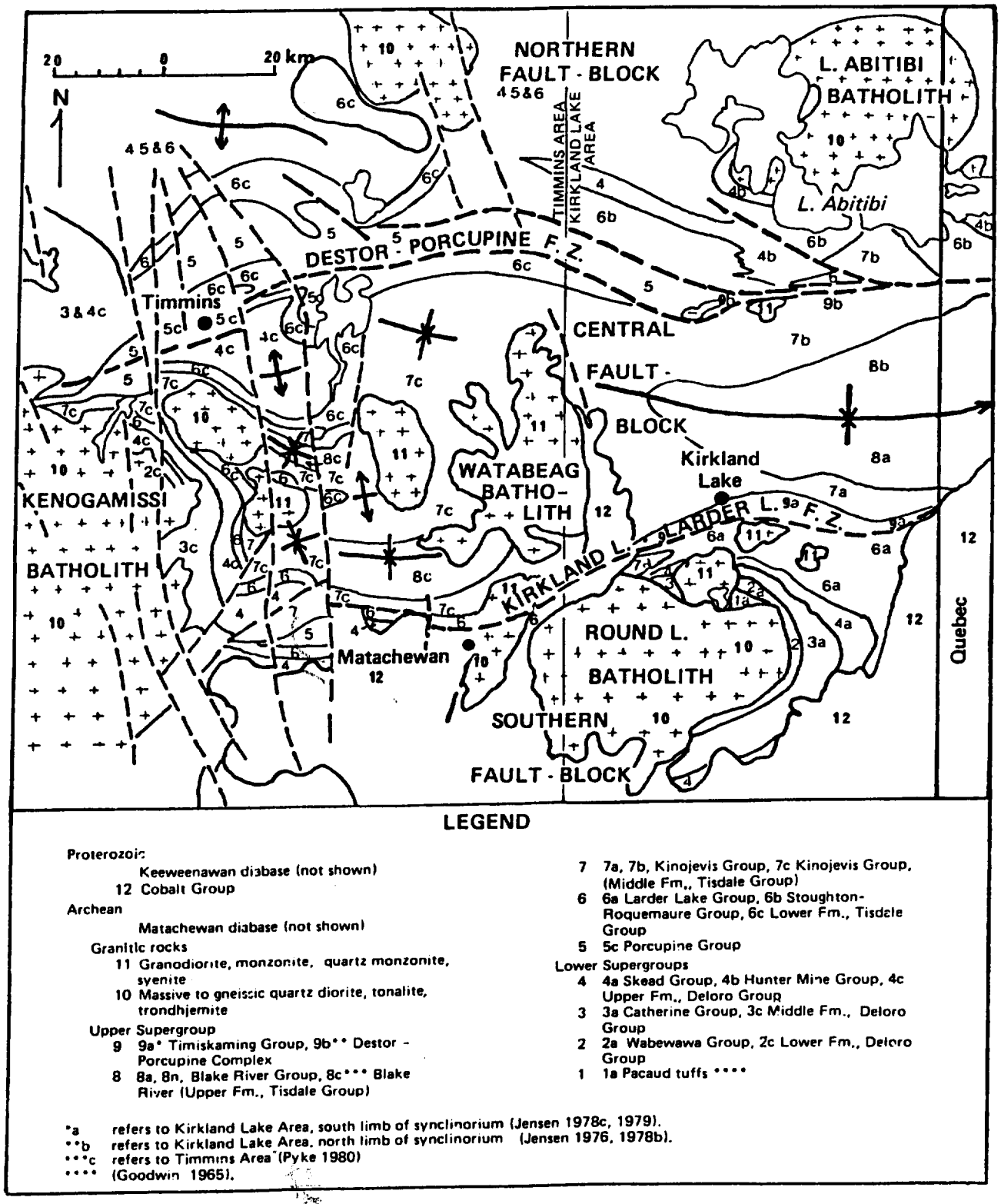


Figure 5-1—Stratigraphy and structural geology of the Timmins-Kirkland Lake area.

ANNEX
II-B-2 II

ANNEX "B-3"



LEGEND

Proterozoic

Keeweenawan diabase (not shown)

12 Cobalt Group

Archean

Matachewan diabase (not shown)

Granitic rocks

11 Granodiorite, monzonite, quartz monzonite, syenite

10 Massive to gneissic quartz diorite, tonalite, trondhjemite

Upper Supergroup

9 9a* Timiskaming Group, 9b** Destor - Porcupine Complex

8 8a, 8n, Blake River Group, 8c*** Blake River (Upper Fm., Tisdale Group)

7 7a, 7b, Kinojevis Group, 7c Kinojevis Group, (Middle Fm., Tisdale Group)

6 6a Larder Lake Group, 6b Stoughton-Roquemaure Group, 6c Lower Fm., Tisdale Group

5 5c Porcupine Group

Lower Supergroups

4 4a Skead Group, 4b Hunter Mine Group, 4c Upper Fm., Deloro Group

3 3a Catherine Group, 3c Middle Fm., Deloro Group

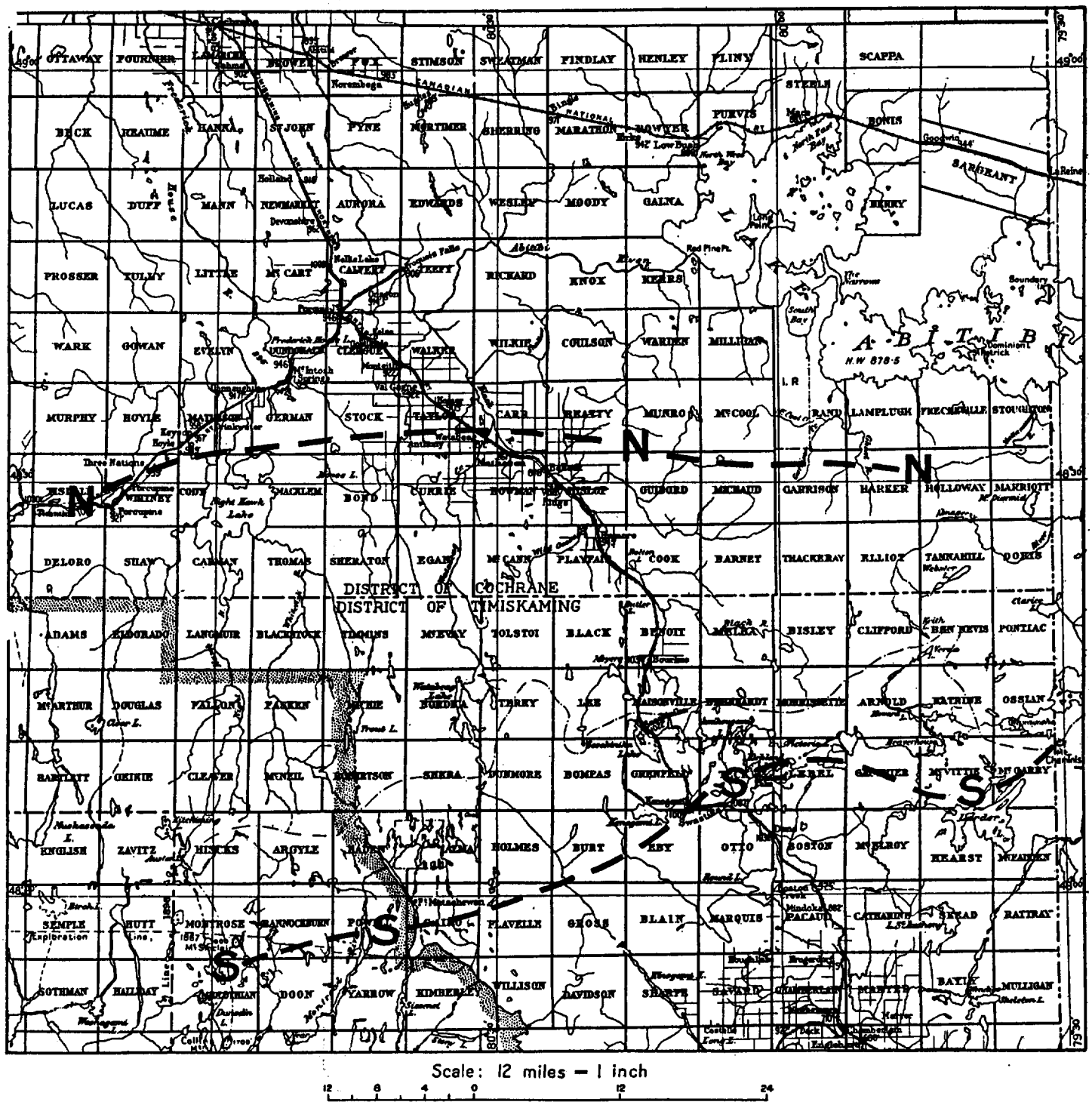
2 2a Wabewawa Group, 2c Lower Fm., Deloro Group

1 1a Pacaud tuffs ****

*a refers to Kirkland Lake Area, south limb of synclinorium (Jensen 1978c, 1979).
**b refers to Kirkland Lake Area, north limb of synclinorium (Jensen 1976, 1978b).
***c refers to Timmins Area (Pyke 1980)
**** (Goodwin 1965).

Figure 5. Geological map of the Timmins - Kirkland Lake area.

ANNEX "B-3A"



Key map of part of Northern Ontario extending westerly from the Quebec boundary and showing general position of the northern and southern gold belts. The letter "N" appears for the Porcupine, Munro, and Lightning River areas, and "S" for Midlothian, Matachewan, Kirkland Lake, and Larder Lake.

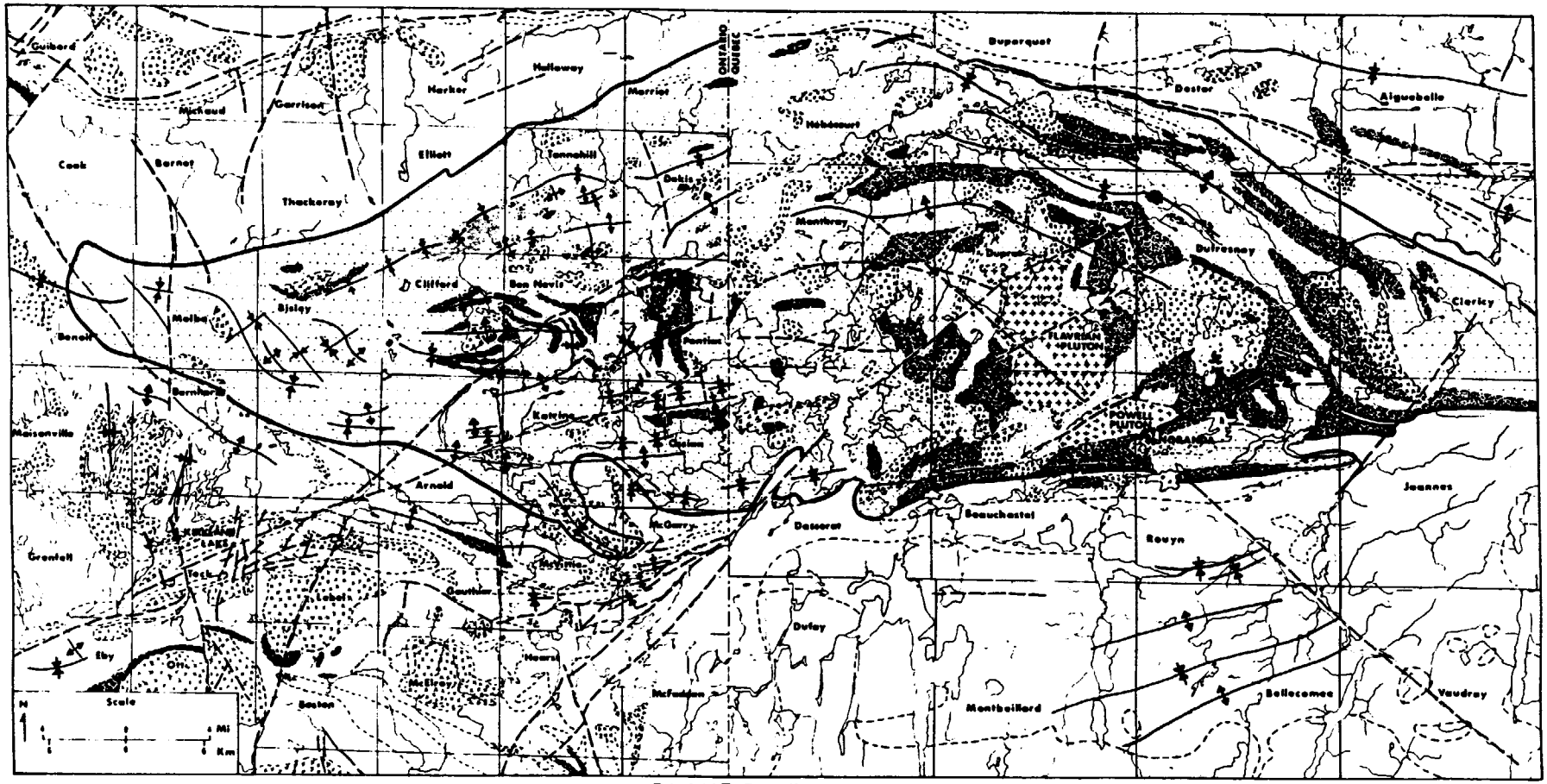


Figure 64. Map of the Blake River Group in Ontario and Quebec (Quebec part of the Blake River Group after Grenier 1967). Note type section of the Blake River Group occurs in Cadillac Township, 20 km east of Joannes Township.

ANNEX 11, B-4 11

ANNEX "B-5"

y of
Northern Development
and Mines

0 1000 2000 m
1:37751

99/04/13-11:18-afri1- janice brisson
Sheet North 1 of 1, East 1 of 1
UTM zone 17 NAD 27

ERLIS DATABASES

Assessment Files

- Airborne Geophysics
- Ground Geophysics
- Geology
- Geochemistry
- Diamond Drilling
- Physical
- Other
- Selected Feature

Publications

- Bedrock Geology
- Energy
- Geochemistry
- Geophysics
- Mineral Deposits
- Surficial Geology
- Miscellaneous
- Selected Feature

Mineral Deposits

- Discretionary Occurence
- Occurence
- Prospect
- Developed Prospect Without Reserves
- Past Producing Mine Without Reserves
- Developed Prospect With Reserves
- Past Producing Mine With Reserves
- Producing Mine

Drill Holes

- Diamond Drill Hole
- Wedged Diamond Drill Hole
- Overburden Drill Hole (Auger, Wacker)
- Percussion Drill Hole
- Reverse Circulation (Sonic)
- Underground Drilling
- Other

Rotation of Symbol Denotes Azimuth (e.g. 90)

Topographic

- Levee/Dyke
- Inland Water
- Rivers and Streams
- Major roads
- Minor roads

Lithogeochemistry

- Station Samples = 1
- Station Samples > 1

Ontario Ministry of Northern Development and Mines
Earth Resources and Land Information System (ERLIS)
ASSESSMENT FILE INDEX SUMMARY REPORT

AFRI FILE	Township/Area Name	Work Type Group	Performed For	Year	Maps	Pages
32D04NW0180	BOSTON LEBEL	AIRBORNE GEOPHYSICS	HSK MINERALS LTD	1989	13	52
32D04NW0248	LEBEL	GEOCHEMISTRY GROUND GEOPHYSICS	LACANA MINING CORP	1980	4	12
32D04SW0310	BOSTON	DIAMOND DRILLING GEOCHEMISTRY OTHER	MARSHALL MINERALS CORP	1983	2	99
32D04SW0320	BOSTON	GEOLOGY GROUND GEOPHYSICS OTHER PHYSICAL	MARSHALL BOSTON IRON MINES LTD	1981	7	50
32D04SW0336	BOSTON	DIAMOND DRILLING	MARSHALL BOSTON IRON MINES LTD	1971	1	76
32D04SW0338	BOSTON	GEOCHEMISTRY GEOLOGY GROUND GEOPHYSICS	MARSHALL BOSTON IRON MINES LTD	1972	27	16
42A01NE0071	TECK	DIAMOND DRILLING GEOLOGY OTHER	CYPRUS CAN INC	1994	5	75
42A01NE0073	TECK	DIAMOND DRILLING GEOLOGY OTHER	BATTLE MNT CAN INC	1992	56	278
42A01NE0076	LEBEL	OTHER	UNKNOWN	1990		3
42A01NE0077	LEBEL	DIAMOND DRILLING	RON CRICHTON	1990		13
42A01NE0094	LEBEL	GROUND GEOPHYSICS	Y LABINE	1976		18
42A01NE0095	LEBEL	GROUND GEOPHYSICS	Y DURANSEAU	1977	1	6
42A01NE0096	LEBEL	GEOLOGY GROUND GEOPHYSICS	M LABINE	1969	1	7
42A01NE0098	LEBEL	DIAMOND DRILLING	J J GRAY	1970		3
42A01NE0100	EBY GRENFELL OTTO TECK	DIAMOND DRILLING GEOCHEMISTRY GEOLOGY GROUND GEOPHYSICS OTHER PHYSICAL	BATTLE MOUNTAIN (CAN) INC	1990	106	445
42A01NE0103	TECK	PHYSICAL	J MORGAN	1991	1	3
42A01NE0105	TECK	GEOCHEMISTRY GEOLOGY	BATTLE MOUNTAIN(CANADA) INC	1991	5	49
42A01NE0106	TECK	DIAMOND DRILLING OTHER	BATTLE MOUNTAIN INC	1991		20
42A01NE0110	TECK	GROUND GEOPHYSICS	BATTLE MOUNTAIN (CAN) INC	1991	4	20

ANNEX "B"

AFRI FILE	Township/Area Name	Work Type Group	Performed For	Year	Maps	Pages
42A01NE0111	TECK	DIAMOND DRILLING GEOCHEMISTRY GROUND GEOPHYSICS	BATTLE MOUNTAIN (CANADA) INC	1991	26	288
42A01NE0113	TECK	GEOLOGY OTHER	BATTLE MOUNTAIN(CANADA) INC	1990	29	82
42A01NE0114	TECK	GEOLOGY GROUND GEOPHYSICS	BATTLE MOUNTAIN (CANADA) INC	1991	6	17
42A01NE0118	TECK	PHYSICAL	C P FORBES	1989		8
42A01NE0123	TECK	DIAMOND DRILLING OTHER	BATTLE MOUNTAIN (CANADA) INC	1991	12	203
42A01NE0124	TECK	DIAMOND DRILLING OTHER	BATTLE MOUNTAIN INC	1990	1	221
42A01NE0128	TECK	GEOCHEMISTRY GEOLOGY PHYSICAL	BATTLE MOUNTAIN (CAN) INC	1990	30	201
42A01NE0158	TECK	DIAMOND DRILLING OTHER	EDEN ROC MINERAL CORP	1984		5
42A01NE0164	TECK	GROUND GEOPHYSICS PHYSICAL	M DYMENT	1996	3	14
42A01NE0168	TECK	DIAMOND DRILLING	LAC MINERALS LTD	1987		45
42A01NE0177	TECK	GROUND GEOPHYSICS	EDEN ROC MINERAL CORP	1983	4	28
42A01NE0178	TECK	GEOLOGY OTHER PHYSICAL	QUEENSTON GOLD MINES LTD	1983	6	23
42A01NE0186	TECK	DIAMOND DRILLING OTHER	EDEN ROC MINERALS	1982	2	35
42A01NE0188	TECK	OTHER	JONPOL EXPL LTD	1981		56
42A01NE0199	TECK	DIAMOND DRILLING	A STEWART	1981		5
42A01NE0202	TECK	DIAMOND DRILLING	E CHORZEPA	1979		4
42A01NE0203	TECK	GEOLOGY PHYSICAL	WILLROY MINES LTD (MACASSA DIV)	1980	7	6
42A01NE0204	TECK	GROUND GEOPHYSICS	NEWMONT EXPL OF CANADA LTD	1978	5	10
42A01NE0206	TECK	DIAMOND DRILLING GEOCHEMISTRY	NEWMONT EXPL LTD	1978	1	26
42A01NE0207	TECK	DIAMOND DRILLING	SPARK GOLD MINES LTD	1977		4
42A01NE0209	TECK	OTHER	SPARK GOLD MINES LTD	1975		5
42A01NE0211	TECK	DIAMOND DRILLING PHYSICAL	SPARK GOLD MINES LTD	1975	1	10
42A01NE0212	TECK	DIAMOND DRILLING	KERR ADDISON MINES LTD	1974	8	36

AFRI FILE	Township/Area Name	Work Type Group	Performed For	Year	Maps	Pages
42A01NE0212		GEOLOGY GROUND GEOPHYSICS OTHER PHYSICAL				
42A01NE0219	TECK	OTHER	UPPER CANADA MINES LTD	1972		10
42A01NE0220	TECK	OTHER	SPARK GOLD MINES LTD	1974		62
42A01NE0227	TECK	DIAMOND DRILLING OTHER	KERR ADDISON MINES	1974		12
42A01NE0228	TECK	DIAMOND DRILLING	MAYFIELD EXPLORATION & DEVELOPMENT LTD	1972		23
42A01NE0235	TECK	DIAMOND DRILLING OTHER	TECKORA MINES	1972	1	35
42A01NE0236	TECK	DIAMOND DRILLING	R M BUTLER	1966		5
42A01NE0237	TECK	DIAMOND DRILLING OTHER	UPPER CANADA MINES LTD	1973	7	8
42A01NE0289	TECK	DIAMOND DRILLING OTHER	2973090 CAN INC TOM OBRADOVICH	1996	1	28
42A01NE0315	TECK	DIAMOND DRILLING	KINROSS GOLD CORP	1997	3	20
42A01NE0503	TECK	DIAMOND DRILLING OTHER	LAC MINERALS LTD(MACASSA DIV)	1986		10
42A01NE0507	TECK	GEOCHEMISTRY OTHER	L M DYMENT	1984	2	61
42A01NE0509	TECK	GEOLOGY	LABRADOR EXPL ONT LTD	1982	4	19
42A01NE2001	TECK	DIAMOND DRILLING	LAMPE RESC CO LTD	1981		7
42A01NE8930	TECK	GEOCHEMISTRY GEOLOGY OTHER PHYSICAL	BATTLE MOUNTAIN (CAN) INC	1990	22	73
42A01NE8932	TECK	GROUND GEOPHYSICS OTHER	M RASH & CO LTD TECKORA MINES LTD	1971	4	53
42A01NE8936	TECK	DIAMOND DRILLING GEOCHEMISTRY GEOLOGY OTHER	BATTLE MOUNTAIN (CAN) INC	1992	56	276
42A01SE0001	TECK	DIAMOND DRILLING OTHER	BATTLE MOUNTAIN INC	1991	2	57
42A01SE0002	OTTO OTTO	AIRBORNE GEOPHYSICS	BATTLE MOUNTAIN CDA INC	1990	42	66
42A01SE0003	OTTO TECK	DIAMOND DRILLING GROUND GEOPHYSICS	GOLDEN CRESCENT RESC LTD	1988	8	352

