REPORT

ON

THE STURGEON NARROWS PROPERTY

OF

CANADEX RESOURCES LIMITED

PLAYFAIR RESOURCES LIMITED

SANTA MARIA RESOURCES LIMITED

SWANSEA GOLD MINES INC.

STURGEON LAKE AREA, ONTARIO

by L. J. Cunningham, B.Sc., P.Eng.
Mining Engineer
dated 11th February, 1984
and
Allan R. Smith, B.Sc.,
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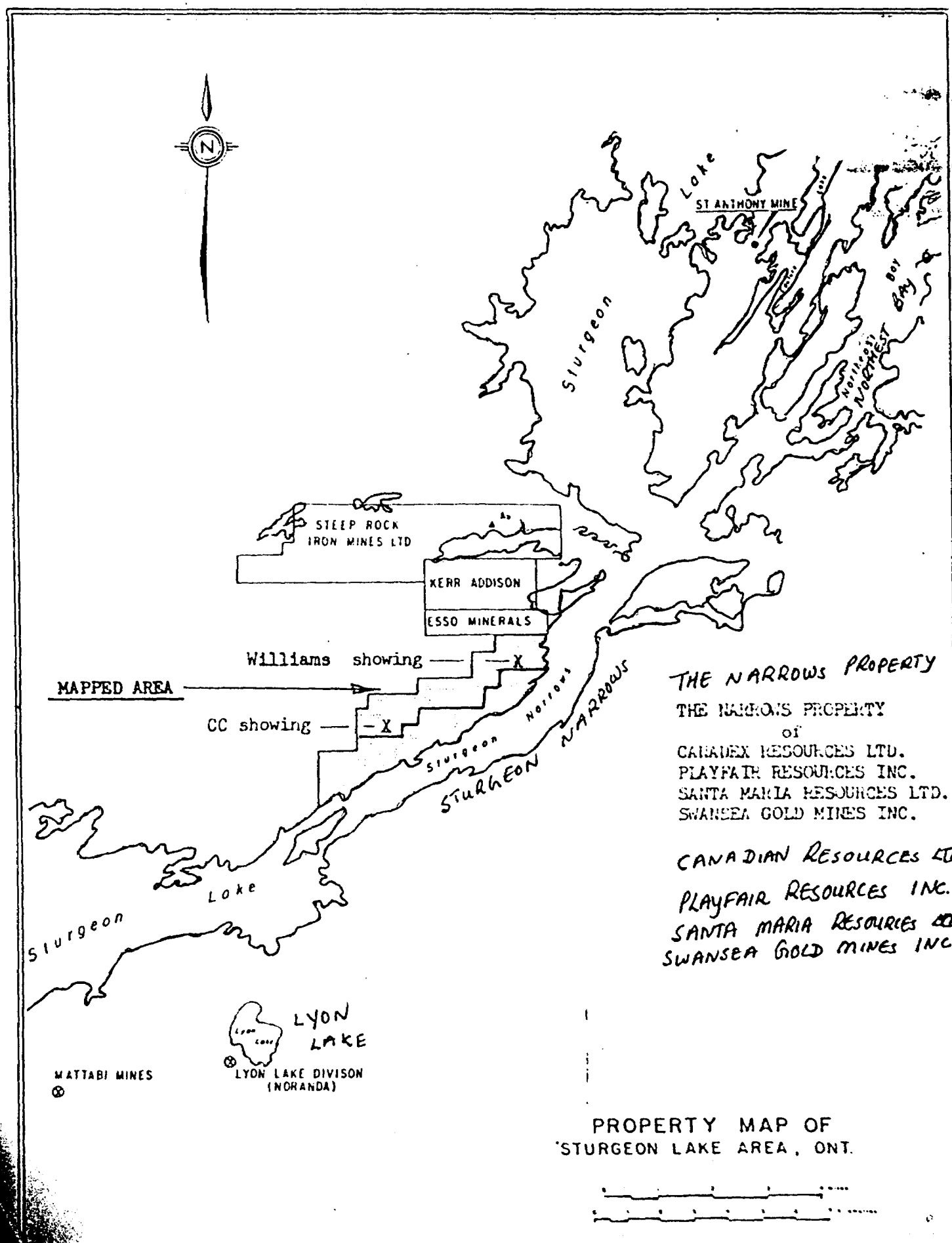

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STURGEON LAKE AREA, ONTARIO

LOCATION & DESCRIPTION

Sturgeon Lake is located 210 km. northwest of Thunder Bay. From Ignace on Highway 17, a paved highway, No. 599, runs north to the Village of Savant Lake. A number of access roads between Kilometre 80 (north of Ignace) and Kilometre 130 (Savant Lake) give convenient access to the Sturgeon Lake Area. The Sixmile Lake road, which exits at Kilometre 100, traverses much of the claim group.

The claims are located within the Sixmile Lake Area (Plan No. 2877) within the Patricia Mining Division (Recording Office, Sioux Lookout, Ontario).

The 104 claims are numbered as follows:

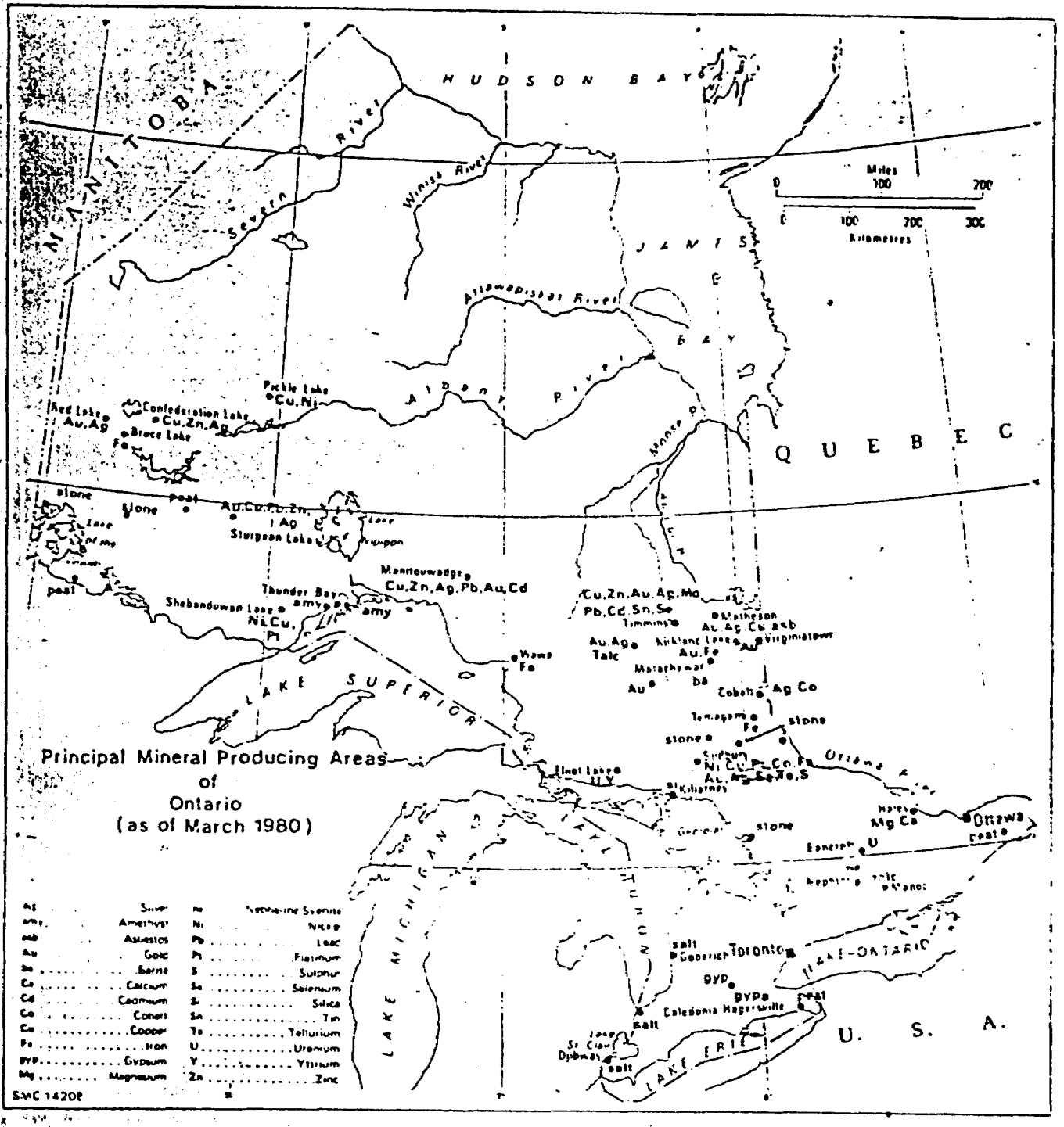
P.642478 - 82	inclusive
P.611504 - 06	"
P.642974 - 86	"
P.642988 - 97	"

HISTORY

The Sturgeon Lake Area was the scene of one of Canada's earliest gold rushes. Gold was first found in 1898 and in 1900 the St. Anthony Mine (now Aubet) was discovered. By 1911 numerous gold occurrences were recorded. Extensive trenching, a number of shafts and a limited production resulted. The activity was short lived for all but St. Anthony Mines which operated intermittently from 1908 to 1941 to produce 331,000 tons grading 0.19 oz. gold per ton. A discovery in 1935 on Beidelman Bay, 35 km. southwest of the St. Anthony at the southwest end of Sturgeon Lake, led to extensive underground development but no production resulted.

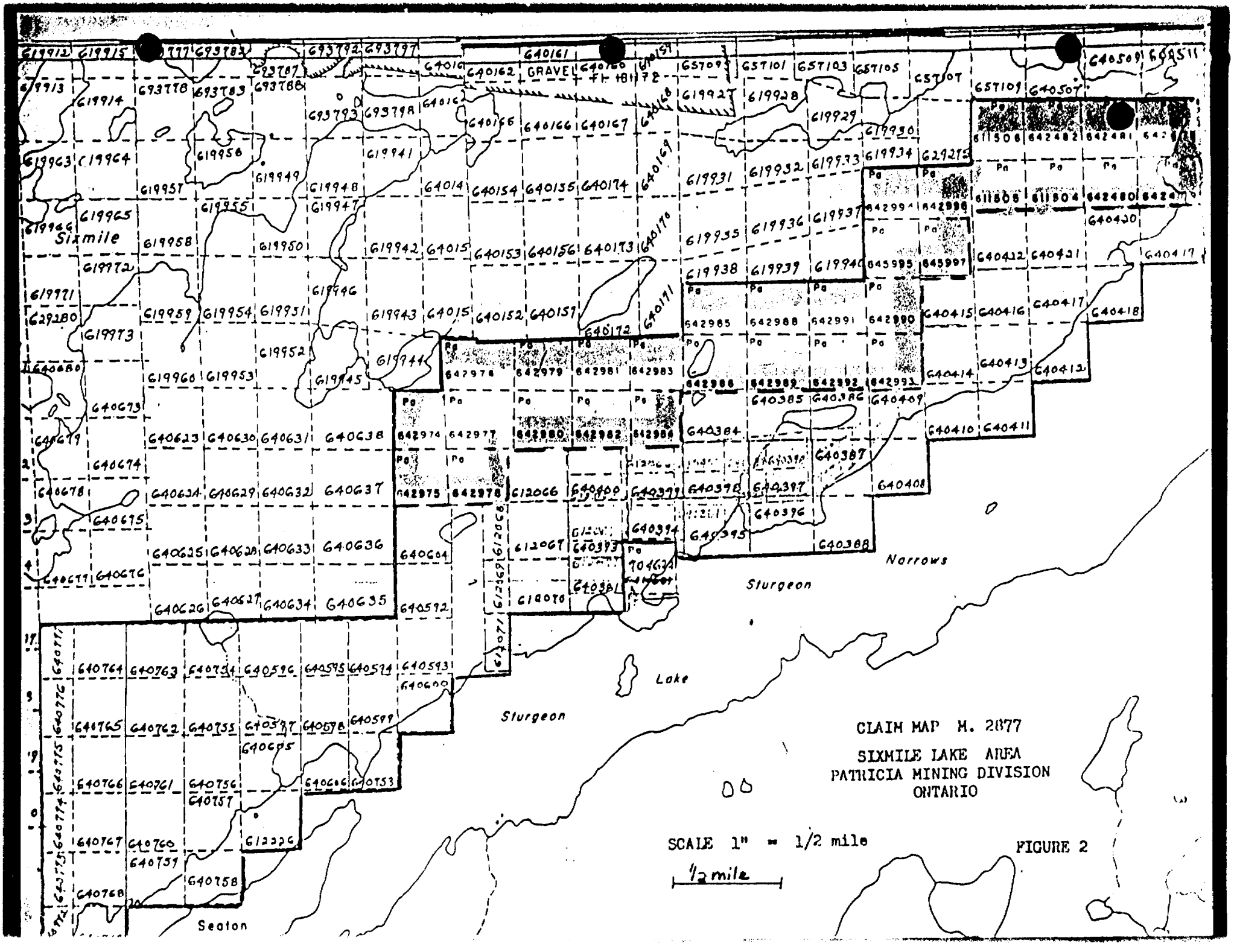
The area was inactive until 1969 when the Mattabi base metal deposit was discovered. By 1972 four additional deposits had been discovered (Sturgeon Lake, Lyon Lake, Creek

All of the area now staked for gold was staked in 1969-75 and tested by mapping, geophysics and some drilling without success for base metal mineralization.



Principal mineral producing areas of Ontario (as of March 1980).

FIGURE 1


Sixmile
Narrows
Sturgeon
Lake
Sturgeon
Seaton
GRAVE
CLAIM MAP M. 2877
SIXMILE LAKE AREA
PATRICIA MINING DIVISION
ONTARIO
SCALE 1" = 1/2 mile
1/2 mile
FIGURE 2

Sturgeon Lake
Feb. '84

Undoubtedly the present claim block was prospected in the early days, although no records are known of this probable work.

In 1939, Williams, A.D., recorded trenching on claims which form the north-east end of the present group.

1968-69 W. G. Wahl completed ground geophysical surveys and drilling on Sturgeon Narrows.

1970-71 Mattagami Lake Mines drilled two holes (Mattagami Block 27) to test an airborne conductor. Felsic-carbonaceous rocks were encountered but no base metal mineralization was found. On Mattagami Block 28, ground geophysics was completed.

Conwest Exploration Company completed ground magnetic and electro-magnetic surveys.

Rio Tinto Canadian Explorations Limited completed mapping and geophysical surveys.

Greenpoint Mines completed ground and geophysical surveys and drilling.

Selco Exploration Company drilled the Wahl property at Sturgeon Narrows.

L. J. Cunningham & E. Chorzepa discovered a heavily gossaned area (CC showing) located 1 claim southeast of Maria Lake.

1973 Northex Management completed mapping, geophysics and drilled 2 holes (200 feet) on "CC" showing. Anomalous gold encountered.

1974 Northex Management staked and completed geophysics on 8 claims centred on Mattagami drill hole no. 27.

Falconbridge Nickel Mines tested by drilling and mapping a gold-bearing syenite dike on Sturgeon Narrows.