AFRI FILE	Township/Area Name	Work Type Group	Performed For	Year	Maps	Pages
42A01SE0005	TECK	GROUND GEOPHYSICS	MID-NORTH ENG SERVICES LTD	1988	5	23
42A01SE0006	TECK	GEOCHEMISTRY	HSK MINERALS LTD	1988	3	6
42A01SE0007	TECK	DIAMOND DRILLING OTHER	LAC MINERALS LTD	1987		47
42A01SE0008	TECK	DIAMOND DRILLING	GOLDEN CRESCENT RESC LTD MID NORTH ENG SERVICES LTD	1988		18
42A01SE0009	TECK	OTHER	H S K MINERALS LTD	1988	2	8
42A01SE0010	TECK	GROUND GEOPHYSICS	LAC MINERALS (MACASSA DIV)	1986	2	9
42A01SE0012	TECK	GEOCHEMISTRY OTHER	MINISTRY	1984	1	58
42A01SE0013	OTTO	GROUND GEOPHYSICS	HSK MINERALS LIMITED	1987	6	15
42A01SE0015	TECK	GEOCHEMISTRY	LABRADOR MINING & EXPL LTD	1983	2	21
42A01SE0016	TECK	DIAMOND DRILLING	RIO ALGOM EXPLORATION INC	1985		22
42A01SE0017	TECK	GROUND GEOPHYSICS	LABRADOR EXPL (ONTARIO) LTD	1982	7	25
42A01SE0018	TECK	GROUND GEOPHYSICS	LABRADOR EXPL (ONTARIO) LTD	1982	3	24
42A01SE0019	TECK	DIAMOND DRILLING	LABRADOR EXPL LTD	1982	1	8
42A01SE0021	TECK	DIAMOND DRILLING	LABRADOR EXPLORATION LTD	1982	2	26
42A01SE0022	TECK	GROUND GEOPHYSICS	L M DYMENT	1981	2	11
42A01SE0023	TECK	GROUND GEOPHYSICS	JOMI MINERALS & EXPEDITING LTD	1981	3	11
42A01SE0029	TECK	GEOLOGY	L M DYMENT	1981	1	12
42A01SE0030	TECK	GROUND GEOPHYSICS	L M DYMENT	1979	5	19
42A01SE0031	TECK	GROUND GEOPHYSICS	JOMI MINERALS & EXPEDITING LTD	1981	1	11
42A01SE0032	TECK	GROUND GEOPHYSICS	L M DYMENT	1980	2	9
42A01SE0033	TECK	DIAMOND DRILLING	QUEENSTON GOLD MINES LTD	1980		4
42A01SE0035	TECK	DIAMOND DRILLING OTHER	QUEENSTON GOLD MINES LTD	1979		14
42A01SE0036	TECK	GROUND GEOPHYSICS	L M DYMENT	1979	4	24
42A01SE0038	TECK	GEOLOGY GROUND GEOPHYSICS	QUEENSTON GOLD MINES LTD	1978	3	18
42A01SE0040	TECK	DIAMOND DRILLING	GATEFORD MINES LIMITED	1975		3
42A01SE0041	OTTO TECK	DIAMOND DRILLING GROUND GEOPHYSICS	GATEFORD MINES LTD	1974	2	3
42A01SE0043	OTTO TECK	OTHER	GATEFORD MINES LTD	1974	4	40
42A01SE0044	TECK	DIAMOND DRILLING OTHER	GATEFORD MINES LTD	1975	1	26
42A01SE0045	TECK	GEOLOGY	LABRADOR EXPL ONT LTD	1982	1	31

AFRI FILE	Township/Area Name	Work Type Group	Performed For	Year	Maps	Pages
42A01SE0046	TECK	DIAMOND DRILLING	GATEFORD MINES LTD	1974	1	28
42A01SE0047	TECK	DIAMOND DRILLING OTHER	GATEFORD MINES LTD	1975		15
42A01SE0048	TECK	DIAMOND DRILLING	GATEFORD MINES LTD	1974		6
42A01SE0049	TECK	DIAMOND DRILLING	GATEFORD MINES LTD	1974		6
42A01SE0050	TECK	DIAMOND DRILLING	J J GRAY	1971		6
42A01SE0051	TECK	DIAMOND DRILLING	ORME PROSPECTING SYNDICATE R E DANS	1973		6
42A01SE0052	OTTO	GEOCHEMISTRY GEOLOGY GROUND GEOPHYSICS PHYSICAL	F RIVARD	1992	4	26
42A01SE0053	OTTO	DIAMOND DRILLING GEOLOGY GROUND GEOPHYSICS OTHER	F RIVARD	1992	4	24
42A01SE0054	OTTO	DIAMOND DRILLING GEOLOGY GROUND GEOPHYSICS OTHER	F RIVARD P RIVARD	1992	2	43
42A01SE0056	OTTO	GEOLOGY GROUND GEOPHYSICS OTHER	F RIVARD	1993	2	35
42A01SE0102	OTTO	GEOCHEMISTRY GEOLOGY GROUND GEOPHYSICS	F RIVARD	1992	5	45
42A01SE0103	OTTO	GEOCHEMISTRY GEOLOGY OTHER PHYSICAL	L M DYMENT	1991		27
42A01SE0105	OTTO	OTHER	J WALLS	1990		13
42A01SE0107	OTTO	GROUND GEOPHYSICS	L M DYMENT	1990	3	8
42A01SE0108	OTTO	GEOCHEMISTRY GEOLOGY GROUND GEOPHYSICS	J J ST JEAN	1991		50
42A01SE0113	OTTO	OTHER	M DYMENT	1987	1	24
42A01SE0114	OTTO	DIAMOND DRILLING	F RIVARD	1991		10
42A01SE0116	OTTO	DIAMOND DRILLING	FERNAND RIVARD	1989		5
42A01SE0119	OTTO	DIAMOND DRILLING	JOCELYNE KIDSTON	1989	1	14

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AFRI FILE	Township/Area Name	Work Type Group	Performed For	Year	Maps	Pages
42A01SE0119		GEOCHEMISTRY OTHER				
42A01SE0142	OTTO	DIAMOND DRILLING	MINOREX LTD	1980	3	9
42A01SE0150	OTTO	GROUND GEOPHYSICS	JOMI MINERALS & EXPEDITING LTD	1980	1	10
42A01SE1015	TECK	DIAMOND DRILLING	LAC MINERALS LTD	1983	1	8
42A01SE8902	OTTO	GEOCHEMISTRY OTHER	F RIVARD	1990	1	22
42A01SE8904	OTTO	GROUND GEOPHYSICS	NORANDA EXPL CO LTD	1976	2	6
42A01SE8905	OTTO	GEOLOGY GROUND GEOPHYSICS	MINOREX LTD	1980	4	10
42A01SE8906	OTTO	GEOCHEMISTRY GEOLOGY GROUND GEOPHYSICS	MINOREX LTD	1980	6	10
42A01SE8907	OTTO	GROUND GEOPHYSICS	M DYMENT	1982	3	19
42A01SE8909	OTTO	DIAMOND DRILLING	CAN NICKEL CO LTD	1968		4
42A01SE8910	OTTO	DIAMOND DRILLING	L M DYMENT	1989		13
42A01SE8911	OTTO	OTHER	ARGENTEX CORP LTD	1981		31
42A01SE8912	OTTO	OTHER	L M DYMENT	1990	1	5
42A01SE8913	EBY OTTO	DIAMOND DRILLING	F RIVARD	1990		5
42A01SE8934	TECK	DIAMOND DRILLING	QUEENSTON GOLD MINES LTD	1979		7
42A01SE8938	TECK	GEOLOGY	L DYMENT	1981	1	11
42A01SE9705	OTTO	DIAMOND DRILLING OTHER	F RIVARD	1992	4	41
42A01SE9706	LEBEL	OTHER	M LABINE	1800		3
42A01SW0117	OTTO	AIRBORNE GEOPHYSICS	MID NORTH ENG SERVICES	1988	3	19

Total Assessment Files : 127

ANNEX "E"

Geology of the Archean Murdock Creek intrusion, Kirkland Lake, Ontario

Stephen M. Rowins[1], André E. Lalonde[1] and Eion M. Cameron
Mineral Resources Division

Rowins, S.M., Lalonde, A.E. and Cameron, E.M., Geology of the Archean Murdock Creek intrusion, Kirkland Lake, Ontario; in Current Research, Part C, Geological Survey of Canada, Paper 89-1C, p. 313-323, 1989.

Abstract

The Murdock Creek intrusion, immediately southwest of Kirkland Lake, Ontario, in the Abitibi belt, is a composite syenitic pluton, of presumed late Archean age, consisting of six distinct units. It is a member of a suite of late-tectonic syenitic intrusions located within and adjacent to the Kirkland Lake-Larder Lake fault zone, which host virtually all of the gold mineralization in the Kirkland Lake camp. Field relationships between the various rock types and preliminary petrographic evidence indicate that the Murdock Creek intrusion evolved from a single pulse of relatively anhydrous and oxidized syenitic magma which crystallized and differentiated in situ. Recent studies have shown that the gold deposits in the Kirkland Lake mining camp were derived from oxidized hydrothermal fluids; one possibility is that such fluids evolved from oxidized felsic magmas. The oxidized nature of the Murdock Creek magma suggests that a genetic connection between magma and ore fluids should be further examined. The absence of either a distinct metamorphic contact aureole or a peripheral cataclastic zone produced during plutonic emplacement, suggest that intrusion occurred at mesozonal depths.

Résumé

L'intrusion Murdock Creek, sise immédiatement au sud-ouest de Kirkland Lake dans la zone d'Abitibi, est composée de six unités plutoniques distinctes, toutes présumées d'âge archéenne. Elle est membre d'une suite d'intrusions syn- à tardi-tectoniques que l'on retrouve à l'intérieur ou en bordure de la zone faillée de Kirkland Lake-Larder Lake. Ces intrusions encaissent pratiquement tous les gîtes d'or du camp minier de Kirkland Lake. Les relations temporelles ainsi que la pétrographie indiquent que l'intrusion provient de la solidification et de la différenciation in situ d'une unique impulsion de magma anhydre et oxidé. Des études récentes démontrent que les gîtes d'or de la région de Kirkland Lake sont dérivés de fluides hydrothermaux oxidés; il est possible que ces fluides aient eux-mêmes évolués à partir de magmas felsiques oxidés. La nature oxidée du magma de Murdock Creek encourage une étude plus approfondie du lien génétique possible entre magma et fluides minéralisants. L'absence d'une auréole thermique distincte ou encore d'une zone cataclastique périphérique au pluton indiquent un emplacement dans la mésozone.

[1] Department of Geology, University of Ottawa, Ottawa, Ontario K1N 6N5.

INTRODUCTION

The Murdock Creek intrusion is a composite syenitic pluton, of presumed late Archean age, immediately southwest of Kirkland Lake, Ontario, in the southern part of the ~2.7 Ga Abitibi belt in the Superior Structural Province (Fig. 1). The pluton is one of a suite of late-tectonic (Colvine et al., 1988) syenitic intrusions within and adjacent to the Kirkland Lake-Larder Lake fault zone. The intrusions host about 97% of the gold mineralization in the camp (Hodgson, 1986). A close spatial association between felsic intrusions and lode gold deposits in Archean greenstone terranes has long been recognized; possible temporal and genetic links between the two are the topics of considerable study (Hodgson, 1983; Cameron and Carrigan, 1987; Cameron and Hattori, 1987; Colvine et al., 1988). The acceptance of any genetic model has, however, been hampered by a lack of evidence documenting the evolution of the felsic magmas from which the intrusions were derived. This is, in part, due to the extensive alteration around major gold deposits, which destroys the primary igneous minerals of the intrusion used to document magmatic evolution (e.g. Czamanske and Wones, 1973). An investigation of the Murdock Creek intrusion commencing in 1987 showed that the western portion of the pluton is unaffected by the shearing, quartz-veining and carbonatization which have extensively modified the rest of the pluton. This provides an opportunity to estimate the intensive parameters (P, T, $P(H_2O)$, $P(O_2)$) and to evaluate the relative oxidation state of the magma(s). Cameron and Hattori (1987) found that sulphides from the Kirkland Lake gold ores were depleted in ^{34}S, indicating isotopic fractionation in the ore fluids between sulphate and sulphide phases. This evidence for relatively oxidized fluids is supported by the occurrence of sulphate minerals and hematite with the gold mineralization. Cameron and Hattori (1987) suggested that such fluids could have been derived from an oxidized felsic magma. Documenting the oxidation state of the Murdock Creek magma is an initial step in testing this hypothesis. This paper describes the results of field work and preliminary petrographic studies carried out in 1987-88.

GEOLOGICAL SETTING

The volcanic, sedimentary and related intrusive rocks of the Kirkland Lake district form the southern limb of an elongate, east-plunging synclinorium (Fig. 2). All rocks in the region have been metamorphosed, but the prefix "meta" is omitted in the text. The supracrustal rocks have been divided into two successions, representing two cycles of volcanism, referred to by Jensen (1980) as the Lower and Upper supergroups. Each cycle was initiated by komatiitic volcanism, followed by tholeiitic, calc-alkaline, and finally alkalic cycles. The two cycles are separated by sedimentary units comprising argillite, conglomerate, greywacke, chert and iron-formation. The dominant structural feature of the area is the major east-west trending Kirkland Lake-Larder Lake fault zone, a narrow sinuous belt approximately 60 km long and up to 5 km wide, that extends from Matachewan in the west through Noranda towards Val d'Or in the east. Displacements along this fault and the Porcupine-Destor fault, major faults in the Abitibi belt, have been interpreted to be dominantly strike-slip (Hubert et al., 1984) or normal-slip (Dimroth et al., 1983). Subsequent reactivation of the existing structures, predominantly as reverse faults (Sibson et al., 1988), has resulted in a complicated structural zone in which gold mineralization and late felsic plutonism have been focused.

The Murdock Creek intrusion is emplaced within the mafic and ultramafic lava flows of the Larder Lake Group (Jensen, 1980). To the north, the pluton is in fault-contact with the greywacke and tuffaceous conglomeratic sediments of the Timiskaming Group (Thomson, 1950).

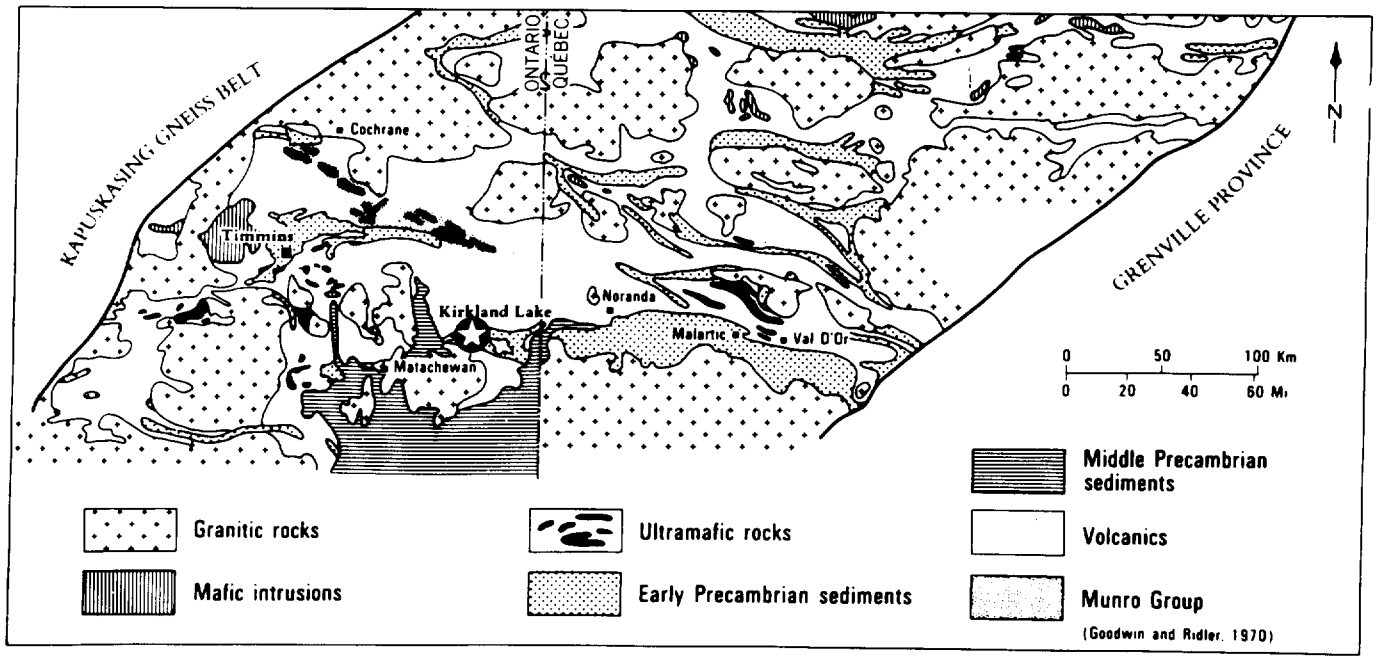
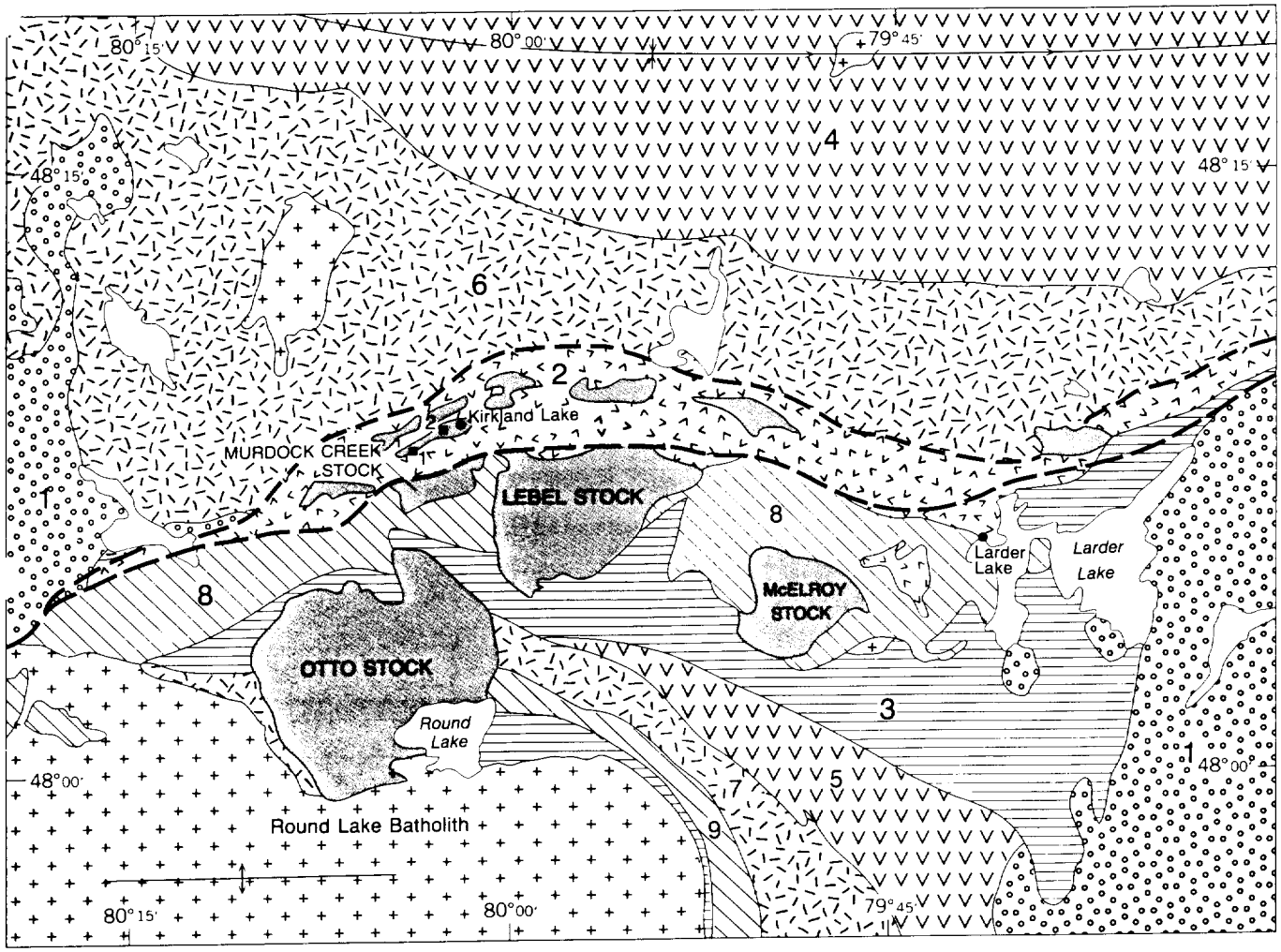


Figure 1. Geology of the Abitibi belt (after Goodwin and Ridler, 1970).



1. *COBALT GROUP*

Syenitic rocks

Trondhjemitic rocks

2. *TIMISKAMING GROUP*
Alkalic volcanic rocks and associated sedimentary rocks

3. *LARDER LAKE GROUP*
Intercycle sedimentary rocks, calc-alkalic tuffs, komatiitic volcanic flows, and ultramafic intrusive rocks

4. *BLAKE RIVER GROUP*
5. *SKEAD GROUP*
Calc-alkalic volcanic rocks

6. *KINOJEVIS GROUP*
7. *CATHARINE GROUP*
Tholeiitic volcanic rocks

8. *LARDER LAKE GROUP*
9. *WABEWAWA GROUP*
Komatiitic volcanic rocks

Kirkland Lake-Larder Lake Fault Zone
Anticline
Syncline
Macassa Mine 1
Lake Shore Mine 2

km
0 10

GSC

Figure 2. Geology of the Kirkland Lake area (modified from Jensen, 1978).

DESCRIPTION OF THE FIELD UNITS

All plutonic rocks described in this paper are classified according to the IUGS nomenclature (Streckeisen, 1976). The following study is based primarily on rock units forming the western part of the intrusion where the primary mineralogy and igneous textures largely escaped deformation and alteration.

At the present level of erosion, the Murdock Creek intrusion outcrops as a crudely elliptical body, elongated in an east-west direction parallel to the Larder Lake-Kirkland Lake fault zone. A thin, heterogeneous mafic margin encloses an extensive alkali-feldspar syenite core. The intrusion is a composite body consisting of six mappable units: 1) clinopyroxenite, 2) meladiorite, 3) hornblendite, 4) melamonzonite, 5) melasyenite, and 6) alkali-feldspar syenite (Fig. 3) . With the possible exception of hornblendite, these units exhibit regular and gradational contacts in the field. Textural and mineralogical evidence given below suggest that the units are from a single pulse of syenitic magma which crystallized and differentiated in situ. The following is a description of the six units, beginning with the oldest.

1) Clinopyroxenite

Clinopyroxenite is massive, homogeneous and medium-grained. It is dark greenish black but may weather brownish grey. It outcrops as a thin (10-300 m thick), discontinuous marginal unit at the western periphery of the intrusion, where it comes in contact with basalts of the Larder Lake Group and fluvial sediments of the Timiskaming Group. The clinopyroxenite is typically fresh, except near contacts with the country rock or where intruded by pink alkali-feldspar syenite dykes. In the field, a fine grained textural variant of clinopyroxenite may be difficult to distinguish from basalt; however, close examination reveals that the basalts possess a metamorphic fabric defined by the segregation of felsic (plagioclase and quartz) and mafic (amphibole) minerals into discrete bands, 0.05 to 1.0 mm wide. This imparts a "streaked" appearance to the rock. In addition, the older intruded basalts are usually more altered than the clinopyroxenite, with abundant epidote, calcite and quartz veins.