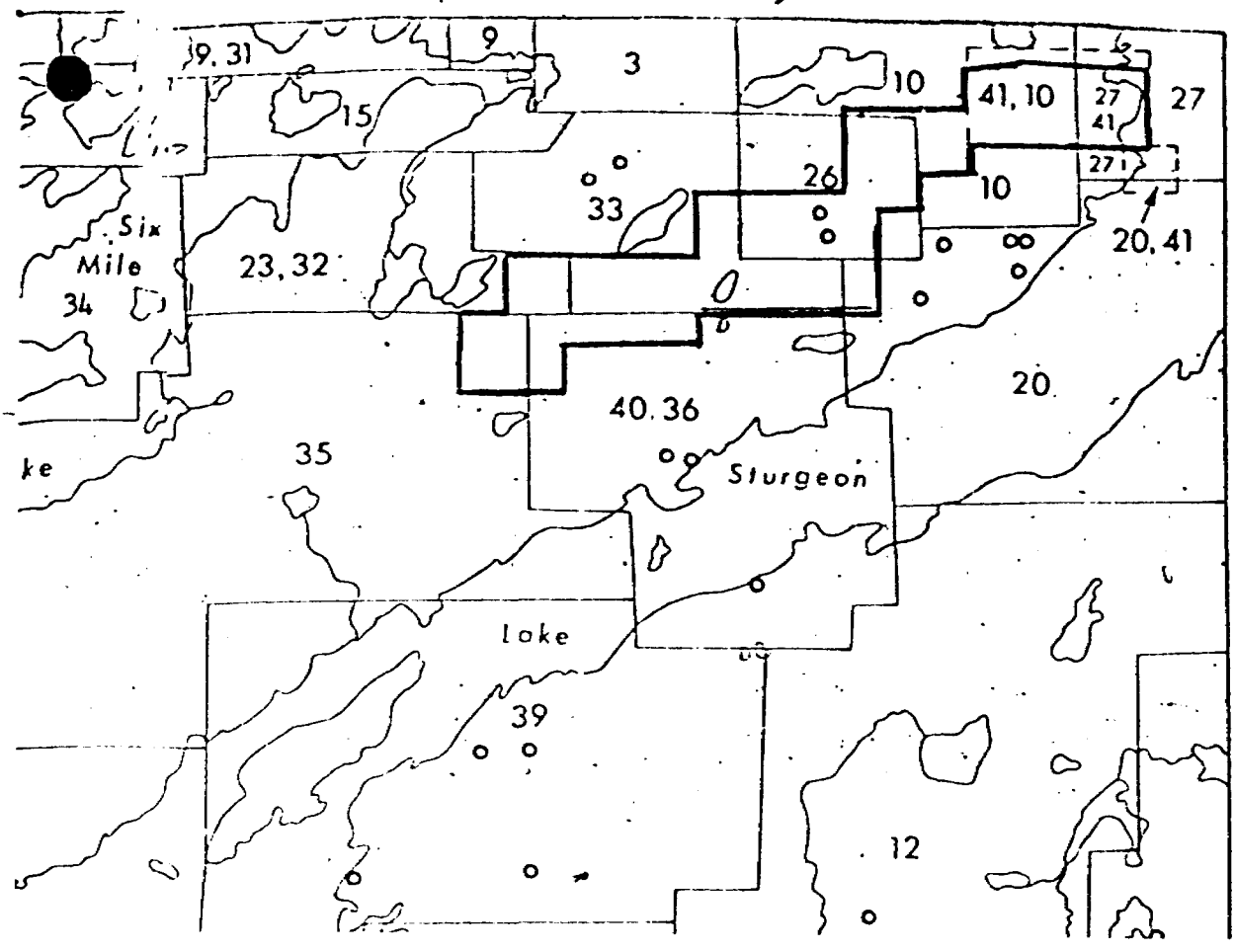
1982 A 31 claim block was staked to cover the Williams-Cunningham/ Chorzepa showings.

1983 Line cutting, mapping, stripping and trenching completed over 31 claims.

Locally:

1982-83 Steep Rock Iron Mines report encouraging gold values in drilling blue quartz veins on King's Bay - 4 miles.

Kerr Addison Mines completed mapping, geophysics, geochemistry, drilling to locate extensive occurrences of auriferous float (quartz veins).



No. 10	Conwest Exploration Co. Ltd.	1970	Geophysics
20	Greenpoint Mines	1970-71	Geophysics, drilling
26	Mattagami Lake Mines	1970	Drilling
27	Mattagami Lake Mines	1970	Geophysics
32	Northex Management (Canadex)	1972	Geophysics, drilling
33	Rio Tinto Canadian Limited	1970	Geophysics, drilling, mapping
34, 35	Rio Tinto Canadian Limited	1970	Geophysics, drilling
36	Selco Explorations	1970	Drilling
40	Wahl	1968-9	Geophysics, drilling
41	Williams, A.D.	1939	Trenching

Part of
SIXMILE LAKE DATA SERIES
O.D.M. Map P.928, 1974
showing
PRESENT PROPERTY OUTLINE
Scale 1" = 1 mile

1 mile
SCALE

FIGURE 2 a

Sturgeon Lake
Feb. '84

GENERAL GEOLOGY

The Sturgeon Lake Area is a 75 km. long section within the Savant-Crow Lakes Greenstone Belt, Figures 3 and 4.

"In the Sturgeon Lake Area, the volcanic rocks have been tightly folded inward and form a steep trough with the older rocks located on the outer edges of the belt and facing inward. The axis of the trough is transected by the Sturgeon Narrows Fault Zone which is marked by brecciation, shearing and syenite & porphyry intrusions." (Trowell, 1983)

"Regional metamorphism is greenschist and locally almandine-amphibolite rank (Trowell 1974)."

"The metavolcanics south of Sturgeon Lake are a north-facing steeply dipping sequence of mixed tholeiitic to calc-alkalic volcanics representing several cycles of deposition"(Trowell et al., 1980; Franklin et al., 1977). Individual cycles consist of a mafic metavolcanic base overlain by an upper unit of intermediate to felsic volcaniclastics. The majority of the Sturgeon Lake area massive sulphide deposits occur within or at the top of felsic volcaniclastics that are thought to mark the termination of the first major volcanic cycle. Figure 5

"The volcanics immediately north of Sturgeon Lake form the northern sequence consisting of south-facing Fe-tholeiitic basalts and tholeiitic to calc-alkaline flows and volcaniclastics that show a somewhat cyclic development" (Trowell et al., 1980). Trowell et al. (1980) indicate that these metavolcanics are not lithologically or chemically correlative with the volcanics of the south limb.

The north volcanic assemblage was re-examined (Thurston, 1983 Figure 6) and described as follows:

All bedrock in the area is Early Precambrian (Archean) in age. The area (Figure 1) includes part of the Wabigoon Subprovince granite-"greenstone" terrane. The supracrustal units seen on the Six Mile Lake Road from north to south are described in the following sections

1. Coarse-grained pillowed and massive amphibolites of the hornblende hornfels facies are adjacent to the granitic batholith exposed to the north and east.

2. A felsic pyroclastic unit about 1400 m thick extends for 12 km along strike from Highway 599 in the west almost to King Bay of Sturgeon Lake. The unit exhibits, over the full thickness, a generally fining upward aspect, with tuff-breccia gradually fining to predominantly tuff. Individual depositional units, defined by fine tuffaceous tops, exhibit normal size grading over typically 30 to 100 m thicknesses, with the proportion of pumice increasing upward. Grading of clast size and type, the lack of bedding, abundance of pumice, and sequence of primary structures suggests the unit represents subaqueous ash flows (Parsons 1969). The above parameters, especially the well developed grain gradations in tuffaceous units, indicate a northerly top direction for this unit.

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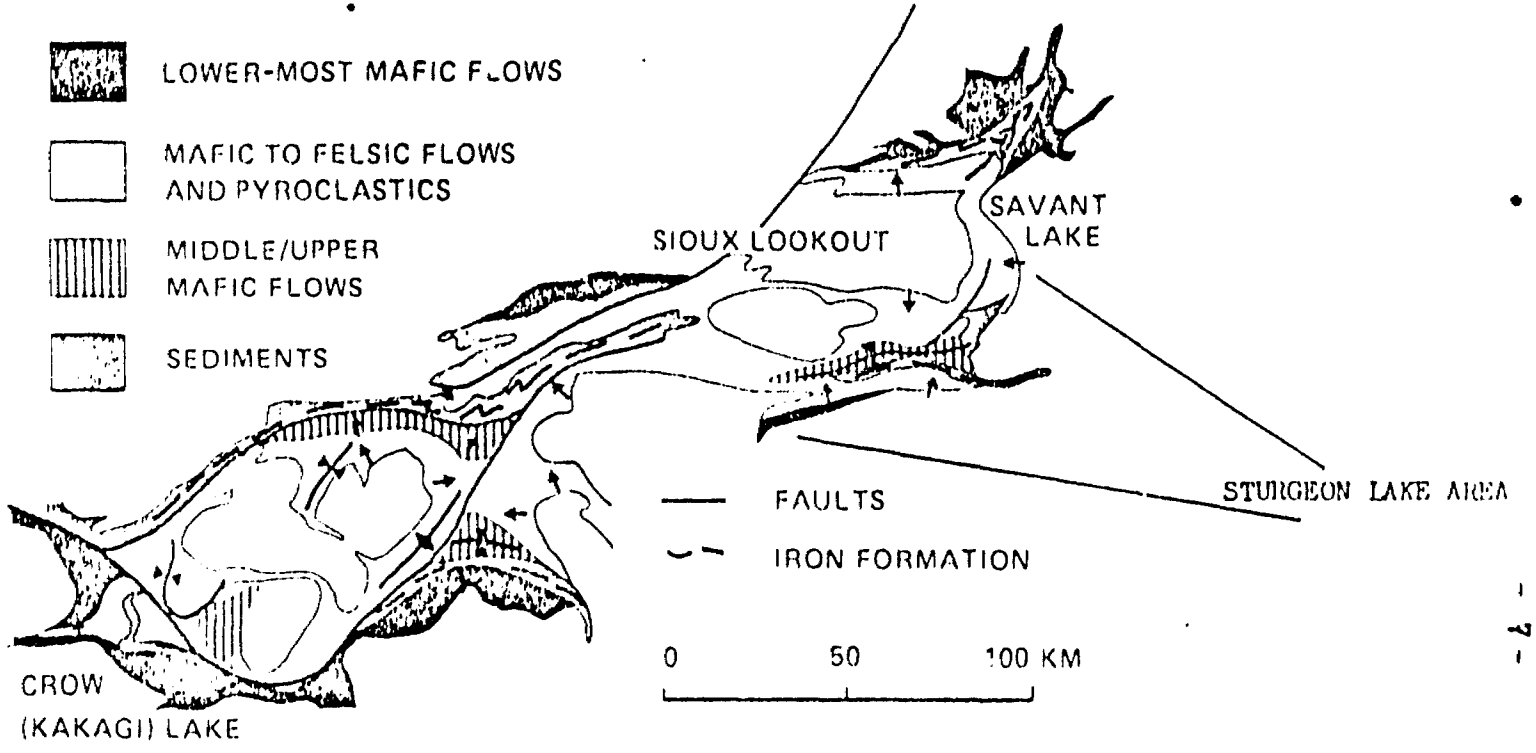
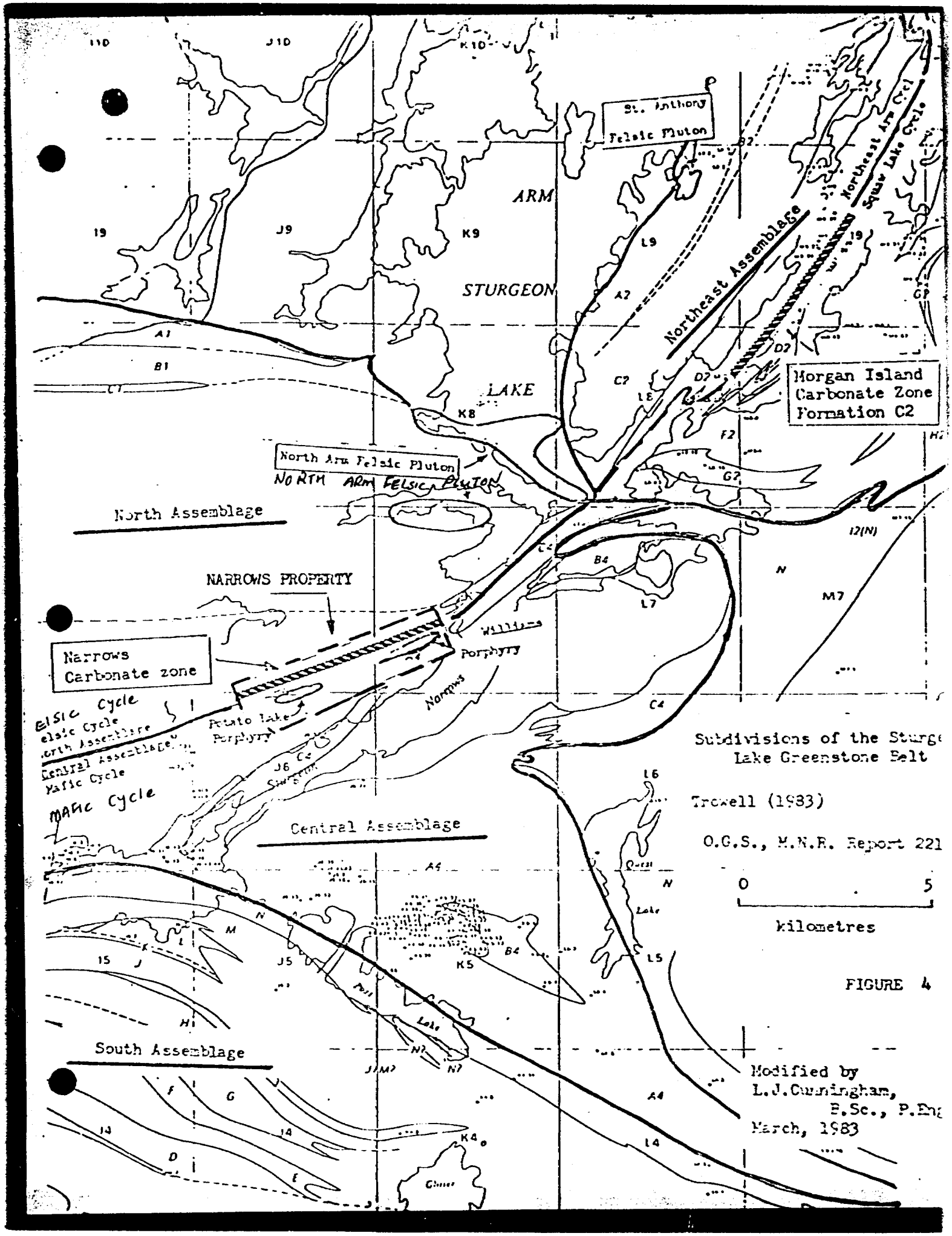
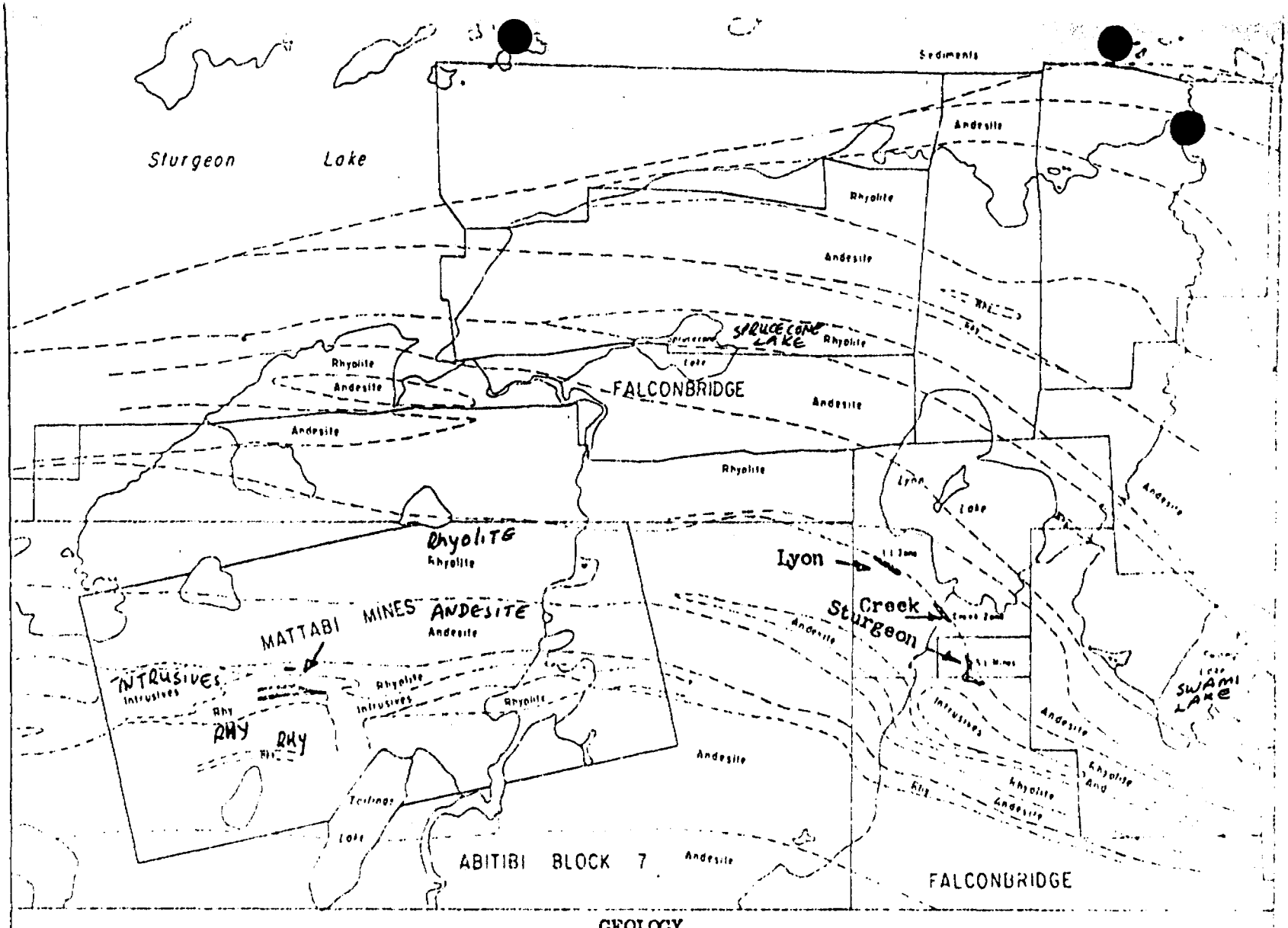