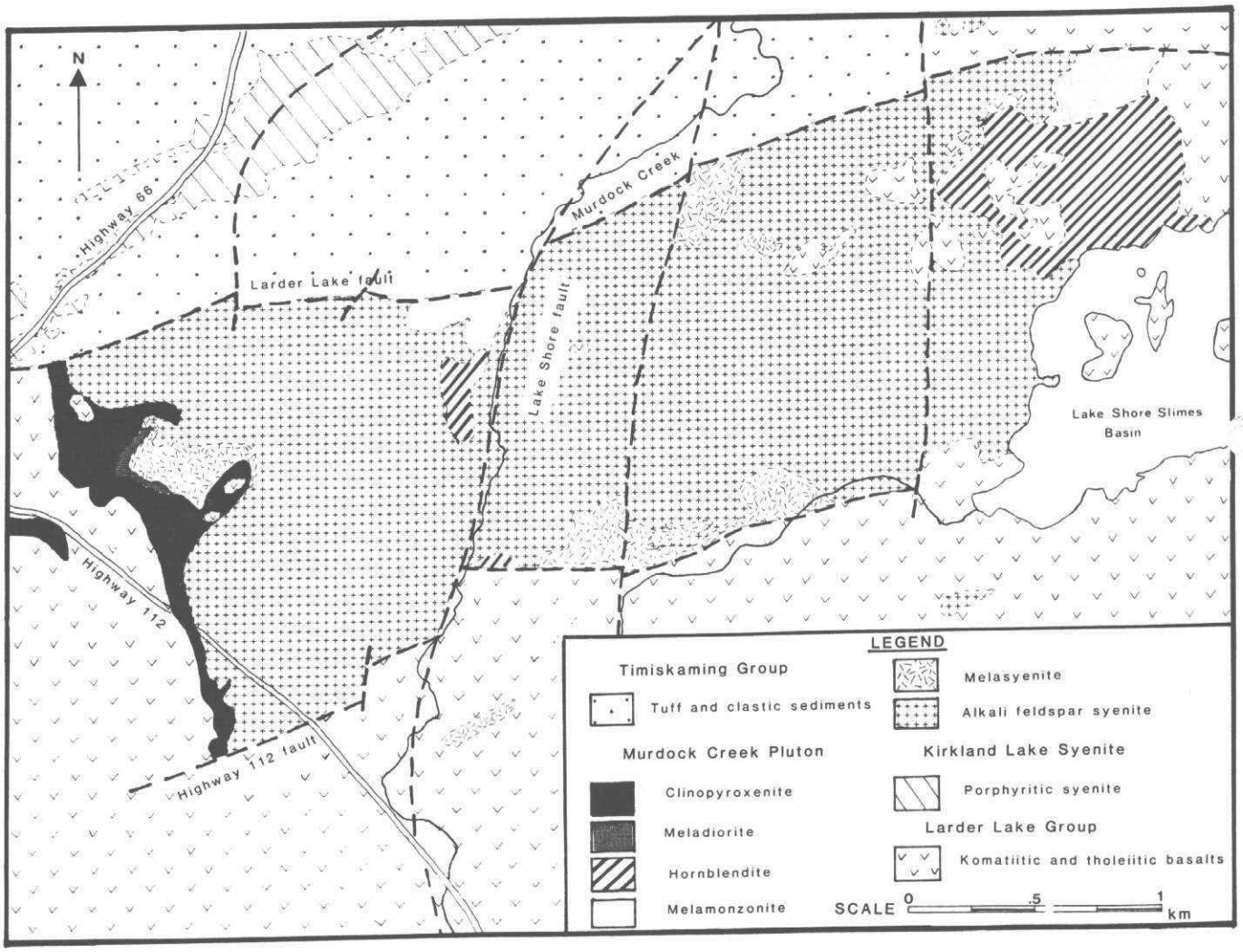


Figure 3. Geology of the Murdock Creek intrusion (Thomson, 1950 and this paper).

) Meladiorite

Meladiorite is a dark green, medium grained rock that may be either massive or foliated. It is a minor unit that occurs as a thin (0-50 m thick), discontinuous unit in the northwest mafic margin of the intrusion. The rock has a distinctive spotted appearance in the field produced by greenish-white plagioclase laths set in a dark green matrix of clinopyroxene, amphibole and biotite. Meladiorite may be slightly porphyritic with plagioclase phenocrysts up to 1 cm in length. The preferential alignment of these plagioclase laths may yield a weak to moderate primary foliation, however the rock's texture is usually massive.

3) Hornblendite

Hornblendite is a texturally heterogeneous rock recognized by its greenish black colour, coarse euhedral hornblende crystals (0.5-10.0 mm across) and rough, knobby-weathered surface (Fig. 4). Considerable variation in grain size occurs, with medium- and coarse-grained variants in ıe same outcrop. Hornblendite outcrops sporadically throughout the mafic margin, except in the northeastern extremity of the intrusion where it forms an extensive (500-700 m) peripheral body. Pink alkali-feldspar syenite dykes and xenoliths of basalt are common.

4) Melamonzonite

Melamonzonite is a minor unit, transitional between meladiorite and melasyenite. This unit is quite heterogeneous varying from fine to medium grained, and from syenitic- to clinopyroxene-rich, over tens of centimetres. Melamonzonite is massive and greyish green when fresh, but becomes light brownish grey upon weathering. Subequal proportions of pale yellowish green perthite and plagioclase irregularly distributed throughout a dark greenish black matrix of clinopyroxene, biotite and amphibole, results in a mottled appearance. Pink alkali-feldspar syenite dykes intrude the melamonzonite in the northwestern part of the intrusion.

5) Melasyenite

Melasyenite is a transitional unit which becomes increasingly leucocratic towards the core of the intrusion, away from the mafic margin. The rock is medium grained, massive to trachytic, with pale orange-pink perthite crystals set in a slightly finer-grained matrix of dark green clinopyroxene, biotite and amphibole. Mafic varieties can appear slightly porphyritic with coarse subhedral perthite laths set against a medium grained mafic groundmass, imparting a spotted appearance similar to that exhibited by the meladiorite. The coarse grained perthite crystals (10-15 mm across) commonly exhibit colour zoning in which a pink core is enclosed by a greyish white rim. Plagioclase crystals are smaller (1-4 mm across) and possess a milky-white luster. As the rock becomes more leucocratic its textures and mineral distributions become increasingly homogeneous, the spotted appearance giving way to a more evenly coloured pink syenite. Based on the highly mafic composition of this unit (40-50 % mafic minerals) with respect to the alkali-feldspar syenite ($\approx$ 10-20 %), the melasyenite is interpreted to be the last mafic unit to crystallize. This is consistent with its location along the interior contact of the mafic margin with the extensive alkali-feldspar syenite core.

6) Alkali-feldspar syenite

Reddish pink alkali-feldspar syenite is the most extensive rock unit of the pluton. It occupies the central core of the intrusion. The unit is heterogeneous, medium to coarse grained, massive or well-foliated, in which case the foliation is defined by the parallel alignment of reddish perthite laths and dark green, columnar mafic minerals (predominantly clinopyroxene). This trachytic alignment is generally concordant with the internal contacts between the various plutonic units, however, it is locally discordant. The most intense red colouration of the feldspars coincides with the most strongly altered mafic silicates, both adjacent to faults and small shear zones within the intrusion. A coarse grained variant with pinkish grey, subhedral perthite crystals ranging up to 3 cm in length outcrops in the west-central part of the intrusion as small irregular bodies, tens of metres across. This coarse textural variant grades subtly over several metres into the much more common, medium grained alkali-feldspar syenite.

FIELD RELATIONSHIPS

The Murdock Creek intrusion may be subdivided into two separate domains on the basis of degree of alteration and deformation. West of the north-trending Lake Shore fault (Thomson, 1950), syenitic units are fresh with only minor shearing and attendant alteration. East of this fault, the rock is intensely sheared and altered (Fig. 3). Features distinctive of deformation and the attendant flow of hydrothermal fluids are areas of low relief, such as along stream beds (i.e., Lake Shore fault, Highway 112 fault); sheared and carbonated rock; silicification and resultant quartz-veining; chloritization and pyritization of mafic minerals; intense reddening of the feldspars; and the development of mylonitic or cataclastic rock textures.



Figure 4. Rough, knobby-weathering surface of hornblendite.

Dykes and cognate inclusions are distributed throughout the intrusion, with an anomalous concentration of basaltic xenoliths in the northeastern corner of the pluton. These large (20-200 m diameter) basaltic xenoliths are possibly roof pendants. Late, fine- to medium-grained alkali-feldspar syenite dykes frequently cut both the crystallized mafic margin and its enclosed basaltic xenoliths without any preferred orientation. Basaltic xenoliths not contained in the mafic margin but in the younger alkali-feldspar syenite core, are also intruded by pink alkali-feldspar syenite dykes which have been derived directly from the enclosing syenitic melt. Small angular xenoliths of the intruded rock frequently occur within these dykes.

Dykes of bright red, pegmatitic alkali-feldspar syenite (1-30 cm wide) occurring either singly or together in small swarms intrude medium-grained, alkali-feldspar syenite. These coarse pegmatites are leucocratic and weather-out as resistant ridges against the finer-grained, less resistant, alkali-feldspar syenite (Fig. 5). These late pegmatite dykes are also frequently associated with small shear zones in the intrusion. One small, irregular, lamprophyre dyke (10-20 cm wide) was observed cross cutting alkali-feldspar syenite in the southwestern corner of the intrusion. The lamprophyre consists almost exclusively of brown biotite (>90%) with subordinate apatite, magnetite and titanite.

Along the western edge of the intrusion, the contact between the clinopyroxenite and the Larder Lake basalts consists of a heterogeneous 200 m wide zone of intermingled altered clinopyroxenite and basalt. Numerous lime-green epidote veins and pale pink calcite veins with euhedral green amphibole needles (2-15 mm long) occur throughout this zone. Dark lime-green epidote pods with anastomosing alteration selvages, found within this zone, may give the appearance of pillow basalts, however, this feature is not primary but results from alteration. Late, quartz-bearing, whitish-grey felsic dykes intrude this heterogeneous contact zone. These dykes are not related to the syenitic magma of the Murdock Creek intrusion, since primary quartz is virtually absent in units forming the intrusion. However, small salmon-pink coloured alkali-feldspar syenite dykes, distinctly different from the quartz-bearing variety do appear directly equivalent to the Murdock Creek plutonic unit. Since these two dyke varieties are not exposed together, their relative ages are not known.



Figure 5. Resistant late dykes of pegmatitic, alkali-feldspar syenite in alkali-feldspar syenite.

PETROGRAPHY OF THE UNITS

Clinopyroxenite

This fine- to medium-grained ultramafic unit consists almost entirely of pale green pleochroic diopsidic pyroxene (as determined by preliminary microprobe analysis), with subordinate amounts of secondary biotite and amphibole. Pyroxene crystals range from 0.3 mm to 3.0 mm in length, are typically subhedral, and are often in mutual contact with neighbouring grains. The texture is not cumulate as there is no evidence of gravitational settling. Ovoid inclusions of apatite, zircon and opaque oxides and sulphides are numerous. Tiny acicular inclusions often encircle the core of some pyroxenecrystals (Fig. 6). These "rods" or "needles" are about 0.1 mm long and are dark brown at high magnification. Similar acicular inclusions have been noted in amphibole by Gorbatschev (1960) and have been interpreted as possible "exsolution" needles of titanite.

Uralitization of pyroxene is widespread and pleochroic greenish brown hastingsitic amphibole occurs as irregular patches throughout primary pyroxene. Fibrous, pale blu and faintly pleochroic actinolite replaces both primary pyroxene and secondary amphibole, beginning along crystal margins and proceeding inwards along fractures and cleavage planes. Both varieties of amphibole are deuteric. Subhedral, brown biotite flakes are commonly interstitial between the larger pyroxene crystals and also in irregular aggregate clusters with magnetite, apatite and titanite. The titanite may occur as discrete subhedral wedges or as an exsolution corona around magnetite, the latter being the product of sphenitization, commonly attributed to subsolidus oxidation (Carmichael and Nicholls, 1967).

Plagioclase, along with biotite, is interstitial to the pyroxene. Usually it is intensely saussuritized and sericitized, though faint albite twinning may still be discernable. Minor accessory phases include epidote, calcite, quartz, zircon, pyrite, and chalcopyrite. Pyroxene crystallized first followed by plagioclase and the primary accessory phases. In general, the clinopyroxenite unit is a hypidiomorphic-granular rock.

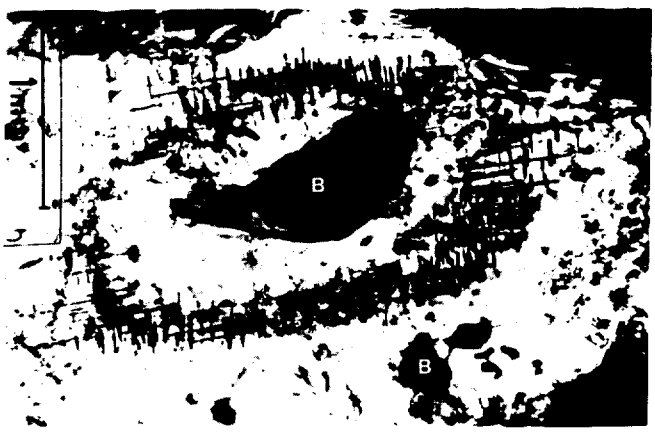


Figure 6. Acicular needles of titanite (?) encircling the core of clinopyroxene crystal, which also contains biotite inclusions (B).

Meladiorite

Mineralogically and texturally, meladiorite is very similar to the marginal clinopyroxenite unit, except that plagioclase is a significant phase (colour index(CI)=55±15). Pale green, unzoned pyroxene, ranging from diopside to salite in composition, is the dominant mafic silicate; brown biotite and uralitic amphibole are minor constituents. Pyroxene grains are equant, subhedral and range in size from 0.5 to 5.0 mm; actinolitic alteration along crystal faces is common. Tiny exsolution needles of titanite(?) similar to those in the clinopyroxenite also occur in this unit. Unzoned plagioclase (An_{30-34}) laths, 0.7 to 8.0 mm in length, are typically altered to sericite, calcite and epidote. In the foliated variants, these aligned laths are weaved, along with subhedral biotite, into foliation bands which wrap around and partially replace pyroxene, indicating a period of post-crystalline flattening.

Opaque minerals (predominantly magnetite) may account for up to 2% of the rock. Magnetite and apatite occur together in the foliated biotite bands. Minor sulphide phases are present and include chalcopyrite, bornite and covellite. These occur together in small, rounded composite grains. Under reflected light, brass-yellow chalcopyrite forms sharp, straight criss-crossing exsolution lamellae in a purple bornite host, producing a distinctive basketweave exsolution texture (Ramdohr, 1969). Along grain boundaries and fractures, both chalcopyrite and bornite are altered to blue covellite. Other minor phases in the meladiorite include potassium feldspar, quartz, calcite, epidote, and rutile. In the meladiorite unit, pyroxene and plagioclase crystallized simultaneously. The meladiorite is a hypidiomorphic-granular rock.

Hornblendite

Hornblendite shows wide diversity in textures and mineral proportions. Hornblende constitutes 50-70% of the rock with subordinate diopsidic pyroxene and green biotite. Equant, twinned, pleochroic crystals of greenish brown hornblende (3.0-15.0 mm diameter) become porphyritic in the coarser variants and possess mutually interfering grain boundaries (Fig. 7). Colourless secondary tremolite replaces the hornblende. Pale green, diopsidic pyroxene may constitute up to 30% of the rock. These grains are small (0.4-1.0 mm), subrounded and occur with saussuritized plagioclase, perthite, quartz and biotite in a hypidiomorphic groundmass. Late alteration of the mafic silicates to chlorite and calcite is minor; calcite veinlets and patches are found preferentially along cleavage planes in the hornblende. Accessory phases include titanite, zircon, rutile, pyrite, chalcopyrite and magnetite. In this rock, hornblende was the first liquidus phase followed by pyroxene and late feldspar. The rock texture varies from hiatal-porphyritic to hypidiomorphic-inequigranular.

Melamonzonite

Melamonzonite (CI=50±10) is distinctive by variable proportions of feldspar minerals and a wide diversity of mineral textures. Coarse to medium-grained plagioclase and perthite laths (0.4-6.0 mm long) are extensively saussuritized and sericitized. Ragged and sutured crystal margins are indicative of minor recrystallization, though foliation is absent. Mafic minerals tend to occur in 0.5 to 6.0 mm lenticular clots of near-equal proportions of pyroxene, amphibole and biotite. Larger, pale green diopsidic pyroxene (1.0-3.0 mm diameter) crystals are frequently uralitized and altered to greenish brown biotite to various degrees. Uralite pseudomorphs after pyroxene may subsequently undergo patchy alteration to pale blue, fibrous actinolite. Apatite is abundant as inclusions in biotite.

Titanite is a prominent accessory occurring as minute grains clustered around biotite and as late exsolution coronas mantling magnetite. The spatial association between ferromagnesian minerals, magnetite, apatite and titanite is strong and may result from immiscibility between coexisting Fe-rich and silica-rich liquids during the later stages of solidification of the syenitic melt (Philpotts, 1967; 1981). Feldspars crystallized simultaneously and in apparent equilibrium. They were closely followed by pyroxene which underwent later alteration to amphibole and biotite. Distribution of the accessory phases, magnetite and apatite, seem to indicate broadly coeval crystallization with the ferromagnesian minerals. Melamonzonite is a hypidiomorphic-granular rock.

Melasyenite

The predominance of perthitic alkali-feldspar over plagioclase is the main distinguishing feature of the melasyenite (CI=40±10). In most other respects, the melasyenite resembles the melamonzonite unit. Perthite crystals are typically twinned, subrounded laths ranging from 0.5 to 8.0 mm in length; perthitic intergrowths are of the vein and bleb varieties. This wide range in perthite crystal size is believed to have resulted from the movement of primary perthite laths in a viscous, partially crystallized syenitic magma or crystal-mush, producing substantial granulation of phenocryst edges. Sericitic alteration of perthite to white mica, epidote and calcite is widespread and strongest along fractures and zones of weakness. Plagioclase (An_{18}) is rare and usually saussuritized.



Figure 7. Crystals of hornblende (H) with mutually interfering grain boundaries. Hypidiomorphic groundmass of saussuritized plagioclase (P), clinopyroxene (C), and biotite (B).

Diopsidic pyroxene, brown biotite, uralitic amphibole, magnetite and apatite tend to occur in mafic clots (1.0-8.0 mm in diameter) interstitial to the larger perthite laths; this possibly resulting from liquid immiscibility as previously described (Fig. 8). Pyroxene is similar to that found in other units of the intrusion and may occasionally have inclusions of the tiny dark brown exsolution rods. Accessory phases include titanite and zircon. The paragenesis of this unit is comparable to the melamonzonite, with feldspar crystallizing first, followed by pyroxene and alteration products.

Alkali-feldspar syenite

Alkali-feldspar syenite (CI=20± 15) consists principally of subhedral, perthitic feldspar crystals (75-90%) which vary from fine to coarse grained. Exsolution intergrowths include vein, bleb, patch and interlocking varieties. Turbidity is heterogeneously distributed, being most intense along thin fractures. In some instances, sodic domains are sufficiently coarse to permit identification of albite twinning, and are more turbid than the potassic domains which display the characteristic grid-twinning of microcline. In the trachytic varieties of alkali-feldspar syenite, perthite grains have ragged crystal margins rimmed by a fine grained mosaic of polygonal albite and quartz. Where granulation of perthite crystal margins is minimal, only recrystallized films of clear albite are formed along the crystal margins. Plagioclase is rare but when present occurs as small sericitized masses, interstitial to the larger perthitic feldspar.

Equant, subhedral to euhedral, pyroxene crystals (0.3-10.0 mm in diameter) are slightly pleochroic and compositionally zoned, with bright green aegirine-augite rims and pale green diopside or salite cores (Fig. 9). Alteration of pyroxene is variable, with uralitic replacement most common. In more altered alkali-feldspar syenites, pale blue actinolite may completely pseudomorph pre-existing pyroxene. Less commonly, there is complete pseudomorphous replacement of pyroxene by very pale green tremolite. Amphibole is frequently retrograded to brown biotite containing minute rutile crystals(after titanite); biotite may also display incipient alteration to chlorite.

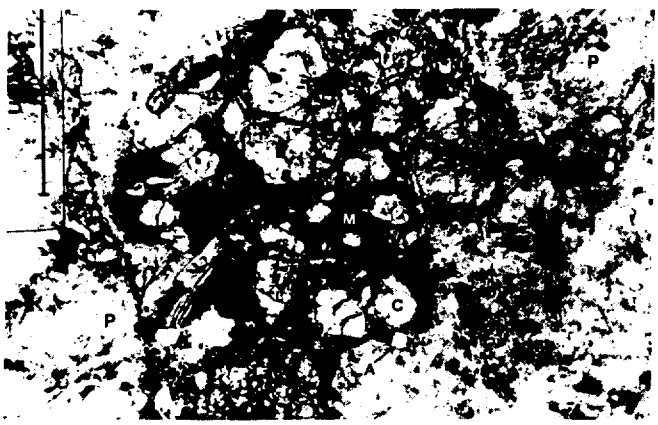


Figure 8. Clinopyroxene (C), uralitic amphibole (U), magnetite (M), and apatite (A) in mafic clots interstitial to perthitic feldspar (P).

Titanite is a prominent accessory in alkali-feldspar syenite and is of two distinct generations: 1) large (1.0-6.0 mm) euhedral, wedge-shaped crystals are an early primary phase, randomly distributed throughout the unit (Fig. 10), and 2) a much later generation forms coronas or partial coronas around anhedral magnetite grains, the result of subsolidus oxidation (sphenitization) of titaniferous magnetite. Other late alteration features include quartz-calcite and biotite-chlorite veinlets which preferentially replace feldspar and pyroxene along fractures and cleavages. Small anhedral sulphide masses composed of pyrite, chalcopyrite, bornite and covellite are present in trace amounts. Chalcopyrite, bornite and covellite occur together and display the same "basketweave" texture which was observed in the meladiorite unit. Perthitic feldspar crystallized first followed by pyroxene and its subsequent alteration products. The overall rock texture is hypidiomorphic-granular.

STRUCTURE

The northern periphery of the Murdock Creek intrusion is truncated by the east- trending Larder Lake fault. This dips to the south at about 60° (Thomson, 1950) and delineates



Figure 9. Zoned clinopyroxene with aegirine-augite rims (A) and diopside-salite cores (DS), surrounded by turbid perthitic feldspar.



Figure 10. Euhedral crystals of primary titanite in turbid perthitic feldspar.

the southern boundary of the Kirkland Lake-Larder Lake fault zone. Along the fault and extending approximately 100-200 m out on either side is a zone of intense carbonatization overprinting both the syenitic rock and sedimentary units of the Timiskaming Group. Calcite and dolomite are the principal carbonate minerals. Shearing and mylonitization may be so intense that recognition of the protolith is impossible. Later periods of brittle deformation lead to the development of quartz veins throughout the carbonated rock (Fig. 11).

A previously unrecognized fault has been identified trending in an easterly direction along the southern edge of the pluton at the intrusive contact with basalts of the Larder Lake Group. This is a zone of weakness due the difference in mechanical competency between the two lithologies and would thus localize any faulting due to changes in the regional stress regime. The east-trending southern fault, informally referred to as the "Highway 112 fault", is a complex mylonitic and cataclastic brecciated zone outlined by green carbonatized (fuchsite-bearing) rocks. Several north-trending post-ore faults, later than the east-west shear zones, may record significant lateral and vertical displacement (Thomson, 1950).



Figure 11. Quartz veins cutting intensely sheared and carbonated rock.



Figure 12. Fragmented feldspar (F) and fibrous reibeckitic amphibole (A) define a protoclastic texture, produced during minor shearing and alteration of alkali-feldspar syenite.