Figure 2— Sketch map showing broad lithostratigraphic relationships and structural complexity of the Savant Lake--Crow Lake area

Source O.G.S. Paper MP 89
Trowell, N.F. et al 1980

FIGURE 3


St. Anthony Felsic Pluton
ARM
STURGEON
LAKE
Northeast Assemblage
Northeast Arm Cycle
Squaw Lake Cycle
Morgan Island Carbonate Zone Formation C2
North Arm Felsic Pluton
NORTH ARM FELSIC PLUTON
North Assemblage
NARROWS PROPERTY
Narrows Carbonate zone
Felsic Cycle
Felsic Cycle
North Assemblage
Central Assemblage
Mafic Cycle
MAFIC Cycle
Potato Lake Porphyry
Williams Porphyry
Narrows
Central Assemblage
South Assemblage
Subdivisions of the Sturge
Lake Greenstone Belt
Trowell (1983)
O.G.S., M.N.R. Report 221
0 5
kilometres
FIGURE 4
Modified by
L.J.Cunningham,
B.Sc., P.Eng
March, 1983



GEOLOGY
SOUTH VOLCANIC ASSEMBLAGE
STURGEON LAKE AREA
SCALE 1" = 2640'
Mattagami Lake Explorations Ltd.

X
F Zone

TABLE 1. Ore deposits, Sturgeon Lake area

Deposit	Tons	%Cu	%Zn	%Pb	oz/tAg	oz/tAu	%Cu/%Zn
F Zone	630,000	0.98	8.10	0.49	1.80		0.12
Mattabi	12,866,000	0.91	7.60	0.85	3.13	0.007	0.12
Lyon Lake	3,033,000	1.12	5.85	0.59	3.04	0.007	0.19
Creek Zone	908,000	1.66	8.85	0.76	4.71	0.019	0.19
Sturgeon Lake	2,100,000	2.98	10.64	1.47	6.14	0.021	0.28

FIGURE 5

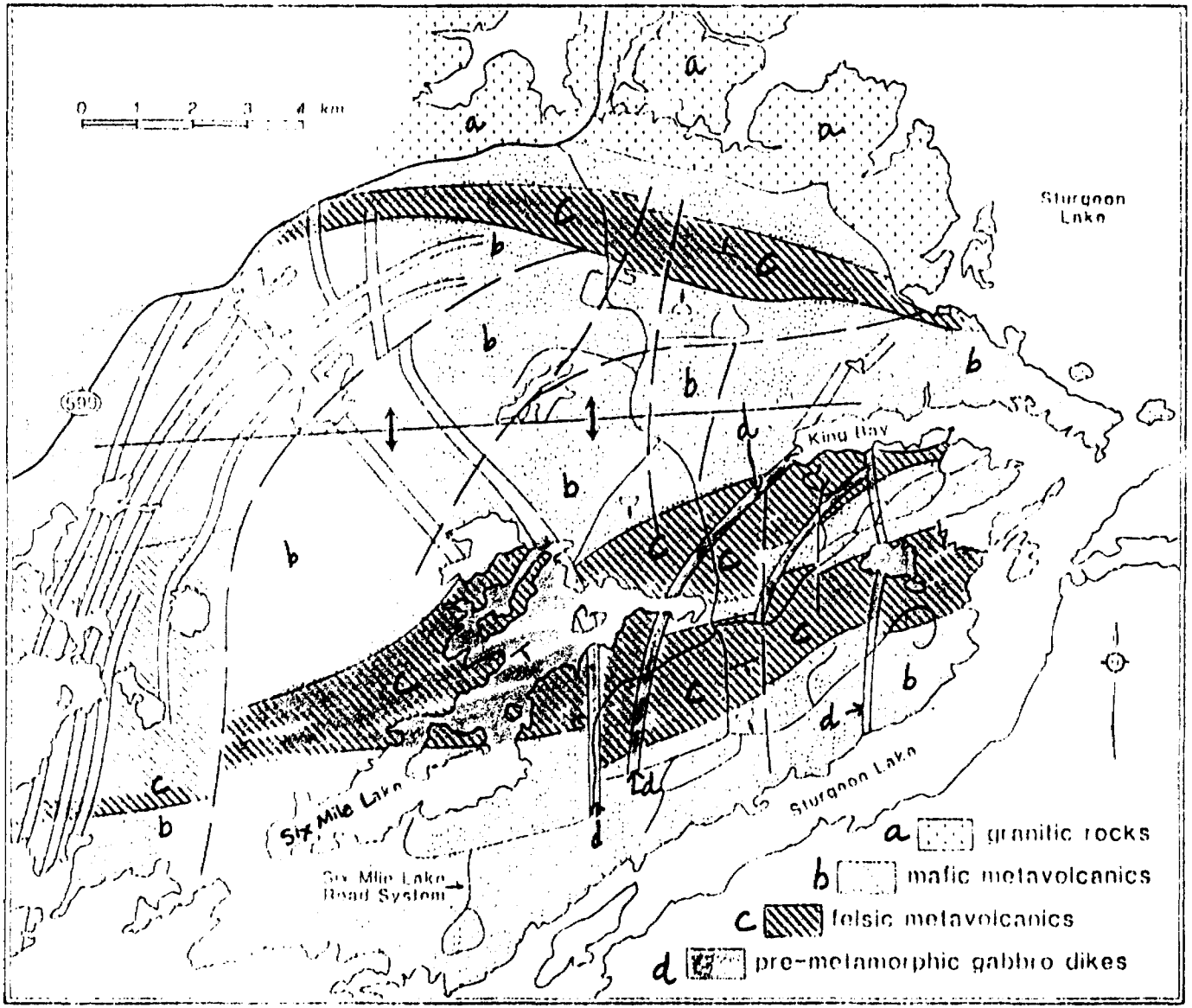


Figure 1. Geological sketch map, central Sturgeon Lake area.

Thurston, 1983 O.G.S. M.P. 116

Assemblage

FIGURE 6

Sturgeon Lake
Feb. '84

3. A unit of mafic flows with massive, pillowed, and plagioclase-phyric flows and associated hyaloclastite extends the full width of the area. The flows exhibit varied, generally slight degrees of epidotization, silicification, and carbonatization. Principal areas of carbonatization are immediately north and south of King Bay of Sturgeon Lake. Epidotization of hyaloclastic mafic flows is prominent immediately north of the southern felsic unit south of King Bay and north of Dan's Lake. A major plagioclase-phyric unit occurs just south of unit 2 (described above) and north of unit 4 (described below). The northern occurrence includes, as well as plagioclase phenocrysts, some centimetre scale clots of felsic plutonic material.

4. The southern felsic unit, termed the top of the Jumping Six-Mile Lake Cycle by Trowell (1983a), is well exposed along the Six-Mile Lake Road and Cobb Bay of Sturgeon Lake. The unit consists of felsic ash flows generally, 100 to 200 m thick, which gradually fine upward to tuffaceous tops. Compositional zoning from andesite dacite to rhyolite is present within individual depositional units. The unit is capped by a 30 to 60 m thickness of cherty, thin-bedded felsic tuff. Generally, top indicators in this sequence suggest south-facing tops.

5. South of this is a sequence of mafic flows containing a prominent unit about 60 m thick with 1 to 5 cm plagioclase phenocrysts, succeeded to the south by pillowed, variably epidotized and silicified mafic flows with rare felsic tuff-intermediate pyroclastic and clastic units.

The sequence is cut by pre-metamorphic north- to northeast-trending gabbro to diorite dikes which range from single phase to composite dikes. The dikes have chilled margins against the country rocks and chilled margins between phases. They range in width from miniscule to 150 to 250 m. They often comprise up to 30% of the crustal volume, particularly in areas underlain by felsic metavolcanics.

The area is cut by syn- to post-tectonic granitoid intrusions varying from monzonite to quartz monzonite.

Cunningham, et al. (1983) mapped an area between Sixmile Lake and Sturgeon Narrows and suggest modifications (Figure 7) to Thurston (1983).

1. The south (upper) felsic part of the southern felsic unit is subdivided into two felsic units with an intercalated mafic horizon. Facings are south with steep dips.
2. The top of the intercalated mafic unit and the overlying felsic pyroclastic unit are hydrothermally altered; the former shows intense carbonatization, the latter carbonatization, sericitization and epidotization in addition to intense shearing. Facings are south with steep dips.
3. The overlying mafic unit (pillowed basalts - the lowest member of the central assemblage) shows extensive epidotization, local development of quartz tourmaline veining and discrete patches of silicification. Facing directions are predominantly southwesterly indicating a possible discordant relationship with the underlying felsic unit (NE to E striking).
4. Three quartz-feldspar porphyry bodies were identified and are considered intrusive.
5. The upper felsic pyroclastic unit (1) apparently terminates to the west, (2) grades from predominantly coarse clastic in the west to fine clastic, thin bedded units in the east and (3) becomes intercalated with the East

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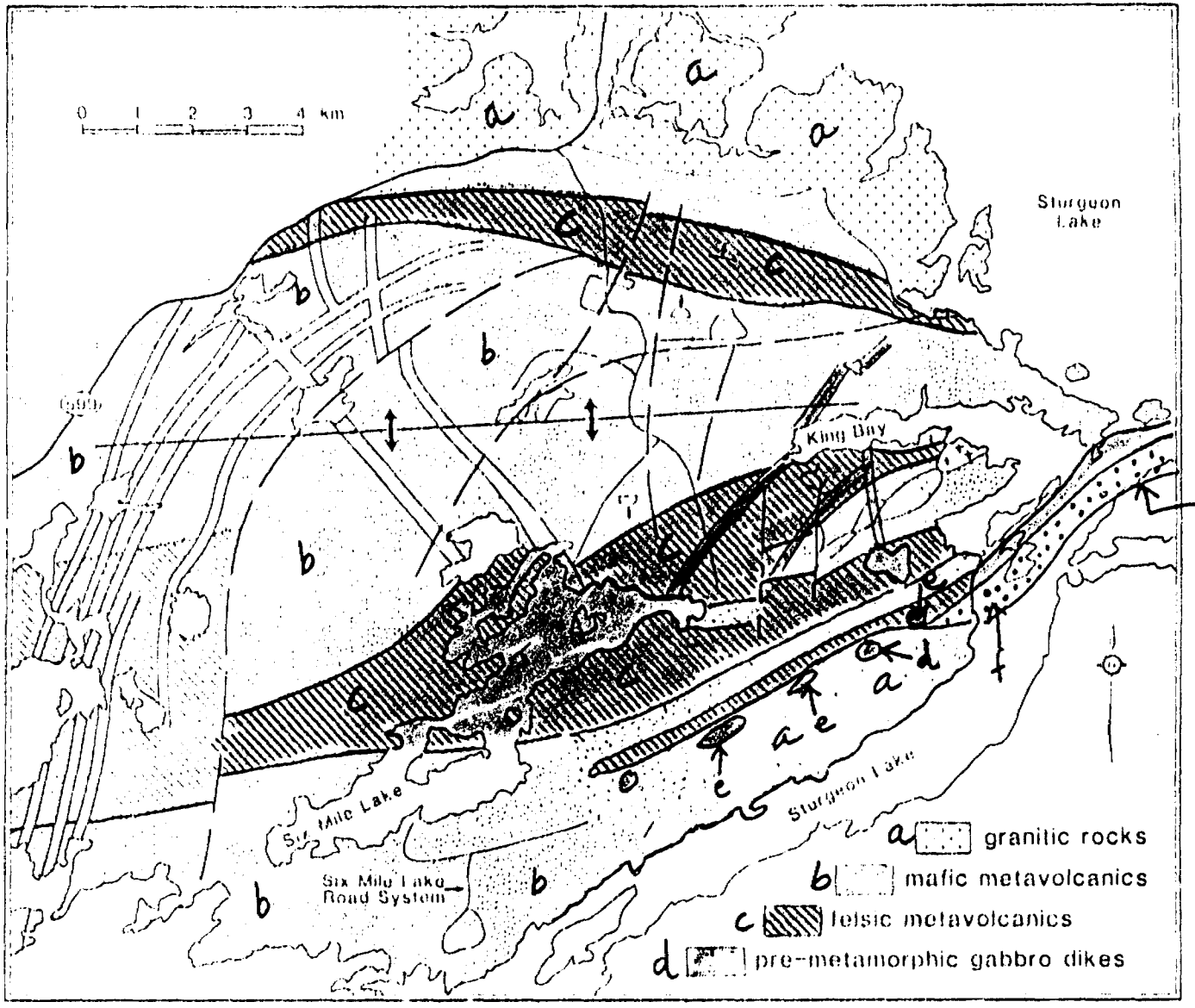

Figure 1 Geological sketch map, central Sturgeon Lake area
Thurston 1983 O.G.S. M.P. 116
Modified by Cunningham 1984

FIGURE 7

Sturgeon Lake
Feb. '84

Bay-Coveney Island sediments, (4) contains several graphitic-pyritic horizons.