Within the alkali-feldspar syenite core of the intrusion there are numerous small shear zones, several metres wide, associated with alkali-feldspar syenite pegmatite dykes. Shearing produced a protoclastic texture, where intensely reddened feldspars are fragmented and blue reibeckitic amphibole replace the earlier mafic silicates (Fig. 12). The occurrence of the shears exclusively within the alkali-feldspar syenite, in association with alkali amphibole and pegmatite, suggests that they acted as pressure-release conduits along which late-magmatic, volatile-rich fluids were forcefully expelled during the final stages of magma solidification. In the alteration zones adjacent to the major faults, alkali-feldspar syenite commonly contains numerous thin and parallel (0.5-2.0 mm wide) cleavage surfaces or slip shears coated with dark green chlorite. These are interpreted as pressure-solution surfaces related to local stresses during faulting (Fig. 13).

METAMORPHISM

Volcanic rocks in the Kirkland Lake area underwent regional burial metamorphism to prehnite-pumpellyite grade at pressures of about 1 kb according to Jolly (1974). Subsequent overprinting of the regional metamorphism is common where plutonic bodies have intruded into the supracrustal rocks generating contact aureoles of variable size and grade. However, unlike several other syenitic intrusions in the area (Otto stock, Lebel stock), the Murdock Creek intrusion has not generated a significant metamorphic aureole or fine grained chill-margin.

EVIDENCE OF MAGMATIC OXIDATION IN THE MURDOCK CREEK INTRUSION

In the introduction it was briefly noted that Cameron and Hattori (1987) identified the ore fluids at Kirkland Lake as being relatively oxidized, since they contained a significant proportion of their total S content as sulphate. A number of smaller deposits in the Timmins-Kirkland Lake area were also shown to have been derived from oxidized fluids, as well as major deposits, such as Hemlo, Ontario, and



Figure 13. Alkali-feldspar syenite with thin, parallel cleavage surfaces or slip shears (S) marked by dark green chlorite.

Kalgoorlie, Australia. There are only two realistic sources for these fluids: oxidized felsic magmas (Cameron and Hattori, 1987) and fluids derived during oxidative metamorphism of the lower crust (Cameron, 1988). For the Kirkland Lake camp the close spatial relationship between syenitic intrusions and gold suggests that this association be tested. There are presently no data to precisely identify the temporal relationship between the intrusions and the gold. Since the veins cut the syenites, they clearly post-date the exposed portions of these intrusions. However, whether there was a sufficiently long interval to exclude the syenite magma as a source for the gold is unknown. To obtain more precise geochronological information is one of the objectives of this project.

Oxidized fluids of magmatic origin must have equilibrated with a similarly oxidized magma. Petrographic evidence from the Murdock Creek intrusion suggests that oxidizing conditions prevailed during the crystallization of some of the rock units. Evidence of this includes, Mg-rich clinopyroxene, abundant primary titanite, and the predominance of magnetite over ilmenite. Alkali-feldspar, which is intensely reddened by hematite, reflects postmagmatic oxidation, possibly inherited from the late magmatic stage. Mg-enrichment in pyroxene indicates oxidizing conditions during crystallization, when Fe, as Fe^{2+} and Fe^{3+} partitioned into magnetite. Under these conditions, Mg^{2+} substitutes for Fe^{2+} in pyroxene (Czamanske and Wones, 1973). Verhoogen (1962) showed that primary titanite required relatively oxidizing conditions for its formation and Carmichael and Nicholls (1967) calculated limits in f_{O_2}-temperature space. Cameron and Carrigan (1987) noted the abundance of primary titanite in various felsic intrusions spatially associated with gold mineralization in the Abitibi belt. The dominance of magnetite over ilmenite has been used by Chappell and White (1974) and Ishihara (1977) to separate the more "oxidized" I-type (magnetite series) granitoids from the "reduced" S-type (ilmenite series). All rock types from Murdock Creek contain magnetite but lack ilmenite, and thus broadly correspond to the oxidized I-type granitoids. Finally, the presence of turbid red feldspar in most of the units may indicate that oxidizing conditions were maintained throughout the crystallization of the intrusion and continued into the postmagmatic stage, when late, oxidizing fluids produced the turbidity in the feldspars. The red colouration is due to the presence of finely divided hematite flakes lining the walls of fluid inclusions in the alkali-feldspar. This hematite results from the dissolution of nearby ferromagnesian minerals (Boone, 1969).

These preliminary observations of magmatic oxidation will be followed by estimation of the oxygen fugacity during the different stages of magmatic crystallization.

SUMMARY

The continuous compositional spectrum shown by the units forming the Murdock Creek intrusion, along with the gradational nature of thus contacts, indicate that the platon formed from a single pulse of relatively anhydrous and oxidized syenitic magma which crystallized and differentiated in situ. Internal dykes related to the specific plutonic units and observed flow foliations suggest that movement of magma continued after the earlier units had solidified. The lack of miarolitic cavities and porphyritic textures suggest that early and rapid vesiculation of the melt did not occur. Furthermore, the absence of either a distinct contact aureole or a peripheral cataclastic zone produced during plutonic emplacement indicates that intrusion occurred at mesozonal depths. Late reactivations of the Larder Lake and Highway 112 faults has resulted in post-emplacement shearing and alteration along the northern and southern margins of the intrusion. The near total absence of modal quartz or feldpathoid minerals indicates that the magma(s) were silica saturated. The minor exposure of the mafic margin of the intrusion indicates that the bulk of the magma was relatively felsic.

The crystallization sequence in the melanocratic Murdock Creek rocks is clinopyroxene (salite or diopside), apatite, titanite, plagioclase (andesine to oligoclase) and alkali-feldspar. An exception to this sequence is the hornblendite where igneous hornblende precedes clinopyroxene. However, in the felsic rocks, the sequence is reversed with alkali-feldspar being the first liquidus phase followed by plagioclase, clinopyroxene, apatite and titanite. Magnetite is both a late and an early crystallizing mineral. It is preferentially associated with apatite and the ferromagnesian minerals, suggesting that an immiscible Fe-oxide-phosphate liquid may have separated during crystallization of the magma. Zircon is an accessory in the more felsic rock types. Amphibole (except in hornblendite), some titanite, and biotite are secondary reaction products around clinopyroxene and magnetite, related to deuteric effects rather than to later prograde metamorphism.

Petrographic evidence and preliminary electron microprobe analyses of the ferromagnesian silicates indicate that some of the plutonic units from the Murdock Creek intrusion crystallized under relatively oxidizing conditions. Turbid red feldspars reflect postmagmatic oxidation which may be inherited from the late-magmatic stage.

Ongoing research includes a detailed study of the mineral chemistry and the whole rock geochemistry which characterizes the individual rock types. In addition, U-Pb zircon, titanite and rutile radiometric age determinations of the extensive alkali-feldspar syenite and an adjacent carbonated and sheared melasyenite hosting hydrothermal gold mineralization is underway to establish the relationship between emplacement of the Murdock Creek intrusion and gold mineralization in the Kirkland Lake camp.

ACKNOWLEDGMENTS

We are grateful to Mike Dyment and Jocelyn Kidston for pointing out several interesting field exposures in the Kirkland Lake area. Bob Garrett and Keiko Hattori kindly reviewed the manuscript.

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ANNEX "H-1"

MULLIGAN PROPERTY

Otto township

At the written request of Mrs. Agnes Mulligan, 135 Deleware Avenue, Toronto, (following an interview with the Deputy Minister of Mines), an examination of her property was made on June 28, 1950. Mrs. Mulligan had been told that a vein of pitchblende occurred on her claim.

PROPERTY

The property consists of one patented claim (P-15871) which occupies the SE $\frac{1}{4}$ of the N $\frac{1}{2}$ of Lot 4, Con. VI Otto township.

ACCESS

No. 11 Highway crosses the Ontario Northland Railway by means of a high-level bridge 500 ft. west of the No. 4 Post of claim P-15871. The bridge is about 2 miles southeast from the junction of No. 11 and No. 66 Highways, and 3 miles by road from Swastika. The railway, trending southeast, enters the claim about 400 ft. south of the No. 4 Post and crosses the south boundary of the claim about 800 ft. east of the No. 3 Post.

GENERAL GEOLOGY

In his report entitled "The Swastika Gold Area" Twenty-first Annual Report, Bureau of Mines, 1912, E. L. Bruce described the geology of Otto township.

Keewatin greenstones and their schistose derivatives extend in a broad belt across concessions V and VI, Otto township. The remainder of the township is occupied by part of a large granite batholith which underlies a wide area to the south. In the northeast corner of the township massive greenstones grade to the southwest into rocks of schistose character. The schistosity becomes more pronounced near the contact with the later acid intrusives. The strike of the schists is usually parallel to the strike

of the contact. The schist contains irregular lenses of massive greenstone and occasional bands of tuff and iron formation which conform to the strike and dip of the schistosity.

LOCAL GEOLOGY

The claim examined (P-15871), which is the SE ¼ of the N ½ of Lot 4, Con. VI, Otto township, is located in the schist zone about ¼ mile north of the granite-schist contact which strikes in a southeasterly direction across the S ½ of the Lot.

The railway rock-cut described by Mrs. Mulligan as lying between the R. R. bridge over Murdock Creek to the north and a trestle fill to the south is not on her claim (P-15871). It occurs in the south half of the claim to the north west (P-16442) where No. 11 Highway crosses the railway.

The rock exposed in this railway cut is part of a band of fine grained schisted rusty black tuff (Specimens 1, 2, 3) which strikes southeast and is exposed again in the southeast quarter of Mrs. Mulligan's claim. A lense of coarser grained black tuff conforming to the schistosity occurs underneath the bridge where it is exposed for 30 ft. in the south wall and three ft. in the north wall. The strike of the schistosity is S 66° E and the dip 75° SW. This lense contains finely disseminated pyrrhotite and coarser pyrite crystals. It is probably the "vein near the south end" mentioned by Mrs. Mulligan. (Specimens 4 and 5). E. L. Bruce describes this rockcut in his report on "The Swastika Gold Area" as follows:

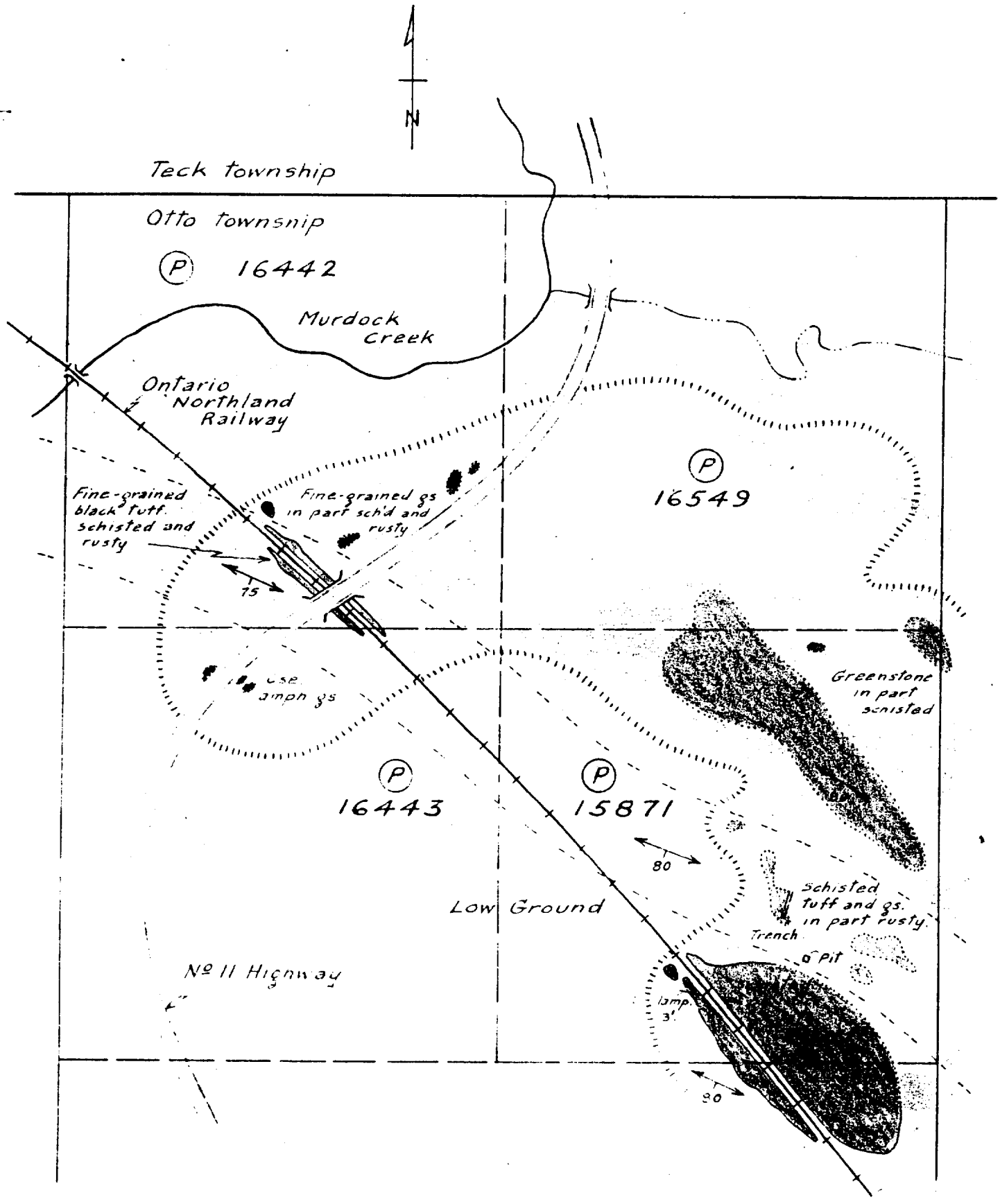
"At mileage 162 on the Temiskaming and Northern Ontario railway there is a cutting through a very dense basaltic looking rock that carries many small lenses of sulphides. Under the microscope the rock shows grains of quartz and a dark sooty material. The rock suggests a baked bituminous shale."

A second railway rockcut straddles the south boundary of Mrs. Mulligan's claim (P-15871). Here the rock is a schisted greenstone containing occasional rusty streaks and small lamprophyre dikes conforming to the schistosity. The strike of the schistosity averages about S 70° E at the north end and S 60° E at the south end, with a steep dip to the southwest. North of this outcrop scattered outcrops of the rusty tuff band, containing lenses of schisted greenstone, can be seen in lower ground and several old overgrown trenches and pits indicate former work, (Specimens 6, 7, 8). To the north of the tuff band there is a ridge of greenstone, in part schisted, which trends NW - SE across the northeast quarter of the claim. (See sketch).

A careful examination of both the above-mentioned rockcuts was made with the Geiger Counter. No evidence of radioactivity was registered by the instrument.

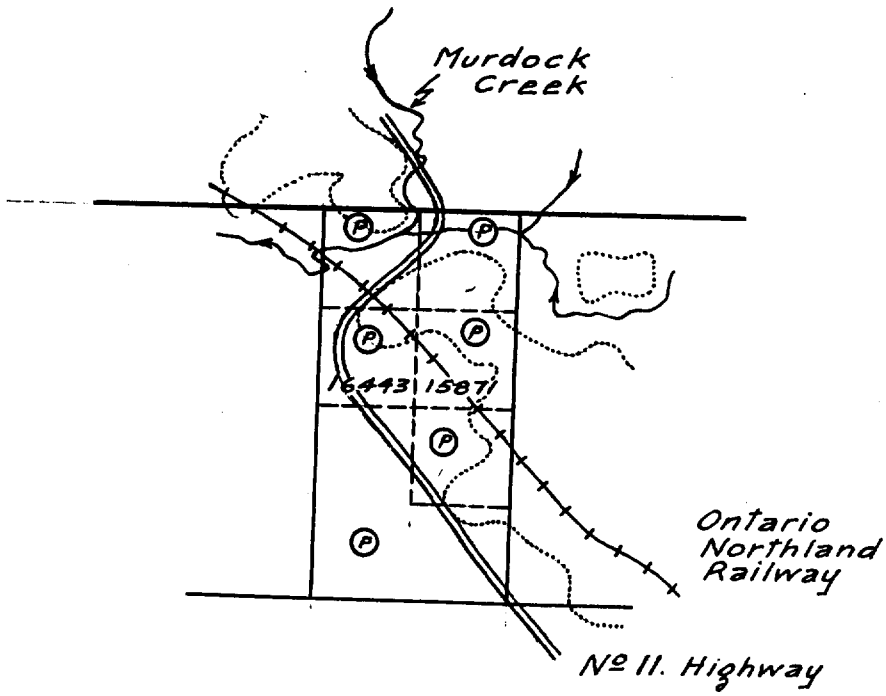
July 10th, 1950

W. S. Savage,
Resident Geologist.



NORTH HALF of LOT 4
CONCESSION 6
OTTO TOWNSHIP
Scale 1" = 400'

June. 1950.
WHS.


Murdock
Creek
16443 15871
Ontario
Northland
Railway
Nº 11. Highway

ANNEX "H-2"

and Address	Wm. S. Harrison — Dane
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ANNEX
"H-3"
"H-3A"

Summary

37th Annual Report

Ontario Department of Mines

Volume 37, Part 2, 1928

KIRKLAND LAKE GOLD AREA
(central zone and vicinity)

by E. W. Todd

This summary will attempt to uncover details of a 160 page report which could provide information re: a group of claims located in the southern portion of the Township of Teck.

Pages 8-13 involved statistics and information about power; page 109 gave us an equipment list, etc..

Pages 1 - 4 give us location, acknowledgements and bibliography and previous work and history. In Swastika, gold occurred in quartz veinlets traversing reddish feldspar porphyry. Tough-Oakes claims have gold in porphyry and conglomerate.

A number of promising veins are discovered including the Hunton property.

Difficulties are encountered in correlating the information obtained underground with that on surface. Certain gaps are discovered in the surface maps. Unfortunately, maps deal with a vey small part of the Kirkland Lake area: ore zone and immediate vicinity.

On page 14, the chapter on general geology reports that the rocks are pre-Cambrian with the oldest as Keewatin (metamorphosed lavas and diabase with iron formation and volcanic tuffs = Boston Creek ores). The productive veins (younger than Keewatin) are found in rocks consisting mainly of Timiskamian sediments and intrusive masses of syenitic type. The synclinal structure (Matachewan - Larder Lake - Cadillac) marked by the sedimentary formations where discoveries of gold ore have been made, is considered as good ground in which to prospect. At Kirkland Lake the sedimentary band is about 2-miles in width and strikes E. 30

degrees N. The sequence North to South across the syncline, according E. W. Todd in the central part of Teck Township:

basal conglomerate and greywacke

volcanic sediments (altered dark-grey to red tuff with water-lain vocanic ash)

conglomerate and greywacke

volcanic sediments

conglomerate and greywacke

Following the Timiskamian period there was a great invasion of granitic rocks of various types (Algoman), which caused much folding and faulting in pre-existing formations explains E. W. Todd. The continued pressure produced large faults allowing deep-seated solutions to enter and form the ore bodies of the Kirkland Lake camp.

One of these faults (Murdock Creek) has a stock-like mass of granite and syenite along one side and on the east side of the creek the rock becomes a grey fedspar porphyry.

The rocks of the Kirkland Lake camp were also influenced by intrusive rocks: basic syenite and acid syenite; these are furthur described by Burrows and Hopkins. Adjacent to the productive zone the basic rock occurs in greatest abundance in the western end of the camp says E. W. Todd. The surface exposures occur in the form of wide dikes cutting the sediments approximately parallel to the strike of their beds, commonly described as "lamprophyre" in Kirkland Lake (or "shonkinite" in Montana). Underground development shows that the basic rock occurs in the form of a boss of considerable size.

Three important diabase dikes extending in a northerly direction have each a different relationship to the veins and fault structures.

STRUCTURE

Re: The Kirkland Lake Main Break

Pressure associated with the invasion of a batholith of Algoman granite caused the folding of the Timiskamian series and the Keewatin on a general east-west line and thus produced the synclinal structure of Kirkland Lake; along lines of weakness and roughly parallel to the folds, diabase with porphyry and syenitic rock were injected. Pressure release produced a series of overthrust faults; deep-seated mineral solutions began to circulate through some of the fractures over a period of time; the last expression of movement was a series of north-south tension faults which followed the period of ore deposition.

FOLDING

The occurrence of two main bands of sediments of volcanic origin (one adjacent to the ore zone and the other about three-quarters of a mile to the south through Kirkland Hunton Mine, T. 16621) may be accounted for by folding says E. W. Todd.

SHEARING

Some shearing is found along the margins of the belt. There is very little evidence of regional shearing surrounding the ore zone.

INTRUSION OF THE SYENITIC ROCKS

The folding of the Timiskamian produced a line of structural weakness in which intruded many narrow dikes of both basic syenite and porphyry.

MINERALIZED FAULTED ZONES

The faults of most economic interest are those which were formed after the intrusive rocks had solidified; the ore-bearing

veins occur along some of these breaks. The "main break" of Kirkland Lake is one of a number of parallel faults belonging to one system.

THE MAIN BREAK

The veins at Kirkland Lake are bodies of secondary minerals filling fractures and partly replacing the country rock along a faulted zone. The principal faults follow a straight line striking about N. 65 degrees E.; along this line the producing mines are strung out over an area about 2-miles long. Changes in the strike of the veins are due to offsets caused by a system of north-south faults that displace the veins. There are several productive veins in the faulted zone, but the ore is associated with a north fault.

THE NORTH VEIN FAULT

The north side of the north-vein fault is marked by a conglomerate and igneous rock on the south side. The contact cuts across the of porphyry dikes; this is evidence of faulting. Also, the subdivision of the sediments into conglomerate and tuff provides a marker of vertical displacement.

THE SOUTH VEIN FAULT

This fault weakens in the Teck-Hughes when it strikes the large mass of basic rock. Conglomerate rocks between the veins represent a marker.

RELATION OF VEINS TO FAULTS

The productive veins lie along the planes of the faults and they cut across all of the important rock formations. These faults

provide openings in the rocks where vein solutions can penatrate in sufficient quantity to form commercial ore bodies. In many subsidiary fractures commercial ore bodies can be found. Also, more brittle rocks, such as porphyry and acid syenite tend to form brecciated zones surrounding faults; these rocks provide most favourable conditions for ore deposition in quantity.

EAST-WEST FAULTS PARALLEL TO THE MAIN BREAK

Two east-west faults located to the south parallel the " main break" and one to the north. One east-west fault passes through the Hunton mine.

CROSS-FAULTS

Existing maps of the surface indicate faulting at Amikougami creek to the north.

Another small fault with a displacement of 80 feet passes into the southwest bay of Kirkland Lake.

Another cross-fault extends along the Goodfish road through the western part of Wright-Hargreaves and across the Lake Shore, east of the shaft. (see map 32e) This cross-fault is seen to displace the conglomerate-Keewatin contact occurring along Goodfish road, and to the south on the opposite side of the sedimentary belt, it produces a similar jog in the contact between conglomerate and syenite.

The easternmost cross-fault of major proprtions encountered in the mine workings occurs in the Tough-Oakes Burnside porperty along the plane of narrow basic dike.

"FLAT" FAULTS

The flat-dipping faults are occasionally found, usually with small displacement.

POST-ORE FAULTS

The system of intersecting cross-faults appears to have resulted from tangential strain acting under tension from south to north on the east end of the camp says E. W. Todd.

VEIN STRUCTURES AND ORE DEPOSITS

Veins are related to fissuring produced by fault movements. Mineral-bearing solutions replaced the country rock. Alteration and replacement are confined to the fissures. In general, the veins consist of sheared and brecciated rocks partially replaced by secondary minerals such as quartz carbonates, sericite, and chlorite. The gold accompanied by the tellurides and sulphides occur in streaks and minute fractures in the masses of secondary minerals.