6. Gabbro bodies are interpreted as rounded stocks to sill-like forms rather than north/south dikes.

On the Joint Venture property:

(1) Three pyritic zones of mineralization have been located within the felsic unit:

a) The CC showing is semi massive auriferous pyrite in a siliceous brecciated unit - considered to be of volcanogenic, hydrothermal origin.

b) The 96 showing is thinly laminated massive pyrite in fine grained clastic sediments - possibly a sulphide facies iron formation.

c) The Williams showings - disseminated to stringer pyrite in a highly siliceous rock - considered to be of hydrothermal origin.

(2) The east part of the property is geologically complex due to (i) faulting, (ii) intrusion of mafic and felsic bodies, (iii) interfingering of felsic pyroclastics, clastic sediments and mafic flows and (iv) hydrothermal alteration.

(3) Several genetic models are proposed:

1. Sea floor volcanism and hydrothermal activity as proposed by Pyon & Crocket (1983) for the Timmins Area:

"Carbonate alteration took place at the sea floor/sea water interface" "alteration zones, which represent regions of hydrothermal fluid discharge into the hydrosphere, are spatially associated with felsic volcanic complexes and with syngenetic, auriferous, cherty dolomite mineralization."

Sturgeon Lake
Feb. '84

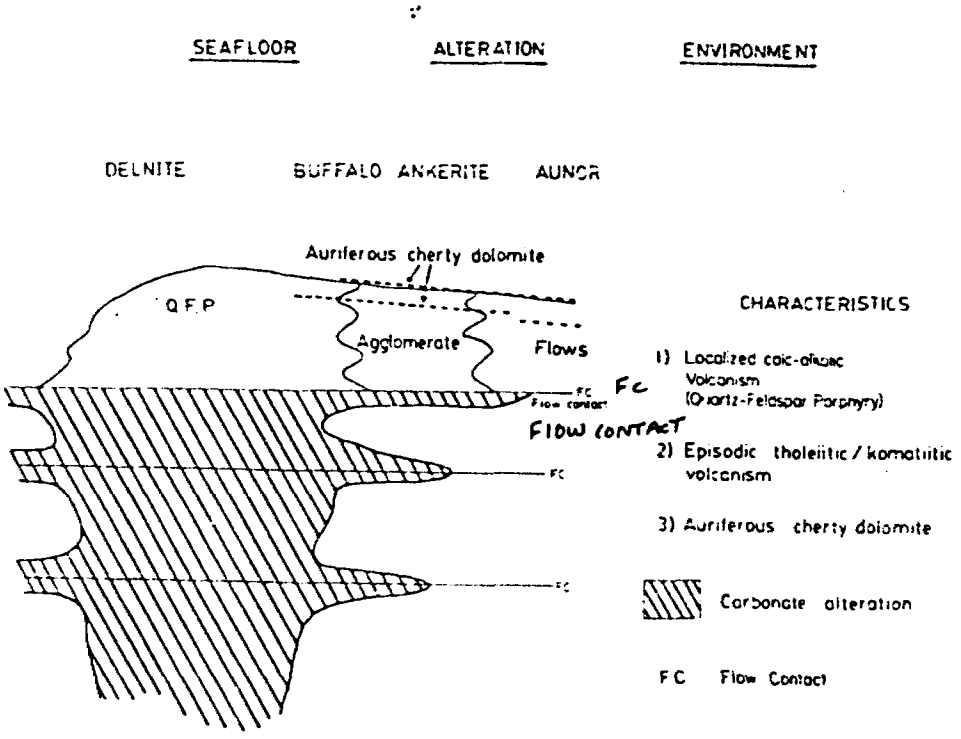

Figure 14–Sketch illustrating the essential characteristics of the a rierous, sea floor alteration environment.

Gold Exploration in the Timmins Area O.G.S. Study 26
J.A. Fyon and J. H. Crockett 1983

FIGURE 8

2. A tectonic model as suggested by Franklin (1983 verbal communication). - The intense shearing and alteration within the upper felsic unit may represent a splay or branch fault (of the Sturgeon Narrows fault zone) along which mafic and felsic intrusions have taken place accompanied by hydrothermal mineralizing solutions.

3. A sedimentary model (Hogg 1984):
"Gold in the area is believed of sedimentary origin, probably deposited within sediments in a shallow marine environment. Accordingly, depending on local conditions, it may occur in strata-bound form, or in veining in structurally deformed or recrystallized areas."

Sturgeon Lake
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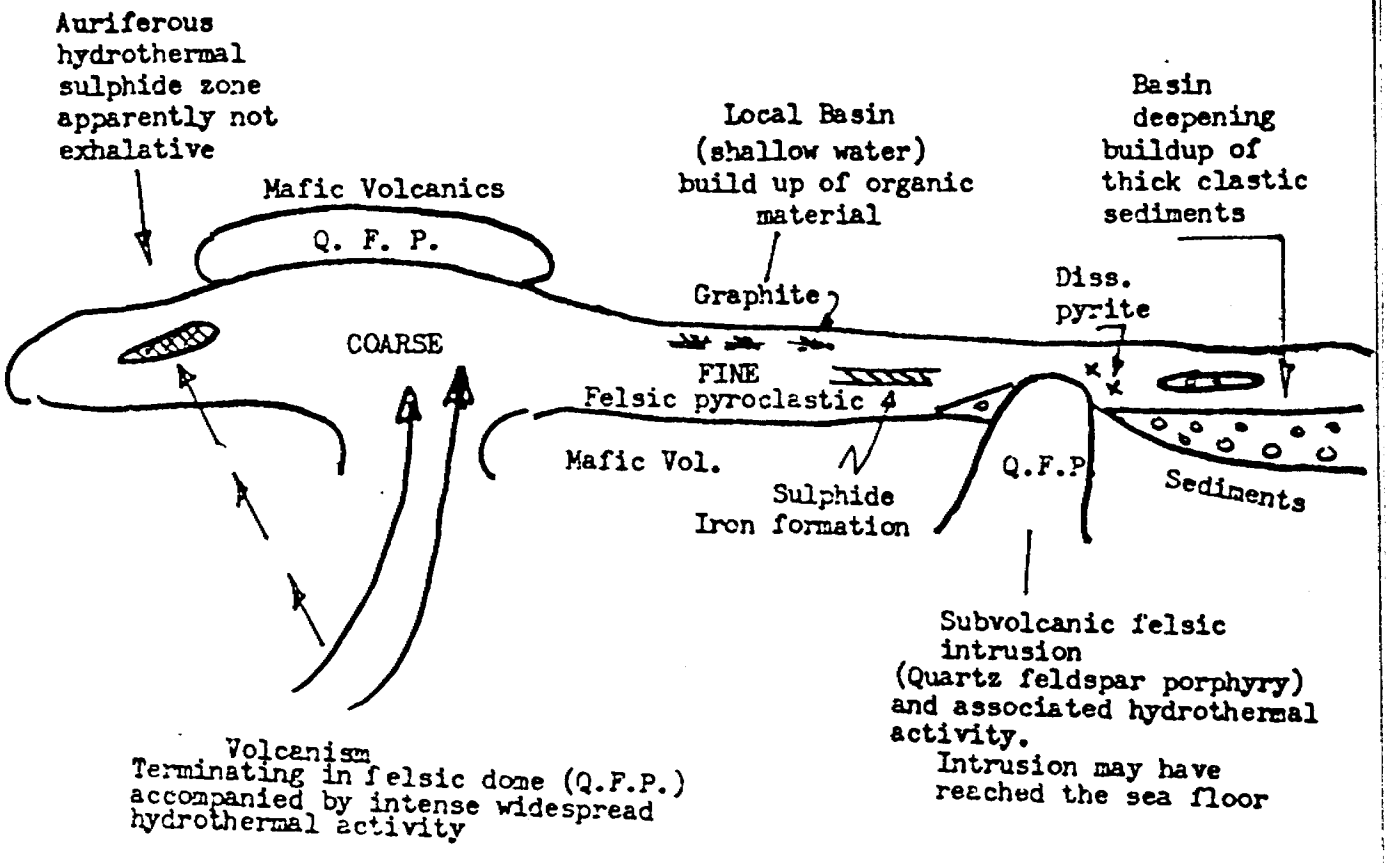
The writer favours sea floor volcanism and suggest the following sequence of events (after Severin (1982) model for Sturgeon Lake Deposit).



Signed,

L. J. Cunningham, B.Sc., P. Eng..
Mining Engineer

Dated at
Kirkland Lake, Ontario
11th February, 1984

Listing of Some Sources of Information on the Sturgeon Lake Area and the Canadex Sturgeon Narrows Property.

Moore, E.S.	1911	The Sturgeon Lake Gold Field. C.I.M.M. Vol. 20, Pt. 1.
Cunningham, L.J.	1973	Geology Report on Claims 325813-13, Santa Maria Mines, Six Mile Lake, Sturgeon Lake Area. Private Report.
King, E.L., Werry J.D.	1974	Six Mile Lake Area. O.D.M. Prelim. Map P.928
Meyer, G.	1974	Report on S. Johnson Gold Showing, Sturgeon Narrows. Private Report.
Trowell, N.F.	1974	Geology of the Bell Lake- Sturgeon Lake Area. O.D.M. G.R. 114.
Janes D.A.	1981	Annual Report of Regional and Resident Geologists. O.G.S. MP.93.
Severin, P.W.	1982	Geology of the Sturgeon Lake Base Metal Deposit. C.I.M.M. Bull. Oct.1982
Cunningham L.J.	1982	Report on the Sturgeon Narrows Property of Canadex Resources et al. Pvt. Report.
Trowell, N.F.	1983	GEOLOGY OF THE STURGEON LAKE AREA, DISTRICTS Geology of the Sturgeon Lake Area, Districts of Thunder Bay and Kenora, O.G.S. Report 221. AND KENORA, O.G.S
Kidd, R.	1983	REPORT ON THE STURGEON NARROWS PROPERTY Report on the Sturgeon Narrows Property, Sturgeon Lake Area, Northwestern Ontario. Private Report to Canadax Res.Ltd.
Thurston, P.C.	1983	Sturgeon Lake Gold Area. O.G.S. M.P. 116
O.G.S./G.S.C.	-	Aeromagnetic Sheets; Bell Lake, 1117G, and Sturgeon Lake 1118G
O.G.S	-	Geological Compilation Series Map 2442
M N.R.	-	Assessment Files, Claim Map M.2677.
Fyon, J.A. & Crockett, J.H.	-	Gold Exploration in the Timmins Area O.G.S. Special Paper 26
Hogg, G.M.	1984	Report on the Sturgeon Narrows Gold Property of Canadex Resources, et al, Sturgeon Lake, Ontario

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LITHOLOGY DESCRIPTION

by Allan R. Smith, 1983
Post Graduate Student, University of Western Ontario

1. Mafic Metavolcanics

Mafic metavolcanic rock is the most abundant lithology on the property, being represented in two volcanic cycles. This group can be subdivided on the basis of texture into seven major lithologies which are described below.

a) Massive Flows

colour - weathered surface, light green to grey-green and brown; locally bleached
- fresh surface, grey-green to dark green

texture - fine grained to aphanitic with some slightly coarser flows
- highly variable in vesicle size and content

structure - massive with local shearing and vertical jointing
- outcrops on elongated rounded ridges which tend to be polished in the direction of ice movement during glaciation
- located near the base of volcanic cycle
- gradational contact with intrusive mafic rocks

composition - basaltic in composition with the following minerals present: plagioclase 40 - 50% amphibele 10 - 15%
pyrcane 15 - 20% sulphides < 3%
chlorite, epidote, carbonate 15 - 20%
- euhedral pyrite cubes are present in some flows and range from 1 to 10 mm in size
- minor barren quartz veins up to 15 cm in width

alteration - carbonatization in matrix, along fractures and shears
- epidote and silica found in irregular stringers
- silicification and chloritization of matrix
- quartz-tournaline veins present

metamorphism - low greenschist facies with the following mineral assemblage: feldspar (plag), chlorite, amphibole, quartz and carbonate

environment - extrusive subaerial to submarine volcanism (from a shield type volcanoe) of a low viscosity magma
- rapid cooling to give fine-grained character

b) Pillowed Flow

colour - weathered surface, grey-green to light green with local bleached white areas and brown stain due to carbonate presence
- pillow margins and interpillow spaces are darker than pillows
- fresh surface, green to grey-green

texture - aphanitic to fine grained equigranular
- locally porphyritic and pillowed (see plagioclase phyric flows)
- abundant vesicles, concentrated toward top of flows

structure - large variation in pillow size from 5 cm to 1.5 m
- locally pillows are stretched east-west and flattened to a few cm
- pillow tops face south on bearings from 170° to 185° and tops are recognizable in about 40% of pillowed flow outcrop
- where surface is chloritic and soft, glacial striations are oriented at 34°

composition - same as that for Massive Flows

alteration - alteration intensity is quite variable and best observed in pillow margins and interpillow spaces
- more intense alteration than present in Massive Flows, with typical assemblages of quartz-chlorite, chlorite-carbonate, carbonate-epidote-quartz, and chert produced by carbonatization, chloritization, silicification and epidotization
- some interpillow spaces contain brecciated alteration mineralization along with some magnetite and pyrrhotite

metamorphism - same as Massive Flows

environment - formed by extrusion of mafic lava from submarine vent on to the sea floor; shallow to deep water
- rapidly cooled, fine grained character

c) Porphyritic Flows

colour - weathered surface, grey-green to orange-green, spotted
- fresh surface, dark green

texture - medium grained anhedral fractured pyroxene phenocrysts set in a fine grained to aphanitic slightly metamorphosed mafic matrix
- where pyroxene has altered to amphibole, the phenocrysts have partially been removed by weathering, leaving a pitted appearance on surface