PROPERTIES

The Teck-Hughes-Gold-Mines-Limited property has as its principal rocks exposed on its northern section, identified as conglomerate, lamprophyric and tuff; there are also some masses of porphyry of fairly large dimensions. On claims 6,813-17 the rocks consist principally of granitic types of syenite and porphyry. Pages 104, 105 and 107 provide us with geological plans of the Teck-Hughes Mine.

The South Fault Structure is indicated on page 111.

The Lake-Shore property lies entirely beneath the lake.

On the Wright-Hargreaves property the 1911 discovery was made on the south vein where the gold was associated with quartz veinlets enclosed in porphyry. Some short shoots of rich ore were uncovered.

On the Sylvanite property a number of narrow quartz veins were found in the porphyry outcrops around the north boundary of L. 2,100. Visible gold occurred in some of these structures. The principal veins are enclosed in a large mass of porphyry. Also, a

north series of veins are in contact with bands of sediments which are included in the porphyry mass on its northern margin.

On the Tough-Oakes Burnside property gold-bearing ore shoots were found in a belt of porphyry and conglomerate. Also, a lamprophyre is intruded by the porphyry.

On the Kirkland Hunton Mines (claims 16,621 and 16,620 located a mile southwest of Kirkland Lake) a porphyry dike intrudes sedimentary rocks near the line between the claims. A shaft was sunk to a depth of 40 feet in the sediment with the porphyry on the north wall. mineralization is reported to extend to the bottom of the shaft, while visible gold was encountered down to about 30 feet. The porphyry and quartz along the rich streak carry abundant iron pyrites. This mineralization is adjacent to a fault plane that strikes in the same direction as the vein.

On the Kirkland Townsite Gold Mines property, rocks exposed underground are dominantly Timiskaming sediments intruded by bands of massive feldspar porphyry. The rocks exposed on the surface consist of massive conglomerate, which is penetrated by several eatward-trending porphyry dikes.

On the Federal Kirkland Mines property the rocks consist of tuff, conglomerate, lamprophyre, and basic syenite intruded by an eastward-trending mass of porphyry containing quartz phenocrysts about 400 feet wide.

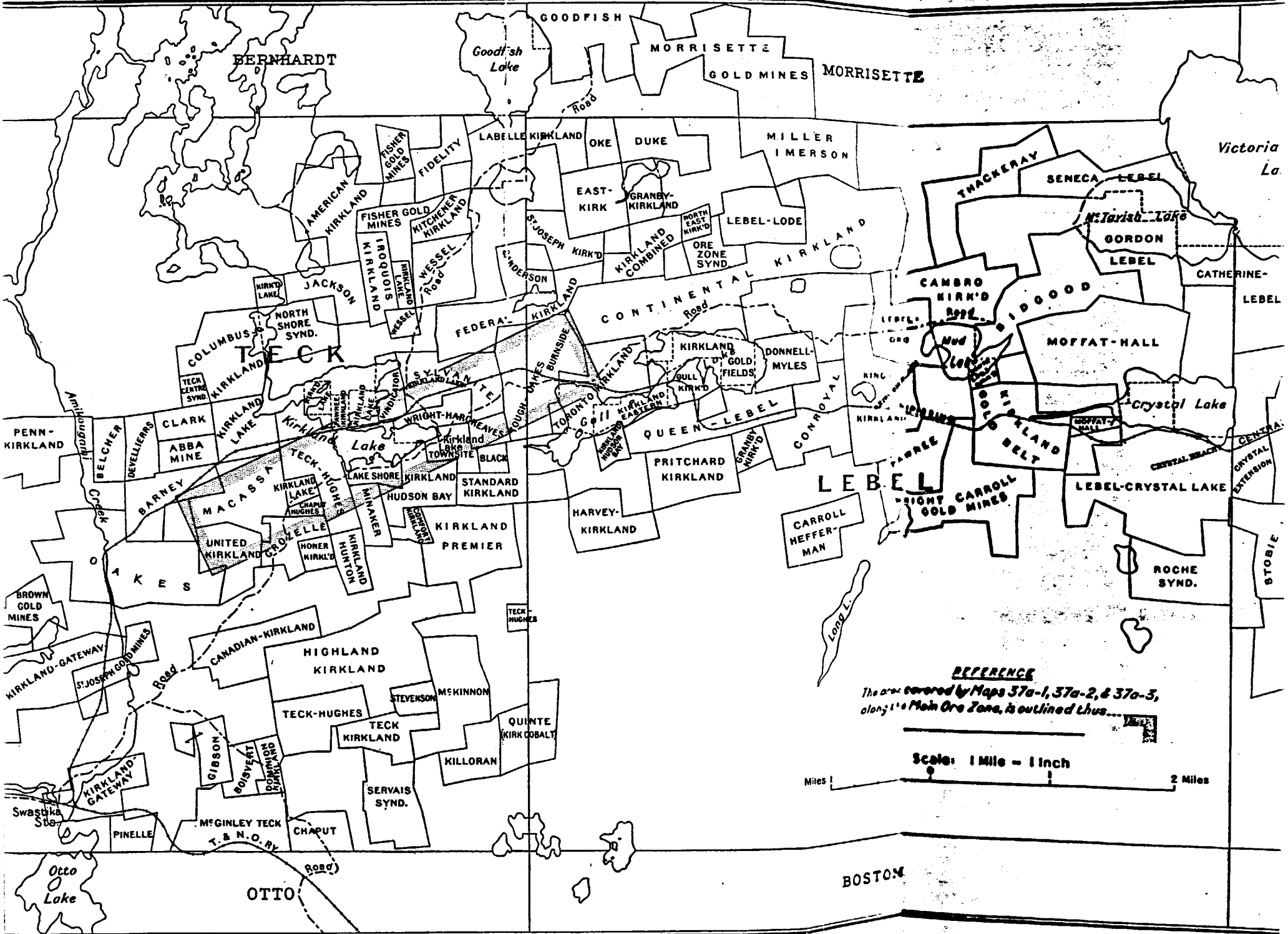
Figure 22 indicates a probable fault near a creek on claim L. 6527 identified as Federal Kirkland Mines.

On the Kirkland Premier Mines property (Hurd Claims) (Kirkland Rand) (Ontario Kirkland Gold Mines), 3/4 of mile south of Wright-Hargreaves, (optioned to the La Rose Mines in 1917) vein structures in the altered sediments and porphyry. Several strong faults were found to displace the veins. The rocks consist of schistose conglomerate and greywacke, which have been intruded by typical reddish feldspar porphyry.

In 1921 this mine ceased operations and was taken over by the Montreal Kirkland and was to be known as the Montreal-Ontario. A highly silicified gold-bearing zone in porphyry was found. The ore consists of fractured red feldspar porphyry with numerous quartz veinlets and much coarse-grained copper pyrites and smaller quantities of iron pyrites, molybdenite, and gold.

On the Goodfish Gold Mines (including eight claims from the Providence Gold Mines, Limited) the rocks consist of massive

Keewatin basic lavas and intrusive dikes and masses of porphyry containing quartz phenocrysts. The main vein has narrow quartz stringers containing pyrite and molybdenite associated with gold. Also, along the heavy fractured zone, narrow lenticular masses of quartz carry low grade material.



MAP SHOWING OUTLINES OF OPERTIES, KIRKL

George A. Gray
Mining Engineer

ANNEX
"H-4"

17 Morton St.
Malone, N. Y.
Apr. 24, 1937

Mr. S. J. Blaugrund,
113 Arcade Building,
Utica, N. Y.

Dear Mr. Blaugrund: Re: Kirkland Lake Mining Claims.

Kindly excuse delay in answering your request for an opinion on the mining claims you have recently acquired in the Kirkland Lake section in Ontario. I have been laid up for the past few days with ear trouble.

In order to give you a complete report on the immediate economic possibilities of these claims it will be necessary to examine each claim in detail. That will mean a trip to the North Country, spend considerable time on location, and map all geological features such as outcrops, veins and other things of interest. The snow should be off the surface in the next ten days.

In looking over the map you have given me I note that you have acquired seven claims in all, situated in the Township of Teck, which is the main producing section of Kirkland Lake. These claims I notice are scattered at intervals throughout the Township, one being tied on to the North boundary of the Township, three a short distance North and West of the Lake Shore and Kirkland Lake Gold Mines, and Three tied on the South boundary of the Township and only a short distance from the railroad station at Swastika.

As I am familiar with the Kirkland Lake Camp I can give you now in a general way the main points of interest that these claims possess. Claim #3655 on the North boundary of the Township is located in what is commonly called the Goodfish Lake Section where considerable free gold has been found and some shallow mining has been done by the Goodfish Gold Mining Co. The claim therefore has potential possibilities on location alone. I also understand that considerable money was spent on this claim in the early days of the camp.

In the near center of the Township are claims #8733, #2966 and $3967, the last two being in a line. From my knowledge these claims are slightly North of the main producing break, but not so far that they can be called outside the zone of possible economic development in the future.

The remaining three claims, #6855, #16527 and #16528 have also good location. They lie East of the original Kirkland Lake producer, the Swastika Mine, known in the early days as the Lucky Cross Mine. This mine produced considerable gold of a spect-

acular sort; and adjoining the Lucky Cross is the Golden Gate Mine which I believe is active again.

In summing the general possibilities of these claims I think you have done well in acquiring ownership. They are so situated that you should be able to dispose or otherwise work them on your own behalf to good advantage. Surrounded as they are by incorporated mining companies and wealthy claim owners who have seen fit to retain their holdings through all these years I can see where you can turn any one or more of your group to the interests I mention at a good profit to yourself. Public enthusiasm for Kirkland Lake is high at the present time and outside capital is bound to come in to develop all favourable located mining claims.

Yours very truly,

George A. Gray.

MINE REPORTS AND SERVICE COMPANY

P. O. Box 241

Sudbury - Ontario

May 4th, 1937.

Mr. Samuel J. Blaugrund
113 Arcade Building,
Utica, New York

Dear Mr. Blaugrund:

It is our pleasure to submit the following report based in information available at the present time.

For your convenience, it has been subdivided under the following five headings.

1. DESCRIPTION OF PROPERTY

Your property consists of seven claims located in the Township of Teck, in the Province of Ontario and in the Dominion of Canada.

This Township, unlike most Townships in the foresaid Province is not subdivided into lots and concessions. It is, therefore, necessary to designate your claims by number instead of being part of a certain lot in a certain concession, said numbers being L-6955, L-2966, L-2967, L-3655, L-8733, 16527 and 16528. These claims are recorded in the office of the Larder Lake Mining Division of the Ontario Department of Mines at Swastika, Ontario, Canada.

2. GEOLOGY

All your claims are situated in an area from which very favorable gold assays can be expected.

The Geological Formation of this area belongs to the Lower Pre-Cambrian or Keewatin Era and is the one in which all major gold discoveries have been made.

This Keewatin formation consists of Greenstone with igneous intrusions of Porphyry which generally carry quite good deposits of gold.

Added to this is the proximity of two other formations carrying Quartzite, Conglomerate, Granite and Gneiss which form faults or depositions at their contacts with the older Keewatin formation. These faults or depositions often occur at the weakest point in the formation which is generally along a mineralized vein. Thus gold is often found along these contacts.

There is such an occurrence on your claim #16527 which showed an extremely strong gold mineralization.

3. WORK PERFORMED

All necessary assessment work has been completed on these claims and your claims are fully patented and have the taxes paid for the year 1937.

Extensive work was performed on #3655 in the Northeastern part of the township and with a little further expenditure would possibly open up a promising deposit.

Results obtained from work done on Nos. 6955, 16527 and 16528 show there are great possibilities of developing these claims into a successful gold mine.

These claims are extremely favorably located, not only from a geological point of view, but also as regards transportation and necessary natural resources.

The Temiskaming and Northern Ontario Railway crosses two of these claims and water, timber, and electric power are easily available making for reduced development and mining costs.

Your other three claims lie within a mile of the strike on which the major mines in this township are situated. The Hydro power line is only one-quarter of a mile distant from these claims.

4. POWER, WATER, TIMBER AND TRANSPORTATION

This area is now very efficiently served with Hydro Power. Power lines pass from within 16 chains (1056') at the nearest point to 110 chains (7260') at the farthest point of your properties.

While electric power costs depend on the individual contracts, it is being delivered in some mining areas for twenty dollars per horse power year.

Water is very abundant throughout this district and there is always sufficient water on the property for mining, milling and community purposes.

All necessary timber for construction and mining needs is quite handy on the property.

Transportation may be by rail, highway or air. The T. & N. O. Ry. passes through two of your claims and the Swastika-Toronto highway about 600 ft. northeast of No. 16528. It is approximately 380 miles to Toronto on this highway.

Air lines have planes serving this district and the many small lakes provide suitable landing places.

5. NEIGHBOURING MINES

The major mines in the district are all gold propositions and are as follows:

Kirkland Lake Gold Mining Company, Ltd.
Teck-Hughes Gold Mines Ltd.
Sylvanite Gold Mines Ltd.
Toburn Gold Mines, Ltd.
Wright-Hargreaves Mines, Ltd.
Macassa Mines, Ltd.
Lake Shore Mines, Ltd.

There are also quite a number of prospects rapidly approaching the production state.

The average output of the mines in the Kirkland Lake Area for the last six years has been over $20,000,000 per annum based on gold values at $20.67 per ounce.

Very truly yours,

MINE REPORTS & SERVICE COMPANY
P. O. Box 241, Sudbury, Ontario.

Lake Shore Mines,
Kirkland Lake, Ontario
October 4, 1937.

Samuel J. Blaugrund, Esq.,
Utica,
New York.

Dear Sir:

I wish to present herewith my report on your property located in the township of Teck embodying data collected by me during an examination of the property on September 22, 25, 26, 28, and 30.

Respectfully Submitted,
Geo. C. Seaborn
Consulting Engineer.

THE SAMUEL J. BLAUGRUND MINING PROPERTIES

Teck Township

Acting upon instructions received from Samuel J. Blaugrund of Utica, New York on September 21, I have made an examination of the seven claims located in Teck Township for the purpose of presenting a preliminary report and advising as to future development. The field work was done on September 22, 25, 26, 28 and 30th.

The preliminary survey was carried out by examining old workings where possible and by a geological examination of the rock outcrops.

Location

The property owned by Samuel J. Blaugrund consists of Seven patented mining claims, consisting of approximately 230 acres, located in the Township of Teck. Three claims are in the south part of the township on the boundary between Teck and Otto Townships. Three others are in the north central part of the township just north of the large producers and the remaining claim is on the Northern boundary of Teck Township.

These claims are numbered 3655, 8733, 2966, 2967, 6955, 16527 and 16528, and are so recorded in the Larder Lake Mining Division of the District of Temiskaming, in the Province of Ontario.

Accessibility

Claim #3655 may be reached in a ten minute walk from the Kirana Mine which is a fifteen minute drive from Kirkland Lake.

Claims #8733, 2966, and 2967 may be reached by trail in fifteen minutes from the Teck Hughes Mine.

Claims #6955, 16527 and 16528 which are in the south part of the township may be reached from the Ferguson Highway which cuts across the corner of the property.

The location of these claims make them all readily accessible from the town of Kirkland Lake. The accompanying sketch map shows the location of the group and the roads leading to them.

Surface Exploration

It has been quite a few years since any surface exploration has been done on these claims and therefore, with a couple of exceptions, the old trenches and pits were filled in and it was impossible to ascertain the extent of previous work.

From certain conversations I had with men who had previously worked there considerable work had been done on the claims in the south and the one in the north.

Apparently the earlier work was halted due to lack of proper finances.

General Geology.

Claim #3655

This claim is part of the old Shannon Gold Mines and is located in the area known as the Goodfish district three miles north of Kirkland Lake. The rocks here are mainly greenstones, which term applys to all the old Keewatin formations. Feldspar Porphyry intrusives occur throughout the greenstones on surface outcrops. The country around this district is strongly sheared and there are a number of vein systems opened up on adjoining properties.

Claims #8733, 2966 and 2967

A detailed report of the general geology of this district will be found in the report of the Ontario Department of Mines. Vol XXXVII, Part 2, 1928.

The rocks through this area conform to those just north of the "main break" of the Kirkland Lake Area. They are Keewatin in age and consist of highly altered lavas and diabase, green schists, and rusty iron formations.

Claims #6955, 16527 and 16528.

These claims are part of the old McGinley Gold Mines and are situated in what is known as the Swastika mining area. Here again the predominate rocks are Keewatin greenstones through which are intruded acid intrusives of a later age. These acid intrusives are responsible for any ore deposition and are important features to be located. These intrusives include feldspar porphyries, syenite, and quartz porphries.

A detailed report on the geology of the Swastika area will be found in the following reports of the Ontario Bureau of Mines; Vol. XXI, Part I, 1912, pp. 256-65
Vol. XXIII, Part 2, 1914, pp. 1-32.

Ore Structures

A number of quartz veins were noted on claims #16527 and #16528. Grab samples taken from old trenches on these veins all returned low values in gold. It must be noted that if these trenches were opened up there would be a much better chance of obtaining a more general sample. There is a definite shear zone on these claims which, if properly developed, might lead to interesting values being obtained.

On claim #2967 in the central group a definite shear was also noted. The mineralization throughout both these shears is pyrite, finely disseminated and in small lenses. The strike of these zones is east and west which conforms to the general trend of the area. Due to the small amount of work done it was impossible to determine the dip.

Other possible ore structures will undoubtedly be uncovered as the work progresses on these claims as they have on adjoining properties.

Camp Facilities

At the present time there are no camp buildings on the property. Excellent sites exist on all three groups for the location of camp buildings to carry on future development. There is a sufficient water supply on hand to meet all camp needs. Creeks running through the property would supply sufficient water for any diamond drilling needs.

The ideal location of these claims would make it possible to get all supplies and equipment to the workings at the lowest possible cost.

Topography

The land throughout this area is generally rolling with some swamps and a considerable amount of high ground. Rock outcrops are numerous especially on the three south claims. There is a considerable amount of heavy overburden on the three claims in the central part of the township which would necessarily slow down any surface development on them.

A small creek runs through the claims to the south crossing the property several times. A branch of Amikougami Lake is within one claim of the central claims.

Operating Facilities

All claims of this group are heavily wooded and either have a water supply on them or adjoining them.

Hydro power lines run within a half mile of all three of the groups in order to serve nearby properties.

There is a road to within two claims of claim #3655 which is kept in good shape. The Ferguson highway adjoins the north-east corner of claim #16528 which is the south group. This group is also crossed by the Temiskaming and Northern Ontario Railway.

The central location of these claims would make the handling of supplies an easy matter as they are all within ten or fifteen minutes driving of Kirkland Lake.

Adjacent Mining Operations.

Two claims east of Claim 3655 is the Kirana Gold Mines, a property which has carried on extensive underground development and has opened up a number of promising vein systems. North of the Kirana is the Goodfish Gold Mines. The Kirkland Central property is east of the Kirana and here they have been doing surface work the past summer in preparation for further development.

The Central group is adjacent to the Lac-Tek, the Cassa-Kirk, and the Teck Gold Mining Syndicate. The large producers, the Macassa and Teck-Hughes Mines are less than half a mile to the south.

Two claims west of Claims 6955, 16527 and 16528 is the Golden Gate Mine which has just finished sinking its second shaft. According to market reports they are obtaining very fine values at this property and it gives promise of becoming the next producer in the Kirkland Lake District.

Conclusions

Due to the fact that most of the work on these claims was halted some twenty years ago it was nearly impossible to sample any of the old work. In going over the claims to the south a number of mineralized quartz veins were uncovered which if developed properly may show good values. It was also noted that on claims 16527 and 16528 that the acid intrusives showed a great deal of mineralization.

In conversation with Mr. McGinley Jr. he gold me that all the old records and assays of the old McGinley property had been destroyed in the Haileybury fire. This is unfortunate as they would have been valuable in future development.

The fact that there is a shaft down on the Lac-Tek property is sufficient proof that values do exist in the central part of the township and nearby the central group of claims. This part of the township has not been developed as yet.

Recommendations

Due to the fact that only claim is owned in the north part of the township I do not think it advisable to spend any time or money in development on it. It is only a small claim

and if anything were found on it the possibility of mining it would be very slim.

I would recommend that any future work be concentrated either on the central group or on the southern group. None of the ground in these areas has been thoroughly prospected for several reasons. Lack of proper finances and the Great War halted all mining development in the Swastika area. It is only recently that work has been resumed here and the showing of the Golden Gate Mine has more than justified the renewal of activity. The area in the central part has never had much attention due to the fact that activity in the eastern part of the township has detracted from it. Now that things have quieted down there a new interest has developed in the western part. This is shown in the formation of new companies and their work in the west central part.

In carrying out any future work I would recommend that the following plan be carried out. A temporary camp should be constructed on both the central and the southern group. A small crew of men, say six or seven, under competent supervision could then be placed on the property. A four weeks trenching program could then be carried out. At the end of this it would be possible to lay out a diamond drilling program on the group which shows the most promise. There are a number of mineralized quartz veins on the property which should be opened up and traced. This trenching program would be necessary in order to determine the strike and dip of the formations. By doing this we could carry out a planned drilling program and not go at it in a haphazard manner.

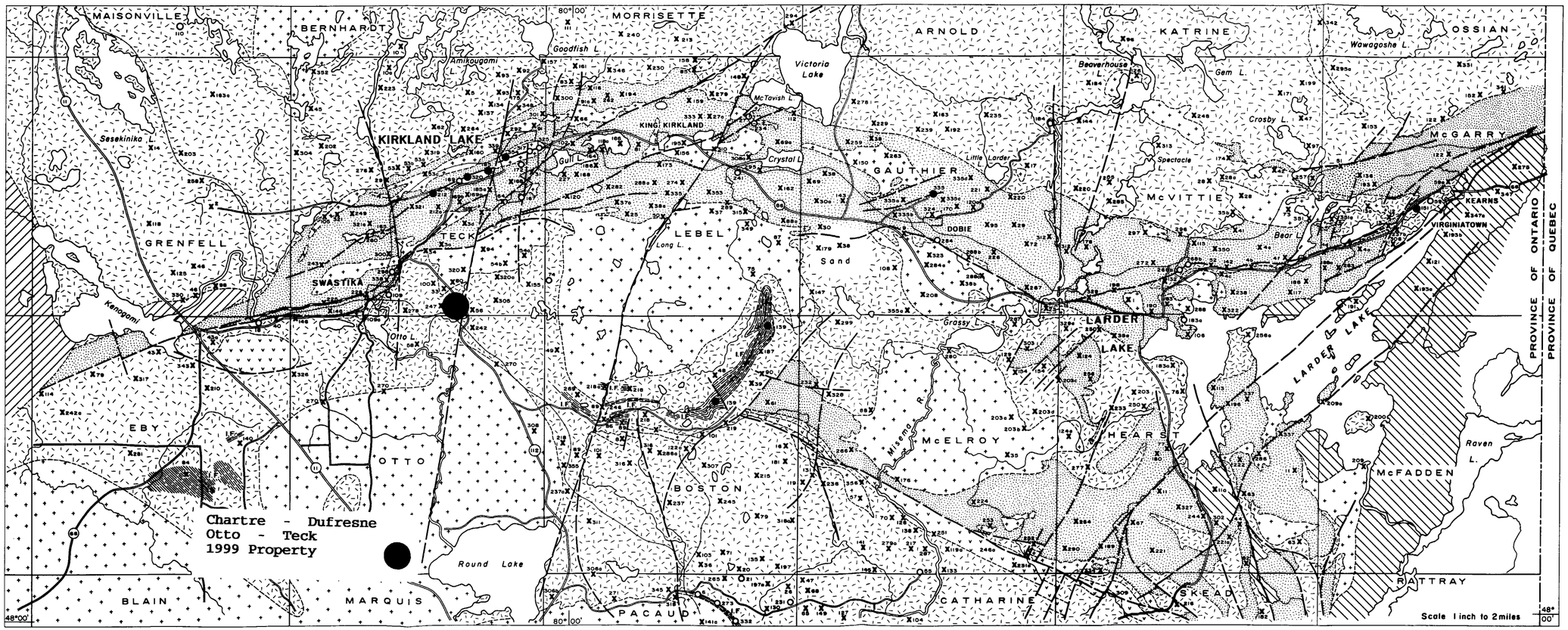
It is my belief that if the work is carried out as I have outlined and under competent supervision there is every reason for the property to have a fair chance of success.