- medium to coarse grained feldspar phenocrysts are found in plagioclase phyric flows
- euhedral pyrite cubes from 2 - 6 mm in size are found well-spaced in some flows

structure - locally sheared but relatively competent flows
- random fracture and joint pattern
- phenocrysts are concentrated near the stratigraphic tops of the flows, which grade into massive flows moving down in sequence

composition - basaltic with phenocrysts of pyroxene (altered to amphibole) and plagioclase

alteration - same as Massive Flow

metamorhphism - same as Massive Flow

environment - formed by subaerial to shallow water extrusive volcanism with the depth variability being indicated by changes in vesicle content
- variable flow composition indicated by phenocrysts composition

d) Pyroclastic Flow

This minor unit found within the massive flows consists of mafic to intermediate angular fragments set in a highly altered mafic groundmass. The weathered surface is brown-green with a slightly darker grey-green fresh surface. The angular fragments which are less than four centimeters in size are slightly less chloritized than the matrix. Competence appears to be high with few joints or fractures present. The unit appears in small lenses of short lengths and has formed by small scale explosive fragmentation at massive flows and resedimentation during deposition.

e) Amygdaloidal Flow

Amygdules present locally within the plagioclase phyric porphyritic flow and nearby massive flows have been filled by clay and silica. The soft, white clay mineral is kaolinite, which has formed as an alteration product of feldspar. Silica in the form of quartz is much less abundant in the amygdules than the kaolinite. This amygdaloidal character occurs at

the top of a massive to porphyritic flow having been formed by a collection of gas bubbles produced during lava extrusion.

g) Pillow Breccia

colour - orange-brown to grey-green weathered surface
- fresh surface, light to dark green

texture - angular to subround pillow fragments range in size from 3 cm to 12 cm but average 7 cm to 8 cm
- fragments are pieces of former pillows now hosted in a fine-grained to aphinitic mafic matrix
- some pillow fragments are stretched and show a subparallel orientation of elongated axes
- many pillow fragments are vesicular

structure - the unit is quite thin (< 3m) and found at the top of a number of the pillowed lava flows
- generally a gradational contact with underlying pillow flow and sharper contact with overlying massive flows
- elongated pillow fragments found to be parallel to the unit's strike and normal to pillow top direction
- unit strikes 090° to 100°

composition - basaltic, same as that for Pillowed Flows

alteration - similar to that of Pillowed Flows accounting for a distinct colour difference between pillow fragments and matrix
- epidotization and carbonatization of pillow fragments produce a light weathering colour, while chloritization and silicification of the matrix tend to produce a darker weathered surface

metamorphism - low greenschist facies

environment - formed by autoclastic brecciation at the top of pillowed flows after their deposition and prior to complete lithofication
- submarine environment

h) Plagioclase Phyric Flow

colour - weathered dark green to green-brown with white spots
- fresh surface is dark green

texture - porphyritic with subhedral to anhedral altered plagioclase phenocrysts ranging in size from 0.5 cm to 3.0 cm
- phenocrysts are widely spaced, with no preferred orientation or fabric
- fine-grained to aphanitic ground mass

structure - occurs as both pillowed to massive flows
- very competent unit with little jointing or fractures
- large well-formed pillows range from 0.7 to 1.4 metres across
- smaller stretched pillows from 20 - 30 cm long
- in vesicular flows, pillow tops oriented at 170° to 200°

metamorphism - low greenschist facies

composition - basalt which is slightly more mafic than previous (older) pillowed and massive flows as indicated by chlorite content
- locally up to 10% plagioclase phenos now altered to kaolinite

alteration - pervasive chloritization and silicification of unit with kaolinization and some sericitization of plagioclase phenocrysts
- chloritization and epidotization of pillow margins
- local quartz-chlorite stringer systems

environment - both submarine and subaerial volcanism to give pillowed and massive flows
- some subaerial weathering

2. Intermediate Metavolcanics

Intermediate metavolcanics have been distinguished from mafic metavolcanics at the east end of the property near the shore of Sturgeon Lake. The unit has not been identified west of the outcrop indicated on the map (see Map 1).

a) and b) Pillowed and Massive Flows

colour - weathered light grey to grey-green with a slightly darker grey-green fresh surface

texture - fine-grained to aphanitic with very few vesicles

structure - massive flows with no foliation or flow structure
- pillowed flows with 20 - 30 cm pillows
- found within large mafic flow sequence

composition - andesitic, slightly more felsic and lighter than associated mafic flows
- mineral species present include:

plagioclase	40 - 50%	pyroxene	5 - 10%
amphibole	5 - 10%	quartz	5 - 10%
chlorite, carbonate & sericite	10 - 20%		

alteration - carbonatization and silicification evident
- weak chloritization and sericitization

metamorphism - weak

environment - found within mafic flows and indicates a slight change in composition at subaerial and submarine volcanism to a more silica rich phase
- due to its small extent, it may represent a felsic segregation in the mafic flows

3. Felsic Metavolcanics

Felsic metavolcanics are quite abundant on the property and form part of one volcanic flow sequence. There is a wide range in texture and composition allowing subdivision into seven main groups.

a) Lithic Tuff

colour - weathered surface is bleached white to grey with localized

brown, green and purple-red staining

- fresh surface red brown to white

texture - consists of subround to subangular crystalline rock fragments which average < 4 cm in diameter

- also present are numerous anhedral quartz grains ("eyes") of 1 cm to 4 cm diameter
- the lithic fragments are of felsic volcanic composition and subsequent alteration has produced fine to aphanitic mineral grains
- locally monolithic with rhyolitic clasts

structure - low competence with pervasive shearing

- 2 directions of shearing at 046° and 070° with the latter sub-parallel to strike
- local grading indicates unit top to southeast
- local autoclast brecciation has allowed the formation of network quartz stringers
- small chloritic horizons are present which may be altered mafic volcanic xemoliths

composition - quartz rich rhyolite to rhyodacite composition

quartz 60 to 70% alteration minerals 10 - 15%
feldspar 10 to 20% (chlorite, talc, sericite, carbonate)

alteration - pervasive carbonatization in fractures and joints

- major alterations include sericitization, epidotization, hematization
- talc present along some shear planes

metamorphism - recrystallization present in some areas

- low greenschist facies assemblage

environment - formed by highly explosive volcanic activity including autobrecciation of extrusive domes and flows

- the material has been thrown out of volcanoes in solid form and has accumulated into deposits by falling from the ash cloud

b) Lapilli Tuff

colour - weathered concrete white to green-white with beet brown and purple-red stained patches
- fresh surface red-brown to white

texture - rock fragments (lapilli) are predominantly spherical or elipsoidal and range in size from 5 mm to 70 mm
- lapilli are subround to subangular with few angular
- the larger lapilli show subparallel orientiation of their long axes
- 1 - 2 mm quartz eyes are abundant
- bimodal lapilli on some areas of 1 to 3 cm and 30-40 cm size ranges

structure - of similar competence as lithic tuff
- pervasive shearing in 2 directions at 038° and 048°
- subparallel orientation of lapilli at 052° to 062°
- unit contains some rounded xenoliths of mafic metavolcanics the blocks being generally $<$ 1 m in size
- randomly oriented quartz fracture fillings are present

composition - similar to lithic tuff, however slightly more alteration minerals are present
- closest to rhyolitic composition
- heterogenous clasts (lapilli) consist of pumice, rhyolite and mafic volcanic

alteration - tends to be concentrated along shears and fractures where fluids have penetrated the rock
- local hematization and carbonatization are abundant
- chlorite whisps are present around some lapilli indicating a less intense alteration
- epidotization and sericitization have taken place and some talc has been found along shear planes

metamorphism - low greenschist facies

environment - formed in a similar but slightly higher energy environment than the lithic tuff
- explosive volcanic activity causing autobrecciation at

felsic domes and flows followed by accumulation of ejected fragments (lapilli) in a subaerial environment

c) Porphyritic Flow

A few isolated outcrops which appear to be part of a rhyolite flow contain small anhedral yellow phenocrysts. The phenos are $<$ 1 mm in size and roughly rectangular, resembling an altered feldspar.

d) Debris Flow

colour - weathered grey-green to green-brown with a fresh surface grey-green in colour

texture - subangular to rounded blocks from 20 cm to 40 cm in diameter composed of carbonatized felsic and mafic metavolcanics
- fine-grained highly altered felsic groundmass
- elongated fragments oriented subparallel at 052°
- slight schistosity at 050°

structure - rare outcrops in one area near lapilli tuff, no lateral extent
- gradational contact with lapilli tuff

composition - very similar to lapilli tuff with slightly higher mafic content

metamorphism - low green schist facies

alteration - abundant hematization and carbonatization
- some sericitization and chloritization

environment - formed by accumulation of felsic clasts and mafic xenoliths and their incorporation into a small felsic debris flow
- a down-slope gravity induced flow
- volcaniclastic mode of formation

e) Rhyolite Flow

colour - weathered surface grey-green to green brown
- fresh surface is grey-green

texture - fine grained to aphanitic
- locally abundant quartz eyes from 1 to 4 mm in diameter

- locally porphyritic with yellow-brown anhedral feldspar phenocrysts

structure - unit is not laterally extensive and may be remains of a rhyolite dome
- locally fissile due to rock fracture along shear planes
- 2 directions of shearing at 040° and 070°

composition - felsic with quartz and feldspar = 80 to 90% of rock
- minor amphibole now altered to chlorite
- carbonate present along shears

alteration - chloritization of mafics
- carbonatization along shears

metamorphism - low greenschist facies

environment - formed by subaerial volcanism, a highly viscous flow which has been extracted slowly as a dome

f) Waterlain Bedded Tuff

colour - weathered surface concrete white to grey
- fresh surface buff to grey-green

texture - rounded to subangular felsic tuff fragments all of which are < 2 mm size
- bedding present as defined by grain size variation on a scale of 0.5 cm to 1.0 cm
- some beds have very cherty appearance due to fine-grained nature

structure - graded bedding on cm scale indicates unit tops to southeast and strikes 84°
- shearing in 2 orientations at 036° and 070°
- local jointing at 040°/vertical
- locally contact with lapilli tuff is marked by a gossan zone

composition - similar composition as lithic tuff
- quartz and feldspar rich

alteration - hematization and carbonatization concentrated along shear planes

metamorphism - low greenschist facies

environment - formed by explosive volcanic activity similar to that producing the lithic tuff, however in this case deposition occurred in submarine conditions producing the lamination and grading observed

- it is located stratigraphically above lapilli tuff and hence indicates a strong to slightly less violent explosive activity where finer particles are falling from the ash clouds

g) Ignimbrite

colour - weathered white to light green

- fresh surface buff to white

texture - porphyritic with broken feldspar phenos from 0.5 to 4 mm in size

- round to subangular tuff clasts from 1 to 8 cm in diameter

- 1 to 2 mm wide pumice shards, 5 to 10 cm in length

structure - stratigraphically below lapilli tuff unit in western central portion of property

- rare localized shearing

- subparallel orientation of elongated clasts and pumice shards on a bearing 045° gives appearance of flow banding

composition - rhyolitic composition with a larger abundance of feldspar than present in lithic or lapilli tuff

- silica is present in pumice, as glass in the matrix and as quartz stringers

- xenoliths of mafic volcanics have undergone alteration to chlorite

alteration - carbonatization and sericitization of the matrix

- minor chloritization and epidotization

metamorphism - low greenschist facies

environment - formed as a result of deposition by nuées ardentes at high temperature

- these ash flows are ejected rapidly from volcanoes as great volumes of extremely hot expanding gases and glass

fragments

- gravity settling of material takes place as the ash flow moves down volcanic slopes

4. Chemical Metasediments

a) Massive Chert

colour - weathered surface green to grey-white

texture - very competent aphanitic glass - monomineralic chert

structure - massive, not found in beds but restricted to open space fillings, fracture fillings and associated with massive mafic metavolcanics as interpillow space fillings

composition - chert 90 to 100%
carbonate $< 5\%$

alteration - local carbonatization in randomly oriented fractures

environment - deposited in submarine environment as a chemical precipitate from silica-rich solutions which permeated pillowed flows after their formation

b) Bedded Chert

colour - weathered grey to white with locally bleached surface
- grey-green fresh surface

texture - alternating beds of chert and fine ash-fall tuff
- chert beds aphanitic with respect to grain size 0.5 to 3.0 cm in width
- tuff beds composed of felsic fragments are from 1 - 4 cm in width

structure - local graded bedding indicates tops of beds are to the south
- intense shearing with subsequent fluid invasion

composition - chert (silica) 90 to 100%
- pyrite 2 - 5 % carbonate 2 - 5%

alteration - carbonatization and silicification along shears and fractures

metamorphism - metamorphic mineral assemblage not observed

environment - formed by hot spring activity during a period of quiescence

follow the explosive felsic volcanism
- silica is deposited by chemical precipitation from hot spring brines in a submarine environment
- these brines have leached silica along with other minerals from the country rock (felsic volcanics) during circulation within convection systems
- the associated tuff beds are a result of contemporaneous deposition of material falling from ash clouds produced by the earlier explosive volcanic activity

5. Clastic Metasediments

a) Conglomerate

A matrix-supported conglomerate occurs immediately south of the claims mapped in a band of sedimentary rock extending a short distance along the north shore of Sturgeon Narrows. Briefly, this unit contains subangular to subround clasts ranging in size from 1 cm to 7 cm set in a fine-grained carbonatized and weakly chloritized matrix. The clasts are composed of lithic tuff, lapilli tuff, mafic volcanics, quartz-feldspar porphyry and argillite.

b) Siltstone, Argillite

colour - weathered surface grey to white; fresh surface grey-brown

texture - very fine-grained, equigranular
- no indication of bedding on macroscopic scale

structure - homogeneous and quite massive with a pervasive shearing possibly along a fissility developed in the rock
- combination of shearing and jointing has caused a separation of blocks from the outcrops, especially in the vicinity of Sturgeon Lake shoreline
- orientation of shearing 056°/vertical
- unit is in gradational contact with interbedded debris flow, the contact orientation ranging from 052° to 058°
- major joints are north-south with vertical dips

composition - composed of fine-grained mineral species weathered from the volcanic assemblage including quartz, feldspar, mica and amphibole

metamorphism - unit has been influenced by a weak metamorphism which has masked sedimentary features and induced a slight fissility to the rock

alteration - weak carbonatization along shear planes
- local variation of carbonate abundance in matrix

environment - formed by erosion of volcanic rocks to the west, transportation of the sediments via rivers and streams, and deposition into a moderate to shallow water depth within a basin
- deposited with an associated debris flow unit
- accumulation of silt-sized particles and their compaction took place in a technically stable time period characterized by the absence of volcanic activity

c) Arenite, Arkose

An arkosic unit occurs in outcrop on islands immediately east of the siltstone and debris flow units to the east of the property. Texturally, it is fine to medium-grained with abundant angular to subangular grains. The major minerals present are quartz (40 - 50%) and feldspar (30-40%), with accessory minerals being mica and amphibole. Calcite is present in the matrix acting as the main cementing agent. This unit has been derived from erosion at the volcanic pile and conglomerate, and deposition in the same basin as the siltstone and debris flow units. The arkose lies stratigraphically above the argillite and debris flows.

d) Greywacke

A clastic unit found isolated in a few outcrops on the property resembles a meta greywacke. Located stratigraphically above waterlain bedded tuff, the greywacke contains numerous subangular lithic fragments set in an argillaceous matrix. There is a weak relict bedding on 074° bearing which is cut by numerous surface fractures. Low grade metamorphism has induced a slight chloritization of the matrix. The sporadic nature of the unit indicates formation by subaerial erosion of the felsic volcanic rocks and deposition into small, topographic low submarine basins.

e) Debris Flow

colour - weathered surface buff to grey-brown with bleached white zones
- fresh surface buff to grey-green

texture - rounded to angular, pebble to boulder sized volcanic fragments (clasts) set in an argillaceous altered matrix
- bimodal size distribution of clasts (1 cm - 2 cm size and 20 cm to 30 cm size)

- polymictic and clast supported with clasts elongated and subparallel on 052° bearing
- poorly sorted and unstratified

structure - found as lensoid accumulations in a metasedimentary sequence interbedded with argillite (siltstone) at east end of property.
- also found near contact of felsic intrusives and lithic tuff in central part of property
- locally highly sheared and jointed
- differential weathering of clasts has produced rough, irregular surface at lake shore

composition - clasts include tuff, intermediate volcanics, mafic volcanics, chert, quartz and argillite
- fine argillaceous matrix of intermediate to mafic composition
- predominantly clast supported but locally matrix supported
- some iron sulphide and iron carbonate shared patches on weathered surface - possibly relicts of former clasts

alteration - chloritization of matrix and carbonatization of some clasts and along fractures and shears

metamorphism - low greenschist facies

environment - a clastic sedimentary unit in which sediment has been eroded from the volcanic pile
- this material has been transported in rivers and streams and deposited in a basin as a shallow water alluvial fan

f) Mudstone

This unit was initially mapped as a mudstone, being characterized by aphanitic grain size, massive appearance and smooth bleached white weathered surface. It is now believed to be simply an extremely fine variation of felsic pyroclastic (tuff) with carbonate and sericite alteration. It has been identified in only a few outcrops and grades laterally and vertically into bedded or massive tuff.

Cataclastic Breccia

A small zone located just below the gossan cap of the west gossan zone was found to be brecciated. This unit was uncovered during blasting and trenching and is not found on weathered surface exposures. It consists of angular hematized volcanic fragments in a fine and very porous hematized groundmass. Located immediately above massive pyrite to cherty pyrite beds and below the gossan cap rocks, it is hosted in a hematized lapilli tuff unit Formation of the breccia is related to small scale tectonic movement of the volcanic rock. After brecciation, resedimentation of the fragments occurred by compaction (due to burial) and invasion of fluids. Quartz, iron oxide and iron carbonate were deposited from the circulating fluid systems to form the matrix cement. Subsequent tectonic activity moved the unit into close proximity to the surface where oxidation and weathering have produced the porous hematized appearance.

Quartz-Tourmaline Mylonite

This unit is found in the immediate vicinity of felsic intrusive rocks in the central portion of the property. It is small in width (< 20 cm) and has a bleached white weathered surface with grey-black stringers. A textural foliation is present, with light coloured felsic quartz-rich bands separated from darker chlorite and tourmaline bands. This foliation trends on a bearing 066°. All minerals are fine-grained to aphanitic and, along with those previously mentioned, include some iron carbonate and feldspar. Chloritization and carbonatization are the two dominant alteration types.

Structurally, the unit occurs as stringers within felsic porphyry and debris flow. On surface the unit is highly polished but below surface shearing is prevalent. Its formation is probably related to tectonic movement along fractures within the host unit causing some brecciation with subsequent invasion of quartz and tourmaline bearing fluids. An extension of this unit is found in pillowed to massive volcanic flows where thin quartz-tourmaline stringers transect the flow.

Interflow Sediment

Occasionally rock units of very small width and lateral extent are found between individual flows in the mafic volcanic sequence. These interflow horizons consist of predominantly felsic pyroclastic rocks with some mafic to intermediate pyroclastics also present. Weathered surfaces vary from white to grey-green with numerous brown patches from iron carbonate staining. Alteration is intense, with silicification and carbonatization predominant. Sulphide mineralization is present in the form of subhedral aggregates of fine grains and as small clasts. Quartz is quite abundant as thin stringers and as 3 mm to 6mm quartz "eyes". The overall composition is rhyolitic with an abundance of feldspar as well as quartz.

Formation of the unit has taken place during a brief highs in the extrusion of mafic volcanic flows. During this period, some erosional activity coupled with explosive volcanic activity from distant centres took place, allowing the accumulation of both volcaniclastic sediments and pyroclastic material.

6. Mafic Intrusives

a) Metagabbro

An intrusive metagabbro unit outcrops in a few locations on the property and is hosted in mafic metavolcanics in each case. These intrusive bodies are quite similar in appearance to the coarser massive flows but can be distinguised by their coarser grain size, slight foliation and magnetic character.

colour - weathered surface green-brown to dark green, spotted
- fresh surface dark green to black

texture - fine to coarse-grained with medium to coarse subhedral phenocrysts and fine-grained matrix
- pyroxene phenocrysts from 0.5 cm to 1.5 cm in diameter are locally altered to amphibole

structure - weathered high with locally pitted surface where altered pyroxene phenocrysts have weathered low
- weak surface foliation defined by felsic stringers which are oriented at 265° and are weathered high
- well developed jointing with some randomly oriented fractures
- locally cut by small irregular mafic dykes

composition - gabbroic intrusive equivalent of mafic flow composition
plagioclase 30 - 40% pyroxene 20 - 30%
amphibole 10 - 15% magnetite 2 - 5%
chlorite & carbonate, sericite & quartz, 15 - 20%

alteration - strong chloritization of mafics
- extensive carbonatization indicated by brown coloured rim
- silicification in fracture fillings

metamorphism - low greenschist facies

environment - predominantly sills and stocks which formed by later intrusion of mafic material into mafic flow units, slow cooling at depth and subsequent exposure at surface by folding and erosion of host rock

b) Mafic Sills

A number of thin irregular sills have been found within both mafic intrusive and extrusive volcanics. They are less than 0.5 metres in width and can be traced no more than 3 metres in length. Compositionally they are the same as the volcanic rocks they intrude and are of synvolcanic origin.

7. Felsic Intrusives

Quartz and Quartz-Feldspar Porphyry

colour - weathered surface red-grey to pink-white and white
- fresh surface buff to grey-green

texture - porphyritic with cohedral to anhedreal feldspar phenocrysts of 2 - 5 cm size set in a fine-grained quartz, feldspar and alteration mineral-rich matrix
- rounded to subangular, clear to white, subhedral quartz "eyes" are from 1 to 4 mm size

structure - locally striated and extensively sheared
- unit width < 4 metres and laterally continuous outcroping in both felsic and mafic volcanics
- contains inechelon tension fractures filled with quartz
- small quartz ladder veins contain some carbonate
- vuggy quartz-chlorite veins define a foliation at 080° and 060°

composition - felsic (rhyoclacite)

- plagioclase and alkali feldspar 30 - 40%
- hornblende and biotite 15 - 20%
- quartz 20 - 25%
- sericite and carbonate and hematite & chlorite 15 - 20%
  minor pyrite

alteration - local hematization and sericitization of feldspars
- pervasive carbonatization in sheared areas
- some silicification present

metamorphism - some recrystallization in low greenschist facies

environment - formed by the intrusion of felsic magma into felsic pyroclastic rocks to form a sill
- emplaced shortly after formation of felsic pyroclastic units
- it is possible that part of the unit cooled on surface

ROCK DESCRIPTIONS OF TRENCHES

By M. W. Masson, B.Sc.

Williams Showing

Trench #1

Location: One hundred feet west of L 132 E, 5N

Bearing: 340°

Measured length: 70 feet

Overburden: 0 - 1.5 feet

Note: All trenches measured from north to south

Measured Distance:

0 - 16.5' Quartz porphyry

Dirty beige-brown weathering with a prominent pervasive shear on surface

Groundmass is very fine grained, aphanitic, blue-grey to green in colour and highly siliceous with minor carbonate. Phenocrysts are predominantly quartz with anhedral-subhedral crystal growth. These have a translucent to pearly lustre and average 2 - 3 mm in size. Phenocrysts are characteristically more readily visible on weathered surface and average 1 - 2% of rock.

Fissures and fractures in rock have been travelways for fluids, with resulting halos present up to 1/4" into rock on both sides of fractures. Halos are purple-red in colour with a waxy lustre. Composition appears to be a carbonate-sericite mix.

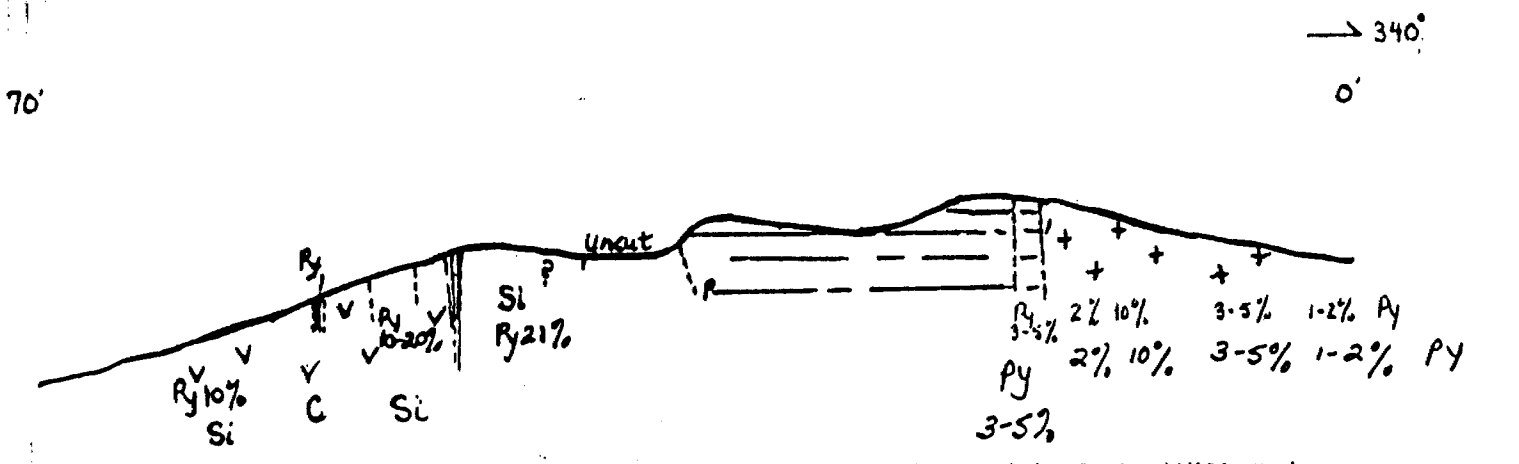
Sulphide mineralization occurs as pyrite and is found as pockets, veinlets and disseminations. Pyrite is anhedral to subhedral and averages 1 mm or less and averages 2-5% of rock.

16.5' Contact 070°/vert.
- contact gradational over 1' with porphyry decreasing in pyrite content (1/%). Contact is by increase in fractures and corresponding sericite-carbonate halos. Phenocrysts in porphyry become apparently more abundant and reach 5-10% of rock.

17 - 18 Blue-grey to green chert with 2-5% eu-subhedral pyrite with a blebby to disseminated character. Chert is generally massive but develops strong sericitized fissures to south.

18 - 34(?) Massive chert, blue-grey to blue-green in colour. Fracture coatings covered with waxy mineral (serpentine family?) purple-red in colour with chloritic green patches. Weathered surface is beige-white with very faint remnant bedding as fine as 1 - 2 mm.

LONGITUDINAL PROFILE - TRENCH MAP
WEST WALL
WILLIAMS SHOWING - TRENCH #1



HORIZONTAL SCALE 1" = 10'

Horizontal Scale 1" = 10'

10' 0 5'

VERTICAL RELIEF NOT TO SCALE

Vertical Relief Not to Scale

LONGITUDINAL PROFILE TRENCH MAP

WEST WALL

WILLIAMS SHOWING - TRENCH #1

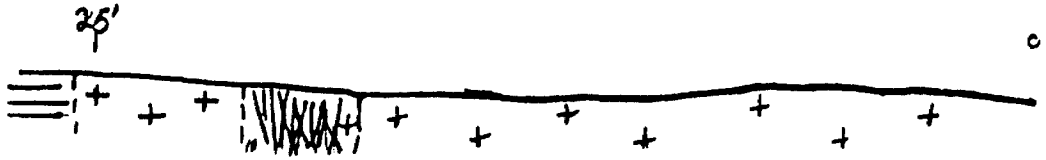
LEGEND

- V V - Mafic Meta-Volcanic
- = = - Chemical Meta-Sediment (Chert)
- + + - Quartz Porphyry
- ⋰ - Geological Contact
- ⋔ - Shearing
- Si - Silica : Silicification and Veining
- Py % - Pyrite C - Carbonitization
- 83-WM-01 - Channel Sample

LONGITUDINAL PROFILE - TRENCH MAP
WEST WALL
WILLIAMS SHOWING - TRENCH #2

LONGITUDINAL PROFILE - TRENCH MAP
WEST WALL
WILLIAMS SHOWING - TRENCH #2

550°
350°



07 | 83-WM2-061 | 05 | 83-WM2-04 | 83-WM2-03 | 83-WM2-02 | 83-WM2-01

07 183-WM2-061 05 | 83-WH2-04 183-WM2-03 183-WM2-02 183-WM2-04

Horizontal Scale 1" = 5'

Horizontal Scale 1"=5'

5FT 0 5ft
6 Ft 2.5 2.5 5Ft

Vertical Relief Not To Scale

LONGITUDINAL PROFILE - TRENCH MAP
WEST WALL
WILLIAMS SHOWING - TRENCH #2

VERTICAL RELIEF NOT TO SCALE

LEGEND

QUARTZ PORPHYRY
QUARTZ PORPHYRY
CHEMICAL METASEDIMENT (CHERT)
CHEMICAL METASEDIMENT (CHERT)
GEOLOGIC CONTACT
GEOLOGIC CONTACT
SHEARING
SHEARING
Py Pyrite PYRITE
83WM2-a -Channel Sample
83-WM2-a - Channel Sample

Sturgeon Lake
Feb.'84

34 - 35' to 48 — Contact between chert and highly siliceous rock (name?) is very poorly exposed where trench was not blasted. Rock is massive, light green with an aphanitic siliceous matrix. Minor pyrite occurs as veinlets <1% . May represent recrystallized chert unit due to the monomineralic (S_1O_2) nature of this rock.

48 - 65 — Beginning of strongly gossanous contact gradational over 2 feet. Rock here is silicified, carbonitized, pyritic mafic volcanic. Light to dark grey and green in colour, generally fine grained aphanitic texture. Carbonitized on surface to rust-red brown colour.
Pyrite mineralization occurs as coarse stringers, blebs and as very finely disseminated pyrite. At 55' to 55.5' there is an amount of massive pyrite.
Silicification is pervasive and as veining. Quartz veins are milky white and reach 8-10" in thickness.
No significant gold values were obtained from this trench.