A map showing the location of the three groups is attached.

Respectfully submitted,

Geo C. Seaborn

Kirkland Lake, Ontario,
October 4, 1937.



KIRKLAND LAKE — LARDER LAKE AREA SHOWING PROPERTY LOCATIONS AND GENERAL GEOLOGY

Chart A
Kirkland Lake-Larder Lake Area
Properties and geology

ANNEX "H-5"

LEGEND

GENERALIZED GEOLOGY

- Cobalt sedimentary rocks.
- Acid intrusive rocks.
- Intermediate and basic intrusive rocks.
- Older sedimentary and volcanic rocks (Timiskaming series).
- Acid and basic volcanic rocks and undifferentiated diorites.
- Iron formation. (I.F.)

SYMBOLS

- ●212 Producing Mine.
- O328 Past Producer.
- X220 Other Properties.

N

NOTES

Properties indicated by numbers on the map are named under the Property List of the accompanying report.

For detailed geology of townships see list of Geological Maps in report.

SOURCE OF INFORMATION

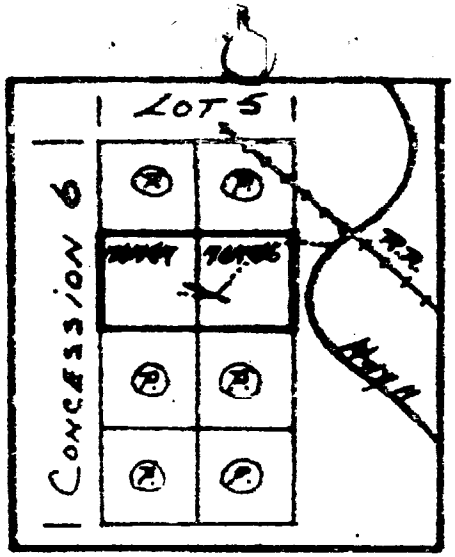
Compiled by W. S. Savage, 1963.

ANNEX "H-6"

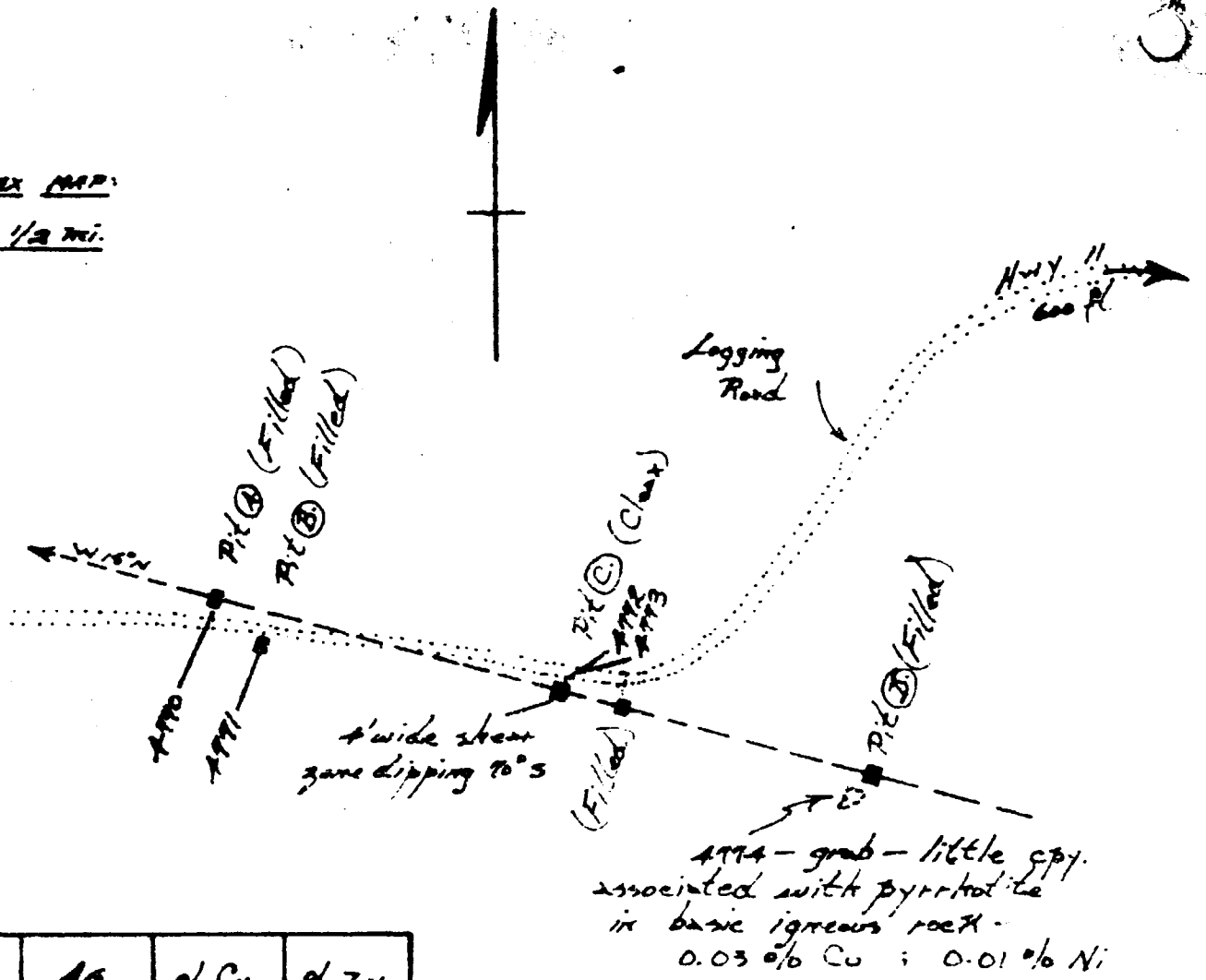
AHOLA GOLD.

OTTO TWP.

KL-0010



INDEX MAP:
1" = 1/2 mi.



SAMPLE No.	WIDTH (feet)	Au oz/ton	Ag oz/ton	% Cu	% Zn
4770	grab	0.005	0.04	—	—
4771	grab	Nil	0.03	—	—
4772	4'	0.005	0.44	—	—
4773	grab	Nil	0.84	1.96	2.87

LOCATION SKETCH
ANOLA GOLD
OTTO TWP

Scale: 1" = 100' Aug./62

ANNEX
"H-7"

The INTERNATIONAL NICKEL CO. OF CANADA, LIMITED

Otto township

KL-1280

FORM 259-A

THE INTERNATIONAL NICKEL CO. OF CANADA, LIMITED

PROPERTY Loon 19-43

SAMPLING RECORD

SHEET NO. 3

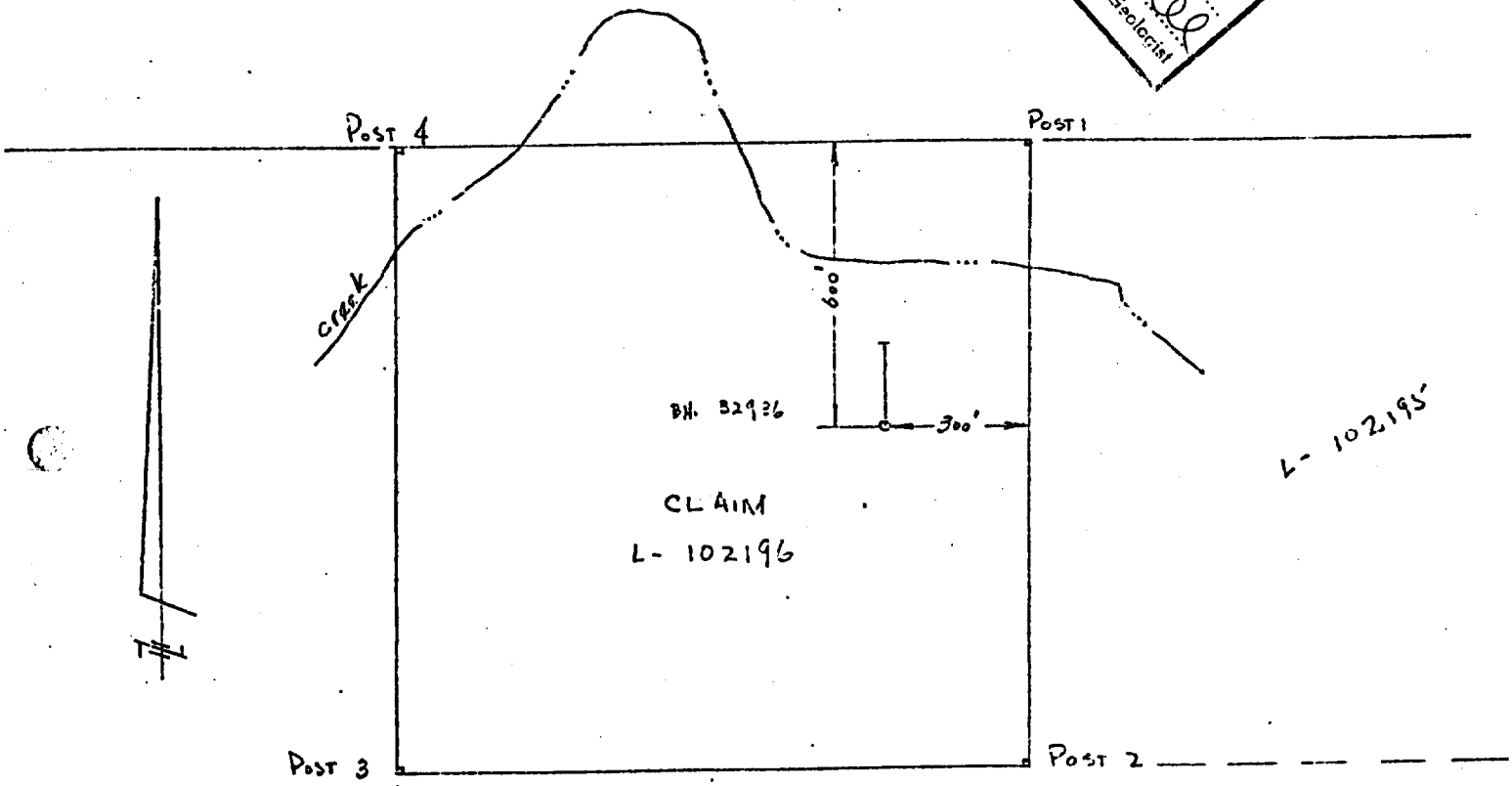
HOLE NO. 32936 DEPTH 342 ANGLE -50° STRIKE N ELEVATION

CO-ORDINATES 1280 N 1000 W

DEPTH FEET	FORMATION	SAMPLE NO.	LENGTH FT.	ANALYSIS COPPER %	ANALYSIS NICKEL %	ANALYSIS CU. & NI. %	LENGTH FEET	PROGRESSIVE TOTALS FEET X PER CENT COPPER	PROGRESSIVE TOTALS FEET X PER CENT NICKEL	PROGRESSIVE TOTALS FEET X PER CENT CU. & NI.
	Log Summary									
00.0	Collar									
37.0	Overburden									
46.5 MvW	Graph. sch.									
55.0 MvW	Gabbro									
65.0 MvW	Graph. sch.									
157.0 MvW	Gabbro									
167.8 MvW	Graph. sch.									
279.5 MvW	Gabbro									
289.5 MvW	Graph. sch.									
327.5 MvW	Gabbro									
332.5 MvW	Graph. sch.									
342.0 MvW	Gabbro									
342.0	Feet of hole.									
	Drilled AXT by Heath & Sherwood									
	Started - April 10, 1968									
	Completed - April 19, 1968									
	All casing recovered.									
	Corrected tests - 100' - 47°									
	300' - 47°									
	Logged by J.E. Mullock.									

ASSESSMENT WORK
Rec'd from Mining Recorder
Kirkland Lake
NOV 4 1968
Date
Resident Geologist

ASSESSMENT WORK
Rec'd from Mining Recorder
Date NOV 4 1968
Resident Geologist



LOCATION SKETCH
of BORE HOLE : 32936
LOCATED on Cl. L-102196
NW 1/4 of N 1/2 LOT 5 CONC. VI
OTTO TWP.
LARDER LAKE MINING DIVISION
Scale : 1inch = 400 ft.

ANNEX
H-8

Ontario

Ministry of Natural Resources

Hon. James A.C. Auld
Minister

Dr. J.K. Reynolds
Deputy Minister

ONTARIO GEOLOGICAL SURVEY

PRELIMINARY MAP P.896 (Rev.)

KIRKLAND LAKE DATA SERIES

OTTO TOWNSHIP

DISTRICT OF TIMISKAMING

Scale: 1:15 840

Mile ¼ 0 ¼ ½ Mile

Metres 100 0 0.2 0.4 0.6 0.8 1 Kilometre

NTS Reference: 42A/1E

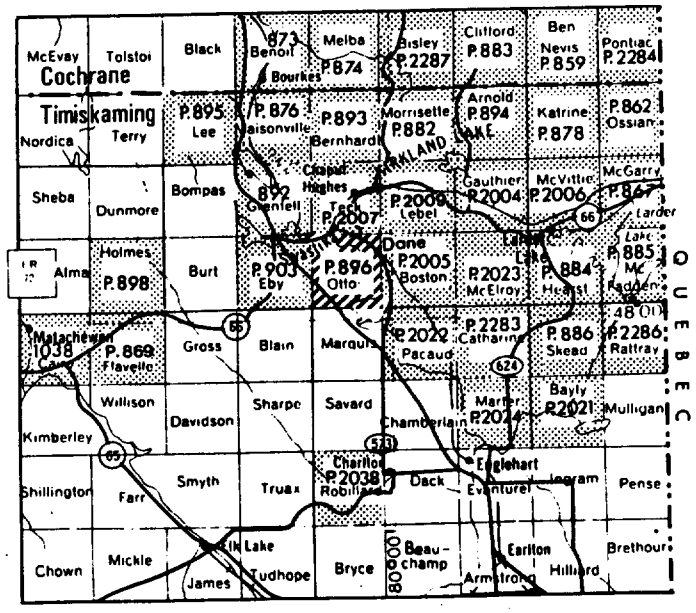
ODM-GSC Aeromagnetic Map: 289G (Rev.)

ODM Geological Compilation Series Map: 2205

© OMNR-OGS 1979

Parts of this publication may be quoted if credit is given and the material is properly referenced.

Rock types indicated in drill hole geology are in order of decreasing abundance.



INDEX MAP

Scale: 1:1 013 760

Kirkland Lake Data Series maps published in this area

LEGEND

MESOZOIC

17 — 17 Kimberlite

INTRUSIVE CONTACT

PALEOZOIC

LOWER AND MIDDLE SILURIAN

16 — 16a Clinton (Thornloe) Formation: limestone, dolostone, sandstone

16b Wabi Formation: limestone, shale

MIDDLE AND UPPER ORDOVICIAN

15 — 15a Dawson Point Formation: shale

15b Farr Formation: limestone

15c Bucke Formation: limestone, shale

15d Guigues Formation: sandstone

UNCONFORMITY

PRECAMBRIAN

LATE PRECAMBRIAN (PROTEROZOIC)

MAFIC INTRUSIVE ROCKS[g]

14 — 14 Diabase dikes

INTRUSIVE CONTACT

MIDDLE PRECAMBRIAN (PROTEROZOIC)

ALKALIC INTRUSIVE ROCKS[d]

13 — 13 Syenite, nepheline syenite, lamprophyre

MAFIC INTRUSIVE ROCKS[f]

12 — 12 Diabase, transition rock, and granophyre sheets and dikes

INTRUSIVE CONTACT

COBALT GROUP

11 — 11 Lorrain Formation: quartzite, arkose

10 — 10 Gowganda Formation (unsubdivided)

10a Firstbrook Member: argillite, siltstone, wacke, arkose

10b Coleman Member: conglomerate, wacke, quartzite, arkose, argillite

UNCONFORMITY

EARLY PRECAMBRIAN (ARCHEAN)

MAFIC INTRUSIVE ROCKS[e]

9 — 9 Diabase dikes

INTRUSIVE CONTACT

ALKALIC INTRUSIVE ROCKS[d]

8 — 8 Syenite, monzonite, lamprophyre[h]

INTRUSIVE CONTACT

ALKALIC METAVOLCANICS[b]

7 — 7 Trachyte, leucitic trachyte flows, tuff, breccia

METASEDIMENTS[i]

6 — 6 Conglomerate, wacke, siltstone, slate, argillite, iron formation[b]

5 — 5 Wacke, siltstone, slate, iron formation

FELSIC INTRUSIVE ROCKS[d, j]

4 — 4 Granitic intrusive rocks

4a Quartz porphyry, quartz-feldspar porphyry, feldspar porphyry, granophyre, felsite[h]

4b Trondhjemite, granodiorite, quartz monzonite: simple batholiths and stocks[h]

4c Trondhjemite, granodiorite, quartz monzonite, quartz diorite, aplite, pegmatite, migmatite: complex batholiths

INTRUSIVE CONTACT

3 FELSIC METAVOLCANICS[a,i]

- 3 Unsubdivided
- 3a Iron formation (mag - chert; gf-py-po; green and brown dolostone)
- 3b Flows
- 3c Pyroclastic rocks

INTRUSIVE CONTACT

2 METAMORPHOSED MAFIC AND ULTRAMAFIC INTRUSIVE ROCKS[c,j]

- 2 Unsubdivided
- 2a Gabbro, diorite
- 2b Peridotite, dunite, pyroxenite, serpentinite

INTRUSIVE CONTACT

1 INTERMEDIATE TO ULTRAMAFIC METAVOLCANICS[a,j]

- 1 Unsubdivided dacite, andesite, and basalt
- 1a Intermediate flows
- 1b Intermediate pyroclastic rocks
- 1c Mafic flows
- 1d Mafic pyroclastic flows
- 1e Ultramafic flows

a. Formerly classified as Keewatin.
b. Formerly classified as Timiskaming.
c. Formerly classified as Haileyburian.
d. Formerly classified as Algoman.
e. Includes north-trending dikes of Matachewan swarm.
f. Inlcudes Nipissing and Sudbury types.
g. Includes Keweenawan.
h. Several ages; some units appear to be intrusive equivalents of volcanic formations whereas others postdate volcanism.
j. Rocks in these groups are subdivided lithologically; the order does not necessarily imply age relationship within or among groups.

NOTE: All rock types listed in the Legend do not necessarily appear on the map face.

Issued 1979

Information from this publication may be quoted if credit is given. It is recommended that reference to this map be made in the following form:

Ploeger, F., Campbell, A., and Grabowski, G.
1979: Otto Township, District of Timiskaming; Ontario Geological Survey Preliminary Map P.896 (Rev.), Kirkland Lake Data Series. Scale 1:15 840 or 1 inch to ¼ mile. Data compiled 1979.

METAL AND MINERAL REFERENCES

Ag . . . . . Silver
asb . . . . . Asbestos
asp . . . . . Arsenopyrite
Au . . . . . Gold
bn . . . . . Bornite
Co . . . . . Cobalt
cp. . . . . Chalcopyrite
Cr. . . . . Chromium
Cu . . . . . Copper
ep. . . . . Epidote
Fe . . . . . Iron
fl . . . . . Fluorite
gf . . . . . Graphite
gn. . . . . Galena
gt . . . . . Garnet
hem . . . . . Hematite
Hg . . . . . Mercury
mag . . . . . Magnetite
mar. . . . . Marcasite
mo . . . . . Molybdenite
Ni. . . . . Nickel
Pb . . . . . Lead
pent . . . . . Pentlandite
po . . . . . Pyrrhotite
Pt. . . . . Platinum
py . . . . . Pyrite
qcv . . . . . Quartz-carbonate vein
qv. . . . . Quartz vein
serp . . . . . Serpentine
sp. . . . . Sphalerite
spec . . . . . Specularite
talc. . . . . Talc
tour . . . . . Tourmaline
Zn . . . . . Zinc

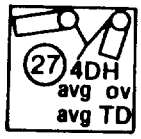
SYMBOLS



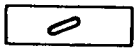
Shaft; depth in feet (for which there is underground information available).



Drill hole (projected vertically); overburden in feet down hole (ov 80); total depth in feet down hole (TD 204).



Group of drill holes; property number 27; average (avg).