Trench #2

Location: Fifteen feet east of L 132 E, 6 + 00N
Bearing: 350°
Measured Length: 27 feet
Overburden: 0 - 6 inches

0 - 18' — Quartz Porphyry (as previously)
Light green-blue aphanitic groundmass with sub-anhedral quartz phenocrysts constituting 5-10% of rock.
Pyrite mineralization has dropped significantly from previous trench down to ≤ 1%.
Fracture planes - 290°/vert., 030°/vert., 052°/vert., 100°/vert.

18 - 21' — Highly sheared and fractured zone with rusty red-brown weathering. Fractures 038°/vert., 116°/vert., 080°/vert.
Rock is sheared quartz porphyry with carbonate along shears.
Pyrite mineralization increases to 2-5% as finely disseminated euhedral to subhedral cubes and veinlets.

21 - 25.5' — Quartz porphyry with disseminated pyrite 1-5%

25.5 - 27' — Light green chert strongly fractured with green sericite-carbonate-chlorite as fracture coatings. Contact with porphyry is gradational over 6 inches. No pyrite associated with chert here.
No significant gold values associated with the porphyry here.

Sturgeon Lake
Feb. '84

Trench #3

Location:	Two hundred feet west of L 132 E, 6N One hundred feet west of Trench #1
Bearing:	330°
Measured Length:	39 feet
Overburden:	0 - 2.5 feet

0 - 10' Quartz porphyry as before. Minor pyrite veinlets at 4 - 5 feet. Contact with chert is again gradational over 6 ins.

10 - 14' Light green, aphanitic massive cherty unit. Sericitic and chlorite along fissure planes.
No mineralization present.
Towards the south end the chert is fragmental within a mafic siliceous matrix.

14.5 - 39' Mafic Volcanic (?)
Silicified, sericitic mafic volcanic with colour variations, from dark green to blue-grey to brown (coloured zone).
Appears to be an extremely altered mafic volcanic.
Pyrite mineralization is 2 - 3% disseminated throughout.

Trench #4

Location:	Two hundred feet east of L 124 E, 5N
Bearing:	006°
Measured Length:	28 feet
Overburden:	0 - 2.5 feet

Whole Trench Massive blue-grey, very fine grained aphanitic rock with well developed fracture planes at 080°/85°N, 075°/vert., 085°/vert., 032°/65°W, 336°/vert.

Moving towards the south dark green chloritic 'patches' appear. Groundmass around these patches is still highly siliceous.

25' At approximately 25' the rock becomes brecciated with well rounded clasts up to 5 cm in size. These clasts are grey-blue in colour while matrix is light grey with small 1-2 cm chloritic patches.

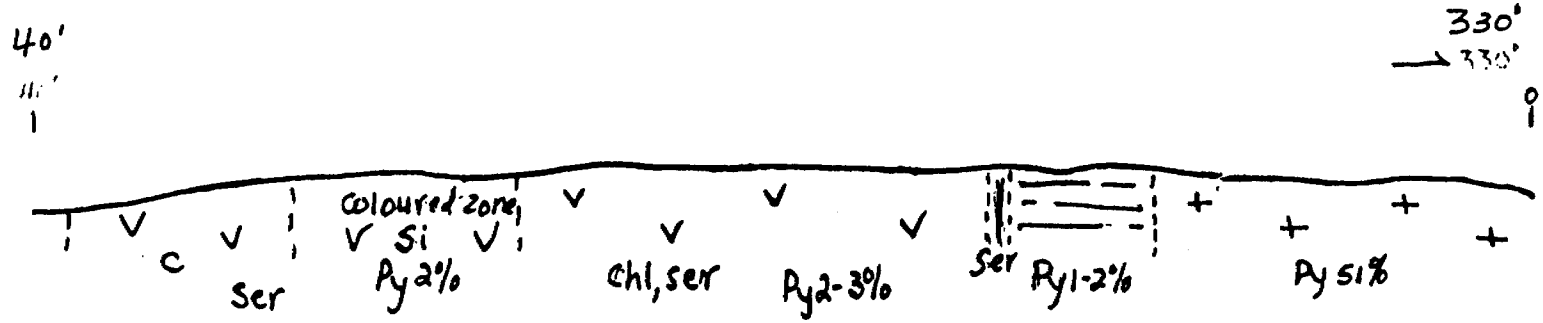
No mineralization associated with the breccia zone.

LONGITUDINAL PROFILE - TRENCH MAP LONGITUDINAL PROFILE

WEST WALL WEST WALL TRENCH MAP

WILLIAMS SHOWING : TRENCH "3

WILLIAMS SHOWING : TRENCH #3



09 | 83-WH3-08 | 83-WH3-01 | 83-WH3-06 | 83-WH3-05 | 83-WH3-04 | 83-WH3-03 | 83-WH3-02 | 83-WH3-01 |

Horizontal Scale 1"=5'

Vertical Relief not to Scale

LONGITUDINAL PROFILE - TRENCH MAP

WEST WALL

WILLIAMS SHOWING - TRENCH #3

MAFIC META VOLCANIC

CHEMICAL META SEDIMENT (CHERT)

QUARTZ PORPHYRY

GEOLOGICAL CONTACT

SHEARING

Silicification

Carbonitization

Pyrite

LEGEND

V V - Mafic Meta Volcanic

- Chemical Meta Sediment (Chert)

+ + - Quartz Porphyry

/ Geological Contact

W Shearing

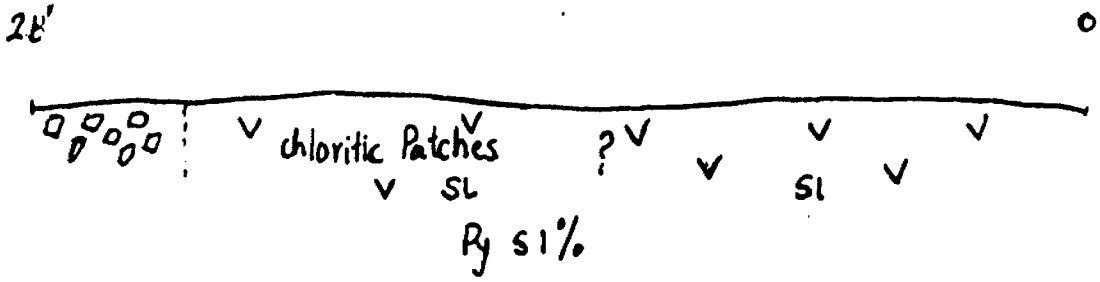
Si - Silicification Ser - Seacite

C - Carbonitization

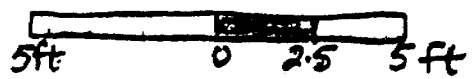
Py - Pyrite

LONGITUDINAL PROFILE - TRENCH MAP
WEST WALL
WILLIAMS SHOWING - TRENCH #4

LONGITUDINAL PROFILE TRENCH MAP
WEST WALL
WILLIAMS SHOWING - TRENCH #4



Horizontal Scale 1"=5'



Vertical Relief not to Scale

LONGITUDINAL PROFILE - TRENCH MAP
WEST WALL
WILLIAMS SHOWING - TRENCH #4

LEGEND

- Mafic Meta Volcanic
- Brecciated Volcanic
- Geological Contact
- Si - Silicification
- Py - Pyrite
- 83 WH4 - Channel Sample

Sturgeon Lake
Feb. '84

Line Ninety-Six Showing

Location: Two hundred feet east of L 96 E, 11-12 N
Bearing: 340°
Measured Length: 29 feet
Overburden: 0 - 1 feet

0 - 2' Well bedded siliceous arenite with bedding 0.5-1.5 cm in thickness. Clasts are less than 1 mm subround quartz with minor arkosic clasts. Cement is silica with richer carbonate to give a well indurated sediment.
Bedding is 074°/vert.

2 - 4' Gritstone blue-grey colour with poorly defined bedding.
Framework is light grey with moderately to well rounded quartz clasts 1 - 2 mm in size.
Matrix is very fine grained, dark grey silica and carbonate.
Induration is poor to moderately good.
Pyrite occurs as isolated blebs smeared around clasts and in matrix; Py 2-5%.

4 - 10' Argillite black, extermely well bedded argillite, interbedded with black-white kaolinized arkose.

10 - 11' Pyritic Argillite black pyritic argillite. Bedding averages 2-3 cm in this well indurated argillite.
Pyrite occurs as disseminated euhedral cubes up to 1 cm in size.

11 - 12.5' Pyritic Gritstone sulphide facies iron formation.
Reworked dislodged pyrite beds averaging 0.5 cm in a fine gritty matrix, possibly coarse greywacke.
Rock is well indurated and grey-brown to metallic in colour.

12.5 - 14.5' Pyritic Wacke fine grained clastic rock, grey-black in colour, well indurated with poorly developed bedding.
Euhedral pyrite up to 0.5 cm and totalling 2-3% of rock.

14.5 - 15' Very fine grained black argillite-shale. Very friable and thin bedded.

15 - 16' Grey-green gritstone (coarse wacke). Clasts are siliceous (quartz) in a silica matrix

16 - 16.5' Black argillite with finely disseminated pyrite up to 5%

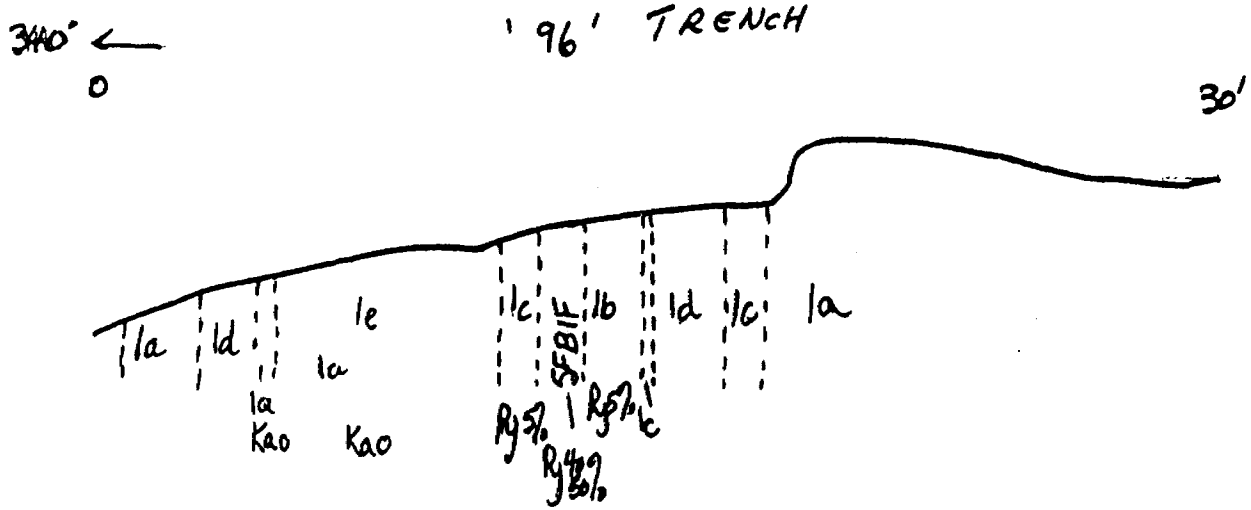
16.5 - 23' Extremely well bedded (075°/vert.) unit. Wacke-arenite with interbedded argillite to give it a slaty parting. Argillite has bedding from 1 mm to 0.5 cm, arenite bedding up to 3-4 cm, as with wacke.

23 - 29' Grey-green, very fine grained 'spotty' sediment, with no well developed bedding. Spots appear to be chloritic patches which may represent chloritization of original clastic fragments such as feldspar. Matrix is extremely fine graind and its massive structure and monomineralic nature may suggest that this is a dirty quartzite.

L.J. Cunningham, B.Sc., P. Eng., 1 McPhee Ave., Kirkland Lake, Ontario P2N 1M1

LONGITUDENAL PROFILE - TRENCH MAP
EAST WALL
'96' TRENCH

LONGITUDINAL PROFILE - TRENCH MAP
EAST WALL
'96' TRENCH



HORIZONTAL SCALE : 1" = 5'

VERTICAL RELIEF NOT TO SCALE

LONGITUDINAL PROFILE - TRENCH MAP
EAST WALL
'96' TRENCH

LEGEND

1 Clastic Metasediments
- 1a Arenite, Arkose
- 1b Wacke
- 1c Argillite Shale
- 1d Greenstone

SFBIF Sulfide Facies (Py) Iron Formation

Geological Contact

Py Pyrite

Kao - Kaolinized

Sturgeon Lake
Feb. '84

C. C. Showing

Location: One hundred and fifty feet east of L 24 W, B.L.0+00
Bearing: 320°
Measured Length: 40 feet
Overburden: 0 - 2 feet regolithic cap

0 - 10' Pyritic Rhyolite (?)(Breccia, stringer zone)
Host is very fine grained aphanitic, non crystalline and highly siliceous, yet weathers preferentially before pyrite (?)(why?).
Rock is massive in structure and blue-grey in colour.
Pyrite mineralization (30-40%) occurs as wormy, dendritic stringers, blebs and fine dissemination. Two phases of pyrite mineralization are noticeable. One is very find $\leq$ 0.5mm with a dull silver-grey metallic lustre (as veinlets, stringers) and a coarse pyrite (L/mm) spatially associated around the edge of the finer pyrite.
Quartz mineralization: At least 2 periods of silica introduction is noticeable in the form of quartz veins. Quartz is milky white, massive (noncrystalline) and subhedral where void fitting occurred. No visible mineralization is seen to be associated with the quartz.
Major fracture filling 304°/50° E - vein 6 - 8" wide
285°/vert. - vein 0.5 - 1" wide

10 - 12.5' Highly oxidized, regolithic zone, rusty-red brown in colour. May represent an original paleo surface of the massive sulfide body but this would have to be confirmed by drilling at depth.