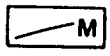
Trenching



Airborne electromagnetic conductors:
Dig . . . . . Dighem
IN . . . . . INPUT
CA . . . . . Canadian Aero Mineral Surveys
Sc. . . . . Scintrex
A . . . . . Aerophysics of Canada Ltd.
H . . . . . Hunting
B . . . . . Barringer
Gx . . . . . Geoterrex



Ground electromagnetic conductors:
VEM. . . . . vertical loop
HEM. . . . horizontal loop
VLF . . very low frequency
JEM . . . . . crone EM-16
TURAM



Ground magnetometer anomaly



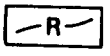
Airborne magnetometer anomaly



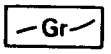
Radiometric anomaly



Airborne radiometric anomaly



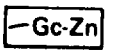
Resistivity anomaly



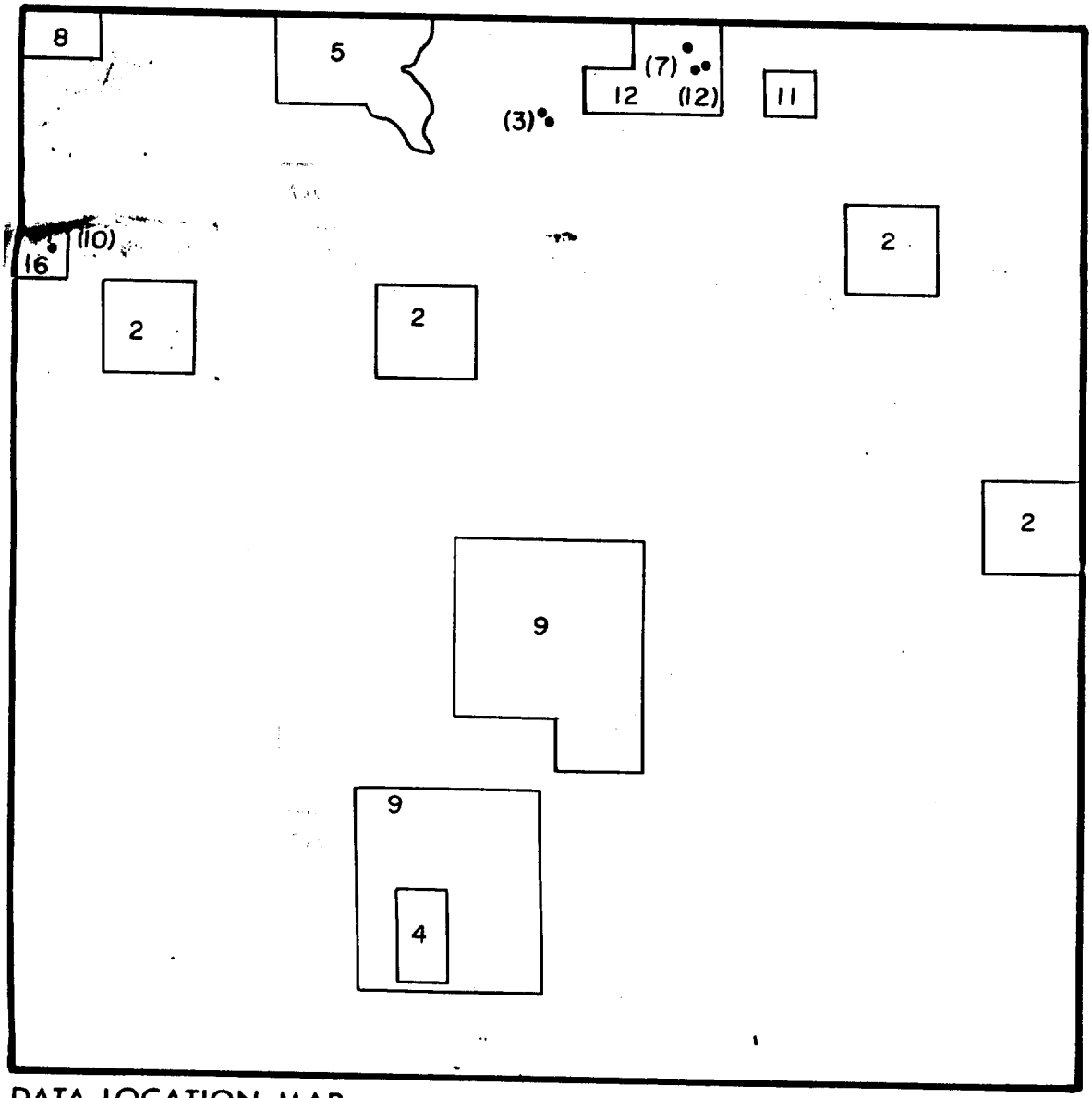
Gravity anomaly



Induced polarization conductor



Geochemical anomaly (Zn)



DATA LOCATION MAP

Scale 1:63 360

DATA FILED WITH THE RESIDENT GEOLOGIST ONTARIO MINISTRY OF NATURAL RESOURCES		TYPE OF WORK															
		GEOLOGICAL	TRENCHING	DIAMOND DRILLING	AIRBORNE MAGNETOMETER	AIRBORNE ELECTROMAG.	GROUND MAGNETOMETER	VERTICAL LOOP ELECTROMAG.	HORIZONTAL LOOP ELECTROMAG.	VERY LOW-FREQUENCY ELECTROMAG.	INDUCED POLARIZATION	OTHER GEOPHYSICAL SURVEYS	UNDERGROUND WORK	MISC.REPT.CORRESPOND. AND PROSPECTUSES	GEOCHEMICAL	OTHERS
1.	Allard, C.		68, 69													
2.	Boston and Otto Townships: "Notes on Radioactive Indications"													53, 55		
3.	Chavigny Gold Mines Ltd.			48										50		
4.	Cochrane, W.M.													50, 50,		
5.	Gateford Mines Limited													74		
6.	Gudrie, T.		69, 70, 71													
7.	International Nickel Co. of Canada, Limited, The			68												
8.	Kelly Kirkland Mines Ltd.													64		
9.	Lee Geo-Indicators Ltd.	75													75	
10.	Little Long Lac Gold Mines Ltd.			57+												
11.	Mulligan, A.	50														
12.	Noranda Exploration Ltd.	76		76+			76	76								
13.	Stewart, W.		70													
14.	Sullivan, T.		70													
15.	Tamminen, T.		70													
16.	Todora Kirkland Prospecting Syndicate	48												48		
	+ Assays															

Note: The numbers of the above list stand for the year when the work was done, e.g., 66 for 1966. On the accompanying **DATA LOCATION MAP**, only areas for which work was submitted to the Division are outlined; and thus, a company may hold more ground than indicated here. The numbers on the **DATA LOCATION MAP** and any circled numbers refer to the company above.

SOURCES OF INFORMATION

Compiled by A. Campbell, G. Grabowski, and F. Ploeger, 1979, from data on file in Resident Geologist's office, Ontario Ministry of Natural Resources, Kirkland Lake.

Base-map derived from the Forest Resources Inventory maps, Lands and Waters Group, Ontario Ministry of Natural Resources.

Kirkland Lake and Swastika Gold areas, district of Timiskaming; Ontario Bureau of Mines Annual Report, Volume 23, part 2, 1914, by A.G. Burrows and P.E. Hopkins.

Swastika Gold Area; Ontario Bureau of Mines Annual Report, Volume 21, part 1, 1912, by E.L. Bruce.

Geology of Eby and Otto area, District of Timiskaming; Ontario Division of Mines and Northern Affairs Geological Report 99, 1972, by H.L. Lovell.

Geochemical distribution of Acid-Soluble Copper in Felsic Plutonic Rocks, Otto Township and Parts of Eby, Marquis, & Boston Townships, District of Timiskaming; Ontario Department of Mines and Northern Affairs Preliminary Map P.717, Geochemical Series, 1971 by W.J. Wolfe, and G.R. Wright.

Geochemical Distribution of Acid-Soluble Lead in Felsic Plutonic Rocks, Otto Township and Parts of Eby, Marquis, and Boston Townships, District of Timiskaming; Ontario Division of Mines Preliminary Map P.718, Geochemical Series, 1971, by W.J. Wolfe and G.R. Wright.

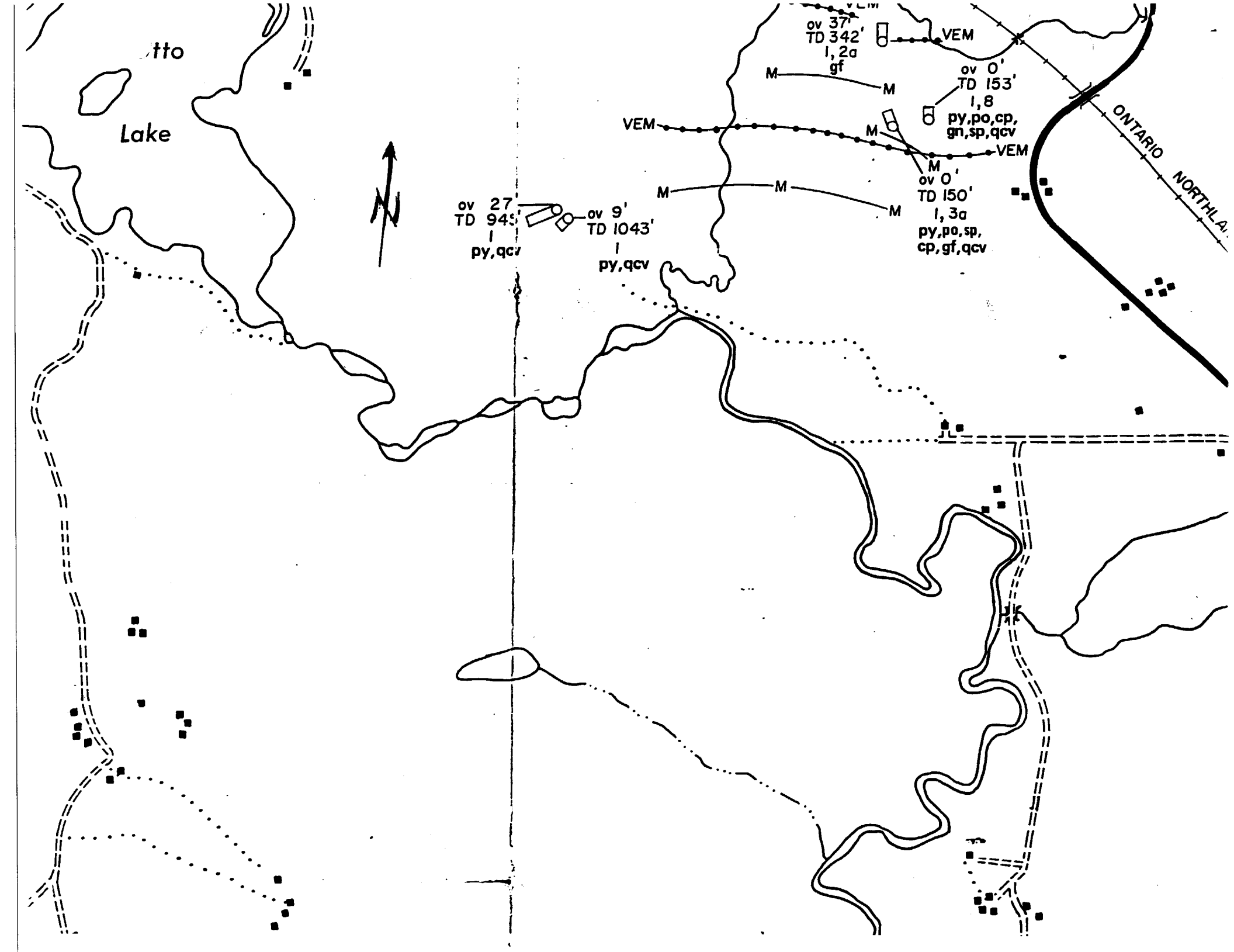
Geochemical Distribution of Acid-Soluble Molybdenum in Felsic Plutonic Rocks, Otto Township and Parts of Eby, Marquis, and Boston Townships, District of Timiskaming; Ontario Division of Mines Preliminary Map P.719, Geochemical Series, 1971, by W.J. Wolfe, and G.R. Wright.

ODM-GSC High Resolution Aeromagnetic Maps 20,143G and 20,149G. Scale 1:25 000, 1975.

This compilation project is part of the Kirkland Lake Area Incentives Program. It is equally funded by the Federal Department of Regional Economic Expansion and the Ontario Ministry of Northern Affairs under the Community and Rural Resource Development Agreement.

This map is published with the permission of E.G. Pye, Director, Ontario Geological Survey.

Metric Conversion Factor – 1 foot = 0.3048 m


tto
Lake
ov 37'
TD 342'
1, 2a
gf
VEM
M
M
ov 0'
TD 153'
1, 8
py, po, cp,
gn, sp, qcv
VEM
M
M
VEM
M
M
M
ov 0'
TD 150'
1, 3a
py, po, sp,
cp, gf, qcv
ov 27'
TD 94
1
py, qcv
ov 9'
TD 1043'
1
py, qcv
ONTARIO NORTHLA

ANNEX "H-9"

M. Dyment and J. Kidston Gold Occurrence (3)

Teck Township

The Dyment-Kidston claim group is located along the southern edge of the Murdock Creek Stock, an east-west elongated intrusion of syenite, situated approximately 2 km south of Kirkland Lake.

A gold zone, similar to that of the Larder Lake Fault zone along the north contact of the stock, has been recognized by the author. The zone extends from the Dyment-Kidston claims east past the south end of the Lake Shore Slimes Basin Dam. (*see* Jas. E. Thomson 1948, Map Number 1945-1).

The stratigraphy of the southern zone resembles that of the Larder Lake Fault zone. From north to south, that is, from the lower to the upper strata, except where locally folded, it consists of the following:

- Diorite, mainly magnetic, cut by reddish feldspathic stringers possibly emanating from the Murdock Creek Stock syenite.
- Magnesium-rich ultramafic flow or dike rock, mostly sheared, cut by more quartz veins than are other rock types, except the green carbonate rock.
- Cherty tuff (graphite-pyrite iron formation), generally trends east-west. Magnetism is minimal; very little magnetite or pyrrhotite is present.
- Pillowed basalt (tops south) and variolitic basalt that form Porcupine and Kerr Addision gold mines type of marker stratum is concordant with the cherty tuff.
- Komatiite with spinifex and polysuture textures, possibly indicate tops north.
- Green carbonate rock, cut by quartz veins (some large).

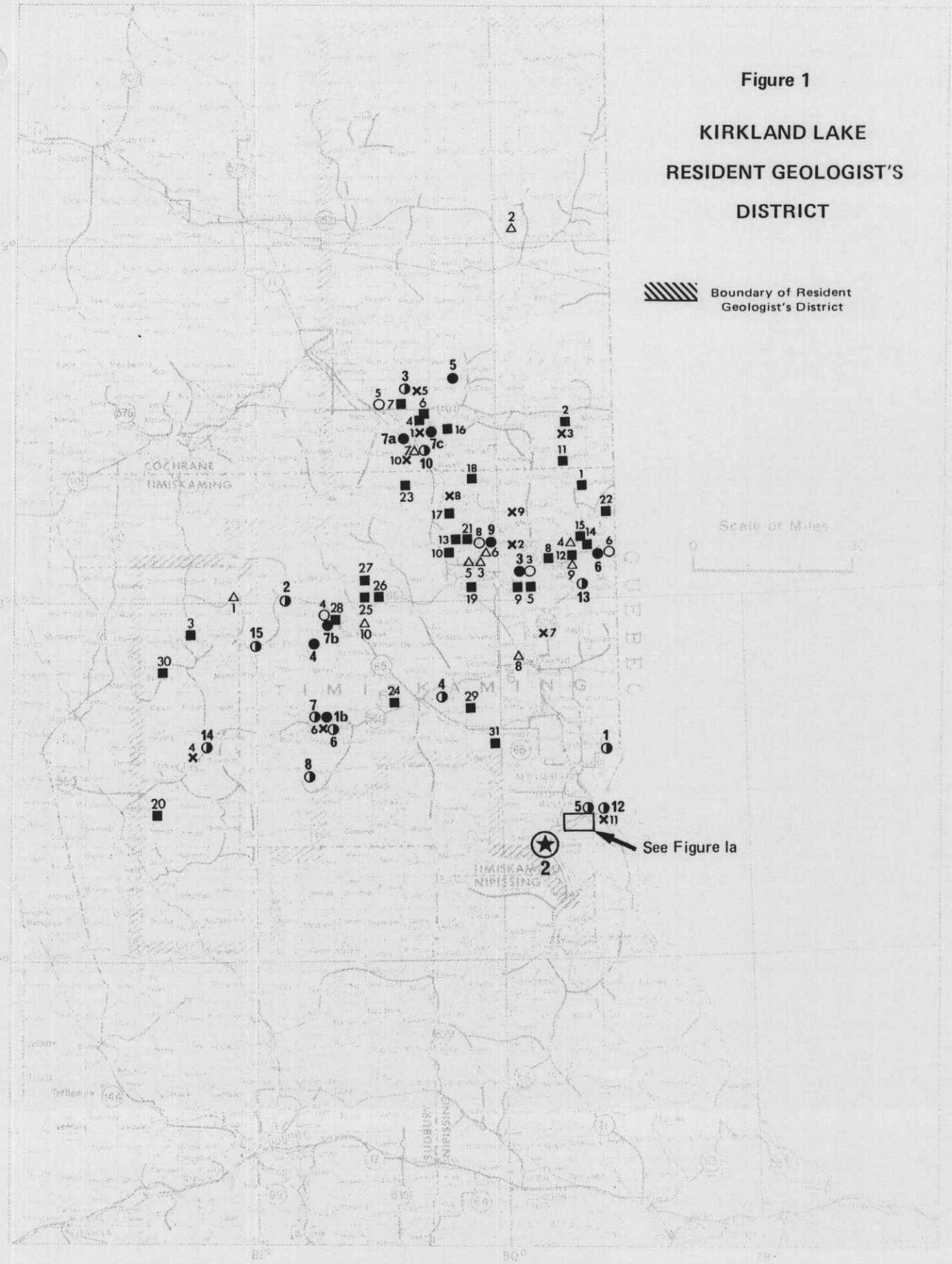
The green carbonate rock was trenched by prospectors many years ago and deserves much further exploration for its gold potential. To the south, the outcrop is covered by swampy ground.

Figure 1

KIRKLAND LAKE

RESIDENT GEOLOGIST'S

DISTRICT



JOMI MINERALS & EXPEDITING LTD.

"Dyment Kidston Claims, Groups A & B"

Teck Township

File # K L - 1321

July 1988

This file provides: Certificates of analysis
description of samples taken
Map of Teck "B" of sampling and stripping areas on Claims # 495739 and # 495738

Sampling Report Teck "B" dated August 25, 1984 (Toronto file #2.6878) (7 claims)
Work consists of HLEM, VLF, Radiometrics, Magnetometer, Geology, Stripping, Diamond Drilling.
Certificates of Analysis

Results: L. M. Dyment says that more detailed work is needed.

This file provides: Radem VLF -EM Survey on Group "B" dated July 2, 1981
Results: L. M. Dyment reported on this 7-claim group where identified Anomalies A, B and C.

This file provides: Geological Survey on Group "B" (claims 495739, 495738 and 495737) dated January, 1981
Results: The Murdock Creek Stock covers most of the eastern and northern part of the claims. Sulphides and massive sulphides are found on claim 495739.

This file provides: Sampling Report Teck "A"
dated August 25, 1984 (25 claims)
Work consists of Diamond drilling, HLEM, VLF, Magnetometer, Stripping and Sampling.

Results: L. M. Dyment says that the most anomalous area appears along the border of the Murdock Creek Stock in the north part of this claim group. (See Toronto file #2.6843)

This file provides: VLM - EM Survey (Group "A") dated Oct. 2, 1981 on two claims (565134 and 565135)
Results: L. M. Dyment reported:
a) Anomaly A - possible shear zone
b) Anomaly B and C - excellent conductors with good field strength correlation
c) Anomaly D - small shear zone
d) Anomaly E - conductive overburden anomaly

This file provides: VLM - EM Survey Group "A" dated November 10, 1981 on four claims (565139, 565138, 565150, 565152)
Results: L. M. Dyment reported:
a) Conductor A - good field strength correlation
b) Conductor F - good field strength massive iron sulphides
c) Conductors G, H and B - good field strength (some rusty rock floats found)
d) Conductors D and K - shear zone with disseminated sulphides and alteration zones noted

This file provides: Radem VLF-EM Survey on Group "A" dated April 6, 1981 (4 claims: 545728, 545729, 566532, 565133).
Results: L. M. Dyment reported: All conductors are covered by overburden; some shearing was observed in the northeast corner of the group.

This file provides: Geological Survey on Group "A" dated January 1981 (claims: 495720, 495721 and 495722)

Results: L. M. Dyment reported: In the south claim Komatiitic dikes and ultramafic dikes can be seen associated with quartz veining. Also a massive outcrop of altered ultramafic rocks of green and brown carbonates cross hatched with numerous quartz veins up to two feet wide can be seen.

This file provides: Radiometric survey on Group "A" dated January 1981 (claims: 495720, 495721 and 495722)
Results: L. M. Dyment noted areas of high potassium.

This file provides: Radem VLF Survey on Group I Dyment-Kidston Claims dated Nov. 23, 1979 (claims: 495720, 495721 and 495722)

Results: L. M. Dyment reported 5 anomalies: D and C have shearing; A, B and D need more information.

This file provides: Proton Magnetometer Survey on Group I Dyment-Kidston Claims dated January 20, 1979 (6 claims)
Results: L. M. Dyment identified two zones of above background anomalous readings. A second zone of low magnetics showed the location of a syenite float.

This file provides: VLF-Em Survey on the Group II Dyment-Kidston claims (Claims #495739, 495738 and 495737) dated January 20, 1979.
Results: L. M. Dyment identified two areas (A and B) of strong conductivity and (C) an area of weak conductivity.

This file provides: Proton Magnetometer Survey on the Group II Dyment-Kidston Claims (claims 495739, 495738 and 495737) dated January 20, 1979.
Results: L. M. Dyment defined a folded-in-appearance anomaly (green carbonate

outcrop)

This file provides: Spectrometer Radiometric Survey on Group II Dyment - Kidston Claims (claims 495739, 495738 and 495737) dated January 25, 1979.

Results: L. M. Dyment was able to describe syenite and greenstone as contourable entities. Areas of interest were pinpointed.

This file provides: Proton Magnetometer Survey on Group II Dyment - Kidston Claims (claims 565145, 545717, 531068, 531066, 495737, 495738 and 495739) dated July 3, 1980.

Results: L. M. Dyment noted two interesting features: 1)Magnetic high in central part of claim 531066 and 2)North-South Magnetic trend on lines 6W and 8W. identified as an iron formation.

Note: These few pages represent an unfair summary of 150 pages of assessment work filed and recorded by MNDM. Best assays appears to be 760/990 parts per billion gold, 533, 655, 1015, 241, 292, 185, 232, 111, 127, 800, 120 and 114 ppbs. (I do not know these values in oz/ton).
Best Copper samples gave 14,800, 4140 and 26,800 ppm.
(One sample (# 11) or (D-4) came in at .2 Au oz./T but location and description of this sample has not been found)
(Another three samples 3-D, 3-X and 79-3 (#54) give us .026, .023, and .02 Au oz./T, respectively; location and description unknown at this time)

ANNEX "J-1"

Ministry of Northern Development and Mines

Ontario

MAP 2543

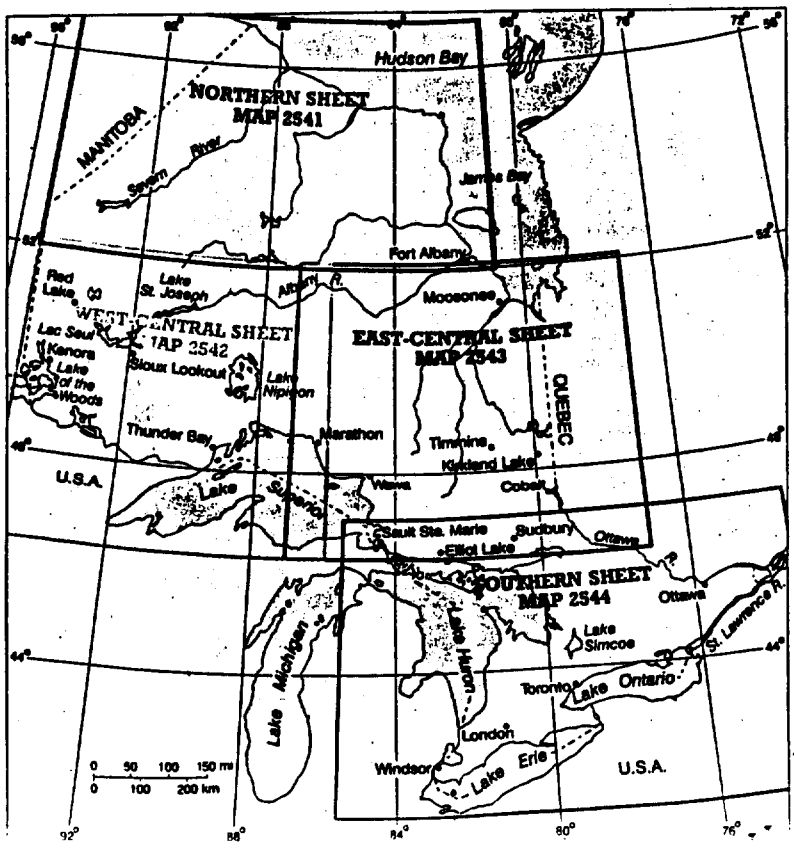
BEDROCK GEOLOGY OF ONTARIO

EAST-CENTRAL SHEET

Scale 1:1 000 000

Kilometres 20 0 20 40 60 80 100 Kilometres

Miles 10 0 10 20 30 40 50 Miles



STOCKNO 10 739

MIDDLE AND LOWER SILURIAN

53 **Sandstone, shale, dolostone, siltstone**
- 53a Guelph Fm.
- 53b Lockport Fm.
- 53c Amabel Fm.
- 53d Clinton Gp.; Cataract Gp.
- 53e Thornloe Fm.; Earlton Fm.
- 53f Wabi Gp.
- 53g Attawapiskat Fm.
- 53h Ekwan River Fm.
- 53i Severn River Fm.

ORDOVICIAN

UPPER ORDOVICIAN

Shale, limestone, dolostone, siltstone
- 52a Queenston Fm.
- 52b Georgian Bay Fm.; Blue Mountain Fm.; Billings Fm.; Collingwood Mb.; Eastview Mb.
- 52c Liskeard Gp.
- 52d Red Head Rapids Fm.
- 52e Churchill River Gp.
- 52f Bad Cache Rapids Gp.

MIDDLE ORDOVICIAN

51 **Limestone, dolostone, shale, arkose, sandstone**
- 51a Ottawa Gp.; Simcoe Gp.; Shadow Lake Fm.
- 51b Chazy Gp., Rockcliffe Fm.

LOWER ORDOVICIAN

50 **Dolostone, sandstone:** Beekmantown Gp.

CAMBRIAN

49 **Conglomerate, sandstone, shale, dolostone:** Potsdam Gp.; Nepean Fm., Covey Hill Fm.

PRECAMBRIAN[d]

GRENVILLE PROVINCE[e]

PROTEROZOIC

NEO– TO MESOPROTEROZOIC (0.57 to 1.6 Ga)

48 **Tectonite unit:** tectonites, straight gneisses, porphyroclastic gneisses, unsubdivided gneisses in major deformation zones, mylonites, protomylonites

CENTRAL METASEDIMENTARY BELT

47 **Late felsic plutonic rocks**[f]**:** granodiorite, granite, syenite, pegmatite, alkalic granite, migmatitic gneisses

46 **Mafic to ultramafic plutonic rocks**[f]**:** diorite, gabbro, peridotite, pyroxenite, anorthosite, derived metamorphic rocks

45 **Alkalic plutonic rocks:** nepheline syenite, alkalic syenite, fenite; associated mafic, ultramafic and carbonatitic rocks

44 **Early felsic plutonic rocks**[f]**:** granodiorite, tonalite, monzogranite, syenogranite; derived gneisses and migmatites

GRENVILLE SUPERGROUP AND FLINTON GROUP[g]

43 **Carbonate metasedimentary rocks:** marble, calc-silicate rocks, skarn, tectonic breccias

42 **Clastic metasedimentary rocks**[f]**:** conglomerate, wacke, quartz arenite, arkose, limestone, siltstone, chert, minor iron formation, minor metavolcanic rocks

41 **Mafic to felsic metavolcanic rocks:** flows, tuffs, breccias, minor iron formation, minor metasedimentary rocks; includes reworked pyroclastic units, amphibolite

MESOPROTEROZOIC (0.9 to 1.6 Ga)

PALEOPROTEROZOIC (1.6 to 2.5 Ga)

Sudbury Igneous Complex (1850 Ma): norite, gabbro, granophyre

Whitewater Gp.[f]**:** fragmental rocks, mudstone, wacke

Carbonatite–alkalic intrusive suite (ca. 1.9 Ga): carbonatite, nepheline syenite, alkalic syenite, ijolite, fenite; associated mafic and ultramafic rocks

23 **Mafic intrusive rocks**[f]
- 23a *Molson swarm (1884 Ma)* diabase dikes; and *Sutton Inlier:* diabase sills
- 23b *Wabigoon swarm:* diabase dikes
- 23c *North Channel swarm:* diabase dikes

22 **Sedimentary rocks**
- 22a *Animikie Gp.*[m]*:* wacke, shale, iron formation, limestone, minor volcanic rocks
- 22b *Sutton Inlier:* dolostone, chert breccias, argillite, wacke, conglomerate, iron formation

21 **Mafic and related intrusive rocks**[f]
- 21a *Preissac swarm:* diabase dikes
- 21b *Marathon swarm:* diabase dikes
- 21c *Kenora–Fort Frances swarm:* diabase dikes
- 21d *Nipissing sills (2219 Ma):* diabase sills, dikes and related granophyre
- 21e Mafic dikes and plutons of uncertain age

20 **Felsic intrusive rocks (Murray Granite 2388 Ma, Creighton Granite 2333 Ma):** granite

HURONIAN SUPERGROUP (2.2 Ga to 2450 Ma)

Cobalt Gp.[n]**:** conglomerate, wacke, arkose, quartz arenite, argillite

Quirke Lake Gp.; Hough Lake Gp.; Elliot Lake Gp.
- 18a Conglomerate, wacke, arkose, quartz arenite, argillite, limestone, dolostone
- 18b Volcanic rocks of the Elliot Lake Gp.

INTRUSIVE ROCKS

17 **Mafic and ultramafic intrusive rocks**
- 17a *Matachewan and Hearst swarms (2454 Ma)*[f]*:* diabase dikes
- 17b Gabbro, anorthosite

SUPERIOR PROVINCE

ARCHEAN

NEOARCHEAN (2.5 to 2.9 Ga)

INTRUSIVE ROCKS

16 **Diorite–nepheline syenite suite**[goo]**:** pyroxenite, diorite, monzonite, syenite, nepheline syenite (saturated to undersaturated suite)

NEO– TO MESOARCHEAN (2.5 to 3.4 Ga)[egop]

INTRUSIVE ROCKS

15 **Massive granodiorite to granite:** massive to foliated granodiorite to granite
- 15a Potassium feldspar megacrystic units

Diorite–monzonite–granodiorite suite: diorite, tonalite, monzonite, granodiorite, syenite and hypabyssal equivalents (saturated to oversaturated suite)

13 **Muscovite-bearing granitic rocks:** muscovite-biotite and cordierite-biotite granite, granodiorite-tonalite

12 **Foliated tonalite suite:** tonalite to granodiorite—foliated to massive

11 **Gneissic tonalite suite:** tonalite to granodiorite—foliated to gneissic—with minor supracrustal inclusions

Mafic and ultramafic rocks[q]**:** gabbro, anorthosite, ultramafic rocks



CRAWFORD
AUBIN
SARGEANT
Dupuy
265m
SEWELL
HILLARY
REYNOLDS
MCKEOWN
CHILDERHOSE
DOYLE
MUSGROVE
CROTHERS
McBRIDE
HASSARD
ENGLISH
REGAN
NORTHRUP
ROBLIN
GOUIN
BLAIN
MARQUIS
PACAUD
CHAMBERS
TEMISKAMING
ARMSTRONG
Earlton
HARLEY
DYMOND
NOBLE
TOGO
ST LOUIS
GARVEY
WESTBROOK
SMUTS
Biscotasi
Donnegana
EDINBURGH
INVERNESS
HENNESSY
CHALET
PAUDASH
BREBEUF
BREWETT
CAVANA
BAYNES
MARQUETTE
SHIRLEY
DUBLIN
BREADNER
BATTERSBY
Nipissing
BEST
COLEMAN
ELDRIDGE
HARTLE
Redwater
MILNE
OLIVE
TORRINGTON
GOODERHAM
KENNY
HAMMELL
McCALLUM
HOBBS
McWILLIAMS
McLAREN
THISTLE
BASTEDO
FELL
LYMAN
NOTMAN
River Valley
GIBBONS
Wahapitei
Lake
ULSTER

J - 3

Ministry of Transportation
Ontario

OFFICIAL RECEIPT

LOCATION 53N

DATE 99-08-19 19 ____

RECEIVED FROM Roger Dufresne

ADDRESS 14 Wright Hargreaves
Kirkland Lake ON
P2N 1B2

CASH ☐ UNMARKED CHEQUE ☐ CERTIFIED CHEQUE ☐ MONEY ORDER ☐

PARTICULARS	AMOUNT RECEIVED
Application for Entrance	
Permit EN-99-53N-022	150 00
	150 00

RECEIVED BY R. O'Malley

ADM-F-6 94-07

H 17943

J-4

SMAILL ROOFING & BUILDING CONTRACTOR LTD
9 BROWN AVE.
KIRKLAND LAKE, ONT P2N 1L1

INVOICE

OUR NUMBER 059658
DATE July 7/00
CUSTOMER'S ORDER

SOLD TO Roger Dufresne
Prospector
ADDRESS

SHIP TO
ADDRESS

TAX REG. NO.	SALESMAN	F.O.B	TERMS	VIA

QUANTITY	DESCRIPTION	PRICE	AMOUNT
	Bill to 14 Wright Haugeaves		
13½	hrs. @ 50.00 per hr.		$ 675 00
	Loader work John Deer 455 E Crawler		
	GST 104 889 837		47 25
			$ 722 25
	pd by 290		
	thank you		
	K. Arnold		

BLUELINE DC32

Ontario Ministry of Northern Development and Mines

Declaration of Assessment Work Performed on Mining Land

Mining Act, Subsection 65(2) and 66(3), R.S.O. 1990

Transaction Number (office use)
W0080.00436.
Assessment Files Research Imaging

42A01SE2011 2.20721 OTTO 900

subsection 65(2) and 66(3) of the Mining Act. Under section 8 of the Mining Act, issesment work and correspond with the mining land holder. Questions about this orthern Development and Mines, 3rd Floor, 933 Ramsey Lake Road, Sudbury,

Instructions: - For work performed on Crown Lands before **recording** a claim, use form 0240.
- Please type or print in ink.

1. Recorded holder(s) (Attach a list if necessary)

Name
Address
Roger Dufresne
14 Wright Hargreaves
Kirkland Lake, Ontario
P2N 1B2

Client Number 127749
Telephone Number 1-705-567-3725
Fax Number

Name
Address

Client Number
Telephone Number
Fax Number

2. Type of work performed: Check (✓) and report on only ONE of the following groups for this declaration.

Geotechnical: prospecting, surveys, assays and work under section 18 (regs) | Physical: drilling stripping, trenching and associated assays ✓ | Rehabilitation

Work Type: TRENCHING AND STRIPPING

Office Use
Commodity
Total $ Value of Work Claimed 1722

Dates Work Performed From Day 01 Month 04 Year 2000 To Day 24 Month 11 Year 2000

NTS Reference

Global Positioning System Data (if available)

Township/Area OTTO TWP.

M or G-Plan Number M-0379

Mining Division Larder Lake

Resident Geologist District. Kirkland Lake

Please remember to: - obtain a work permit from the Ministry of Natural Resources as required;
- provide proper notice to surface rights holders before starting work;
- complete and attach a Statement of Costs, form 0212;
- provide a map showing contiguous mining lands that are linked for assigning work;
- include two copies of your technical report.

PROVINCIAL RECORDING OFFICE - SUDBURY
RECEIVED
NOV 23 2000
A.M. 7 8 9 10 11 12 1 2 3 4 5 6 P.M.

3. Person or companies who prepared the technical report (Attach a list if necessary)

Name
Address
Roger Dufresne
14 Wright Hargreaves
Kirkland Lake, Ontario
P2N 1B2

Telephone Number 1-705-567-3725
Fax Number

Name
Address

Telephone Number
Fax Number

Name DENIS CHARTRE
Address BOX 53 SWASTIKA, ONTARIO P0K 1T0

Telephone Number 1-705-642-3153
Fax Number

4. Certification by Recorded Holder or Agent

I, Roger Dufresne (Print Name), do hereby certify that I have personal knowledge of the facts set forth in this Declaration of Assessment Work having caused the work to be performed or witnessed the same during or after its completion and, to the best of my knowledge, the annexed report is true.

Signature of Recorded Holder or Agent: Roger Dufresne
Date: NOV 24, 2000

Agent's Address
Roger Dufresne
14 Wright Hargreaves
Kirkland Lake, Ontario
P2N 1B2

Telephone Number 1-705-567-3725
Fax Number

RECEIVED
NOV 23 2000
GEOSCIENCE ASSESSMENT OFFICE

RECEIVED
LARDER LAKE
MINING DIVISION
NOV 22 2000
8:35

4.2843

5. Work to be recorded and distributed. Work can only be assigned to claims that are contiguous (adjoining) to the mining land where work was performed, at the time work was performed. A map showing the contiguous link must accompany this form.

W0080.00436.

	Mining Claim Number. Or if work was done on other eligible mining land, show in this column the location number indicated on the claim map.	Number of Claim Units. For other mining land, list hectares.	Value of work performed on this claim or other mining land.	Value of work applied to this claim.	Value of work assigned to other mining claims.	Bank. Value of work to be distributed at a future date
eg	TB 7827	16 ha	$26,825	N/A	$24,000	$2,825
eg	1234567	12	0	$24,000	0	0
eg	1234568	2	$ 8,892	$ 4,000	0	$4,892
1	6959 16442	16	$1,722.25	0	$1722.25	0
2	118 6931	16	0	861.12	0	0
3	118 6932	16	0	861.13	0	0
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
	Column Totals	3		$1,722.25	$1,722.25	0

I, ROGER DUFRESNE (Print Full Name), do hereby certify that the above work credits are eligible under subsection 7 (1) of the Assessment Work Regulation 6/96 for assignment to contiguous claims or for application to the claim where the work was done.

Signature of Recorded Holder or Agent Authorized in Writing	Date
Roger Dufresne	NOV. 24, 2000.

6. Instruction for cutting back credits that are not approved.

Some of the credits claimed in this declaration may be cut back. Please check (✓) in the boxes below to show how you wish to prioritize the deletion of credits:

- ☐ 1. Credits are to be cut back from the Bank first, followed by option 2 or 3 or 4 as indicated.
- ☐ 2. Credits are to be cut back starting with the claims listed last, working backwards; or
- ☒ 3. Credits are to be cut back equally over all claims listed in this declaration; or
- ☐ 4. Credits are to be cut back as prioritized on the attached appendix or as follows (describe):

Note: If you have not indicated how your credits are to be deleted, credits will be cut back from the Bank first, followed by option number 2 if necessary.

For Office Use Only

Received Stamp	Deemed Approved Date	Date Notification Sent
	Date Approved	Total Value of Credit Approved
	Approved for Recording by Mining Recorder (Signature)	

0241 (03/97)

RECEIVED
LARDER LAKE
MINING DIVISION
NOV 22 2000
8:35

RECEIVED
NOV 23 2000
GEOSCIENCE ASSESSMENT OFFICE

Ontario Ministry of Northern Development and Mines

Statement of Costs for Assessment Credit

Transaction Number (office use): W0080.00436.

Personal information collected on this form is obtained under the authority of subsection 6 (1) of the Assessment Work Regulation 6/96. Under section 8 of the Mining Act, this information is a public record. This information will be used to review the assessment work and correspond with the mining land holder. Questions about this collection should be directed to a Provincial Mining Recorder, Ministry of Northern Development and Mines, 3rd Floor, 933 Ramsey Lake Road, Sudbury, Ontario, P3E 6B5.

Work Type	Units of work Depending on the type of work, list the number of hours/day worked, metres of drilling, kilometres of grid line, number of samples, etc.	Cost Per Unit of work	Total Cost
STRIPPING AND	JOHN DEER 455 E CRAWLER		
TRENCHING	13½ HOURS (INVOICE #059658)		722.25
ROGER DUFRESNE	SUPERVISION 2 DAYS	100.00	200.00
PROSPECTING			
DISTRICT GEOLOGIST VISIT	½ DAY	50.00	50.00
REPORT PREP. ROGER	3 DAYS	100.00	300.00
REPORT PRED. DENIS	2 DAYS	100.00	200.00
Associated Costs (e.g. supplies, mobilization and demobilization).			
PERMIT – MINISTRY OF TRANSPORTATION (#17943)		150.00	150.00
Transportation Costs			
FUEL		40.00	40.00
Food and Lodging Costs			
3 DAYS AT		20.00	60.00
		Total Value of Assessment Work	$1,722.25

Calculations of Filing Discounts:

1. Work filed within two years of performance is claimed at 100% of the above Total Value of Assessment Work.
2. If work is filed after two years and up to five years after performance, it can only be claimed at 50% of the Total Value of Assessment Work. If this situation applies to your claims, use the calculation below:

TOTAL VALUE OF ASSESSMENT WORK x 0.50 = Total $ value of worked claimed.

Note:

Work older than 5 years is not eligible for credit.

A recorded holder may be required to verify expenditures claimed in this statement of costs within 45 days of a request for verification and/or correction/clarification. If verification and/or correction/clarification is not made, the Minister may reject all or part of the assessment work submitted.

Certification verifying costs:

ROGER DUFRESNE (please print full name), do hereby certify, that the amounts shown are as accurate as may reasonably be determined and the costs were incurred while conducting assessment work on the lands indicated on the accompanying Declaration of Work form as RECORDED HOLDER (recorded holder, agent, or state company position with signing authority) I am authorized to make this certification.

Signature	Date
Roger Dufresne	NOV. 24, 2000

212 (03/97)

NOV 23 2000
8:35 AM

RECEIVED
NOV 23 2000
GEOSCIENCE ASSESSMENT OFFICE

Ministry of
Northern Development
and Mines

Ministère du
Développement du Nord
et des Mines

Ontario

Geoscience Assessment Office
933 Ramsey Lake Road
6th Floor
Sudbury, Ontario
P3E 6B5

Telephone: (888) 415-9845
Fax: (877) 670-1555

December 13, 2000

ROGER J. DUFRESNE
14 WRIGHT HARGREAVES AVENUE
Kirkland Lake, Ontario
P2N-1B2

Dear Sir or Madam:

Submission Number: 2.20721

Subject: Transaction Number(s):		**Status**
	W0080.00436	Approval

We have reviewed your Assessment Work submission with the above noted Transaction Number(s). The attached summary page(s) indicate the results of the review. WE RECOMMEND YOU READ THIS SUMMARY FOR THE DETAILS PERTAINING TO YOUR ASSESSMENT WORK.

If the status for a transaction is a 45 Day Notice, the summary will outline the reasons for the notice, and any steps you can take to remedy deficiencies. The 90-day deemed approval provision, subsection 6(7) of the Assessment Work Regulation, will no longer be in effect for assessment work which has received a 45 Day Notice. Allowable changes to your credit distribution can be made by contacting the Geoscience Assessment Office within this 45 Day period, otherwise assessment credit will be cut back and distributed as outlined in Section #6 of the Declaration of Assessment work form.

Please note any revisions must be submitted in DUPLICATE to the Geoscience Assessment Office, by the response date on the summary.

If you have any questions regarding this correspondence, please contact JIM MCAULEY by e-mail at james.mcauley@ndm.gov.on.ca or by telephone at (705) 670-5858.

Yours sincerely,

Lucille Jerome

ORIGINAL SIGNED BY
Lucille Jerome
Acting Supervisor, Geoscience Assessment Office
Mining Lands Section

Correspondence ID: 15509
Copy for: Assessment Library

Work Report Assessment Results

Submission Number: 2.20721

Date Correspondence Sent: December 13, 2000 **Assessor:** JIM MCAULEY

General Comment:
Please note that compilation work for the completion of a report is not an eligible expense.

Transaction Number	First Claim Number	Township(s) / Area(s)	Status	Approval Date
W0080.00436	16442	OTTO	Approval	December 12, 2000

Section:
10 Physical PSTRIP
10 Physical PTRNCH

At the discretion of the Ministry, the assessment work performed on the mining lands noted in this work report may be subject to inspection and/or investigation at any time.

Correspondence to:
Resident Geologist
Kirkland Lake, ON

Assessment Files Library
Sudbury, ON

Recorded Holder(s) and/or Agent(s):
ROGER J. DUFRESNE
Kirkland Lake, Ontario

Correspondence ID: 15509

GIF image 2132x1482 pixels

2.20721
P STRIP
1 PTRNCH

TECK TP. - M.392

12 11 10 9 8 7 6 5 4 3 2 1

VI V IV III II I

EBY TP. - M.345

BOSTON TP. - M.332

MARQUIS TP. - M.362

1239266
1239347
1239345
1239346
1206406
1206408
1206407
DANE TOWNSITE
CL 9293
CL 5029
CL 7678
Round Lake

THE INFORMATION THAT APPEARS ON THIS MAP HAS BEEN COMPILED FROM VARIOUS SOURCES, AND ACCURACY IS NOT GUARANTEED. THOSE WISHING TO STAKE MINING CLAIMS SHOULD CONSULT WITH THE MINING RECORDER, MINISTRY OF NORTHERN DEVELOPMENT AND MINES, FOR ADDITIONAL INFORMATION ON THE STATUS OF THE LANDS SHOWN HEREON.

42A01SE2011 2.20721 OTTO 200

THE TOWNSHIP OF OTTO

DISTRICT OF TIMISKAMING

LARDER LAKE MINING DIVISION

SCALE: 1-INCH-40 CHAINS

LEGEND

PATENTED LAND	● or (P)
CROWN LAND SALE	C.S.
LEASES	(L)
LOCATED LAND	Loc.
LICENSE OF OCCUPATION	L.O.
MINING RIGHTS ONLY	M.R.O.
SURFACE RIGHTS ONLY	S.R.O.
ROADS	
IMPROVED ROADS	
KING'S HIGHWAYS	
RAILWAYS	
POWER LINES	
MARSH OR MUSKEG	
MINES	
CANCELLED	C
PATENTED S.R.O.	

NOTES

400' surface rights reservation along the shores of all lakes and rivers

(R) SURFACE AND MINING RIGHTS WITHDRAWN FROM STAKING SEC. 36/80, W9/86, JAN. 24, 1986
O-L26-80 RR OPENS W9/86 DEC. 14, 1990

* APPLICATION UNDER THE PUBLIC LANDS ACT SEC. 31 (b) OF THE MINING ACT

CL 5029 DISPOSITION OF CROWN LAND
Surface Rights Withdrawn under Sec. 36,
The Mining Act R.S.O. 1980, ORDER NO. W-01/91/ONT
(From Canada Pipeline Right of Way one Quarter
Zone perpendicularly 40.25 meters or 132 ft on
either side of centre line of right of way)

NOTICE OF FORESTRY ACTIVITY

THIS TOWNSHIP / AREA FALLS WITHIN THE TIMISKAMING MANAGEMENT UNIT

AND MAY BE SUBJECT TO FORESTRY OPERATIONS. THE MNR UNIT FOREMAN FOR THIS AREA CAN BE CONTACTED AT: P.O. BOX [illegible]
SWASTIKA, ONT.
P0K 1T0
705-[illegible]

PLAN NO. M-379

MINISTRY OF NORTHERN DEVELOPMENT AND MINES

DECLINATION 12° W. OF N.

N

ANNEX "J-5"

OTTO TWP CLAIM #1.5442

POST #1

268.5 M.

SCALE 1/4 INCH = 1 FOOT

(899.34 FT.)

REFERENCE POST

6 ft SOUTH 1.83 M

(82 METRES (268.55 ft) WEST OF N-S CLAIM LINE

N-S CLAIM LINE

PILLOWS WITH MAGNESIUM THOLEIITE

(16 ft WIDE) (4.89 M.)

REF (17 ft. OR 5.19 M.) SOUTH

REF (25 ft. OR 7.63 M.) SOUTH

(8 FT. WIDE) (2.44 M.)

REF (27 ft. OR 8.24 m.) SOUTH

REFERENCE LINE

PILLOWS WITH MAGNESIUM THOLEIITE

(3 FT WIDE) (.92 M)

3 FT. ON LINE .92 M

REF (47 ft.) (14.35 M.) SOUTH

REF (54 ft.) (16.49 M.) SOUTH

Ref. (63 ft.) (19.24 M.) SOUTH

(20.15 M.)

Ref. 166 ft. (8 ft. wide) (2.44 M)

Ref. 169 ft. (21.07 M.) SOUTH

NORTH

DECLINATION 12° W. OF N.

CHARTRE - DUFRESNE 1999 PROPERTY
TECK - OTTO TWPS.
TRENCHING AND STRIPPING PROGRAM AREA #1
SCALE: 1/4 INCH = 1 FOOT
DATE: NOV 20, 2000

42A01SE2011 2.20721 OTTO 210