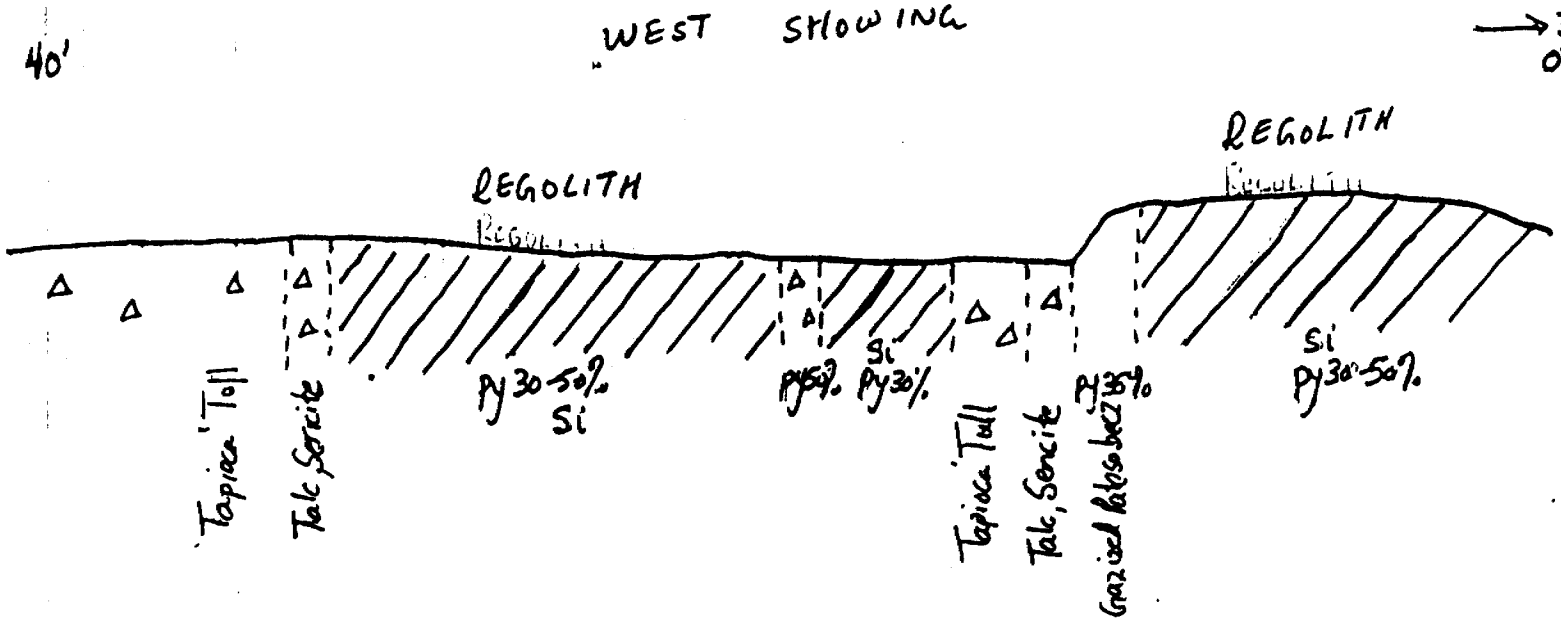
12.5 Contact with sericitic, talcy tuffs very abrupt.

12.5 - 16' Felsic Pyroclastics
This section is characterized by strongly foliated, friable, finely bedded tuffs.
Talcy Sericitic Tuffs: very finely laminated, noncrystalline tuff. Shaley structure due to fineness. Talc and sericite along fracture planes creating a strong fissility.
Unit is light blue-grey-green with purple-red hematite along fissures.
Towards the top of the unit (south) there is a noticeable increase in coarseness of grain size to 'tapioca' tuff. Green-grey in colour with purple-red (hematite) along fracture planes. Clasts are well rounded quartz grains, white to translucent, floating in a dirty grey-yellow matrix. Quartz clasts average $\leq$ 1 mm in a non-crystalline groundmass.

16 - 32.5' Pyritic Rhyolite (?) as previously.

LONGITUDINAL PROFILE - TRENCH MAP
WEST WALL
WEST SHOWING

LONGITUDINAL PROFILE - TRENCH MAP
WEST WALL
WEST SHOWING



HORIZONTAL SCALE 1" = 5'

5ft 0 25 5ft

VERTICAL RELIEF NOT TO SCALE

LEGEND

- Siliceous, Pyritic Rock
- Felsic Pyroclastics (Tuffs)
- Geological Boundary
- Py - Pyrite
- Si - Silicification

LONGITUDINAL PROFILE - TRENCH MAP
WEST WALL
WEST SHOWING

Sturgeon Lake
Feb. '84

32.5 - 33' Purple-red (hematized), fissile, talcy tuff.
This malleable unit is wrapped around the irregular surface of the massive sulfide body due to the compressional forces of regional metamorphism.

33 - 40' 'Tapioca' Tuff. Clear to white rounded quartz eyes in a fine non-crystalline matrix. Hematization visible along fracture planes on the penetration of hematite up to 1/4 inch into matrix of the rock.

Anomalous gold values averaging 800 ppb were obtained from the mineralized zones in this trench.

Ontario

Ministry of Natural Resources

File _____

GEOPHYSICAL – GEOLOGICAL – GEOCHEMICAL TECHNICAL DATA STATEMENT

TO BE ATTACHED AS AN APPENDIX TO TECHNICAL REPORT
FACTS SHOWN HERE NEED NOT BE REPEATED IN REPORT
TECHNICAL REPORT MUST CONTAIN INTERPRETATION, CONCLUSIONS ETC.

Type of Survey(s) Geology

Township or Area Sixmile Lake Area M.2877

Claim Holder(s) L. J. Cunningham

Survey Company L. J. Cunningham & Associates Limited

Author of Report L. J. Cunningham

Address of Author 1 McPhee Ave., Kirkland Lake, Ont. P2N 1M1

Covering Dates of Survey 28 May, '83 – 8 Feb. '84 (linecutting to office)

Total Miles of Line Cut 34.9 miles

SPECIAL PROVISIONS CREDITS REQUESTED

DAYS per claim

Work credits applied for under man-day basis as per attached breakdown.
40 DAYS APPLIED FOR

Geophysical _____

Electromagnetic _____

Induced Polarization _____

Other _____

Geological _____

Geochemical _____

AIRBORNE CREDITS (Special provision credits do not apply to airborne surveys)

Magnetometer _____ Electromagnetic _____ Radiometric _____ (enter days per claim)

DATE: 14 MAR 84 SIGNATURE: _____ Author of Report or Agent

Res. Geol. _____ Qualifications 82 Nov 03

Previous Surveys

File No.	Type	Date	Claim Holder

RECEIVED
MAR 30 1984
MINING LANDS SECTION

MINING CLAIMS TRAVERSED
List numerically

(prefix)	(number)
Pa.	611504
Pa.	611505
	611506
	642478
	642479
	642480
	642481
	642482
	642974
	642975
	642976
	642977
	642978
	642979
	642980
	642981
	642982
	642983
	642984
	642985
	642986
	642988
	642989
	642990
	642991
	642992
	642993
	642994
	642995
	642996
	642997

TOTAL CLAIMS 31

900

If space insufficient, attach list

OFFICE USE ONLY

52G/15NW

AREA OF SIXMILE LAKE

M-2877

SCALE: 1 inch = 40 chains

40 CHAINS

Quest Lake Area - M.2875

Sixmile

Lake

Seaton

Id.

Sturgeon

Narrows

Lake

Creek

Spat

Post

59°

58°

57°

56°

Ministry of Natural Resources
Ontario

Report of Work
(Geophysical, Geological, Geochemical and Expenditures)

#84-46

Mining Act 2.6574

Instructions - Please type or print.
If number of mining claims traversed exceeds space on this form, attach a list.
Note: - Only one credit to calculate for the "Expenditures" section may be entered in the "Expend. Days Cr." columns.
- Do not use shaded areas below.

FROM: Mining Lands

Type of Survey(s): GEOLOGICAL

Township or Area: SIX MILE LAKE Area M-2617

Claim Holder(s): L. J. CUNNINGHAM

Prospector's Licence No.: R21286

Address: 1 MCPHEE AVE KIRKLAND LAKE ONT. P2N 1M1

Survey Company: L.J. CUNNINGHAM + ASS

Date of Survey (from & to): 28 5 83 (Day Mo. Yr.) 2 11 83 (Day Mo. Yr.)

Total Miles of line Cut: 34.9

Name and Address of Author (of Geo-Technical report): AS ABOVE

Credits Requested per Each Claim in Columns at right

Special Provisions		Days per Claim
For first survey: Enter 40 days. (This includes line cutting)	Geophysical	
	· Electromagnetic	
	· Magnetometer	
For each additional survey: using the same grid: Enter 20 days (for each)	· Radiometric	
	· Other	
	Geological	
	Geochemical	

Man Days		Days per Claim
Complete reverse side and enter total(s) here	Geophysical	
	· Electromagnetic	
	· Magnetometer	
	· Radiometric	
	· Other	
	Geological	40
	Geochemical	

Airborne Credits		Days per Claim
Note: Special provisions credits do not apply to Airborne Surveys.	Electromagnetic	
	Magnetometer	
	Radiometric	

RECEIVED
APR 16 1984
MINING LANDS SECTION

Expenditures (excludes power stripping)

Type of Work Performed: MINING LANDS SECTION

Performed on Claim(s):

Calculation of Expenditure Days Credits

Total Expenditures: $ ____ + 15 = Total Days Credits: ____

Instructions
Total Days Credits may be apportioned at the claim holder's choice. Enter number of days credits per claim selected in columns at right.

Date: 14 MAR 84

Recorded Holder or Agent (Signature):

Mining Claims Traversed (List in numerical sequence)

Prefix	Mining Claim Number	Expend. Days Cr.
PA	611504	
	611505	
	611506	
	642478	
	642479	
	642480	
	642481	
	642482	
	642974	
	642975	
	642976	
	642977	
	642978	
	642979	
	642980	
	642981	
	642982	
	642983	
	642984	
	642985	
	642986	

Prefix	Mining Claim Number	Expend. Days Cr.
PA	642988	
	642989	
	642990	
	642991	
	642992	
	642993	
	642994	
	642995	
	642996	
	642997	

PATRICIA MINING DIV.
RECEIVED
MAR 20 1984
A.M. 7 8 9 10 11 12 1 2 3 4 5 6 P.M.

Pa. 611504

Total number of mining claims covered by this report of work: 31

For Office Use Only

Total Days Cr. Recorded	Date Recorded	Mining Recorder
1240	Mar. 20, 1984	
	Date Approved as Recorded	Branch Director
	84.7.4	

Certification Verifying Report of Work

I hereby certify that I have a personal and intimate knowledge of the facts set forth in the Report of Work annexed hereto, having performed the work or witnessed same during and/or after its completion and the annexed report is true.

Name and Postal Address of Person Certifying: L.J. CUNNINGHAM 1 MCPHEE AVE KIRKLAND LAKE ONT. P2N1M1

Date Certified: 14 MAR 84

Certified (Signature):

1362 (81/9)

Assessment Work Breakdown

Man Days are based on eight (8) hour Technical or Line-cutting days. Technical days include work performed by consultants, draftsmen, etc..

Type of Survey: Geology

Technical Days				Technical Days Credits		Line-cutting Days		Total Credits		No. of Claims		Days per Claim
176	X	7	=	1246	+		=	1246	+	31	=	40

Type of Survey

Technical Days				Technical Days Credits		Line-cutting Days		Total Credits		No. of Claims		Days per Claim
	X	7	=		+		=		+		=	

Type of Survey

Technical Days				Technical Days Credits		Line-cutting Days		Total Credits		No. of Claims		Days per Claim
	X	7	=		+		=		+		=	

Type of Survey

Technical Days				Technical Days Credits		Line-cutting Days		Total Credits		No. of Claims		Days per Claim
	X	7	=		+		=		+		=	

LABOUR DETAIL

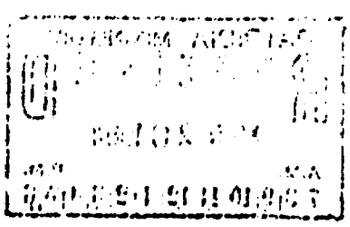
Bruce James	24 August to 4 November, 1984	$ 3,876.96
Mark Massen	19 July to 11 November, 1984	8,307.72
Alan Smith	19 May to 2 September, 1984	8,861.57
Michael Cunningham	19 May to 29 July, 1984	4,038.50
		$ 25,084.75

Geology	$ 14,884.75
Stripping (manual), Drilling, Blasting	7,650.00
Power Stripping Assistance	1,020.00
Camp Construction	1,530.00
	$ 25,084.75

Assessment Work Breakdown

Man Days are based on eight (8) hour Technical or Line-cutting days. Technical days include work performed by consultants, draftsmen, etc..

Type of Survey	Technical Days		7	=	Technical Days Credits	+	Line-cutting Days	=	Total Credits	÷	No. of Claims	=	Days per Claim
Geology	178	X	7	=	1246	+		=	1246	÷	31	=	40
		X	7	=		+		=		÷		=	
		X	7	=		+		=		÷		=	
		X	7	=		+		=		÷		=	



Ministry of Natural Resources
Ontario

Geotechnical Report Approval

File 2.6574

Mining Lands Comments

To: Geophysics

Comments

☐ Approved ☐ Wish to see again with corrections | Date | Signature

To: Geology - Expenditures

Comments

☐ Approved ☐ Wish to see again with corrections | Date | Signature

To: Geochemistry

Comments

LD

☐ Approved ☐ Wish to see again with corrections | Date | Signature

To: Mining Lands Section, Room 6462, Whitney Block. (Tel: 5-1380)

93 (81/10)

H46 2-65 :4

PA 611504	✓	✓						
505	✓	✓						
506	✓	✓						
642478	✓	✓						
479	✓	✓						
480	✓	✓						
481	✓	✓						
482	✓	✓						
642 974	✓	✓						
975	✓	✓						
976	✓	✓						
977	✓	✓						
978	✓	✓						
979	✓	✓						
980	✓	✓						
981	✓	✓						
982	✓	✓						
983	✓	✓						
984	✓	✓						
985	✓	✓						
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988	✓	✓						
989	✓	✓						
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991	✓	✓						
992	✓	✓						
993	✓	✓						
994	✓	✓						
995	✓	✓						
996	✓	✓						
997	✓	✓						

L. J. CUNNINGHAM & ASSOCIATES LIMITED

MINING AND GEOLOGICAL CONSULTANTS

1 McPHEE AVENUE - TELEPHONE 705-567-5620

KIRKLAND LAKE. ONTARIO. P2N 1M1

1984.03.14

Director,
Lands Management Branch,
Ministry of Natural Resources,
Room 6610, Whitney Block,
Queen's Park,
Toronto, Ontario M7A 1W3

Dear Sirs:

Re: Joint Venture - Sturgeon Lake Area
Canadex Resources Limited
Playfair Resources Limited
Santa Maria Resources Limited
Swansea Gold Mines Inc.

Enclosed find two copies of geological report.

We are applying for credits on 'days worked' basis. We intend to use the line cutting as credit at a later date this year.

The hydrothermal alteration is intense and the geology very complex (as can be verified by D. Janes, Resident Geologist, Sioux Lookout, or P.H. Thurston, O.G.S.) - hence we did a great deal of stripping of moss with grub hoes and re-mapping to attempt to understand the geology. These are our reasons for claiming more than 20 days for geology.

Yours very truly,

L. J. Cunningham, Bsc P. Eng

1984 04 05

Your File:
Our File: 2.6574

Mr. Albert Hanson
Mining Recorder
Ministry of Natural Resources
P.O. Box 669
Sioux Lookout, Ontario
P0V 2T0

Dear Sir:

We have received reports and maps for a Geological Survey submitted on Mining Claims PA 611504 et al in the Area of Sixmile Lake.

This material will be examined and assessed and a statement of assessment work credits will be issued.

We do not have a copy of the report of work which is normally filed with you prior to the submission of this technical data. Please forward a copy as soon as possible.

Yours sincerely,

S.E. Yundt
Director
Land Management Branch

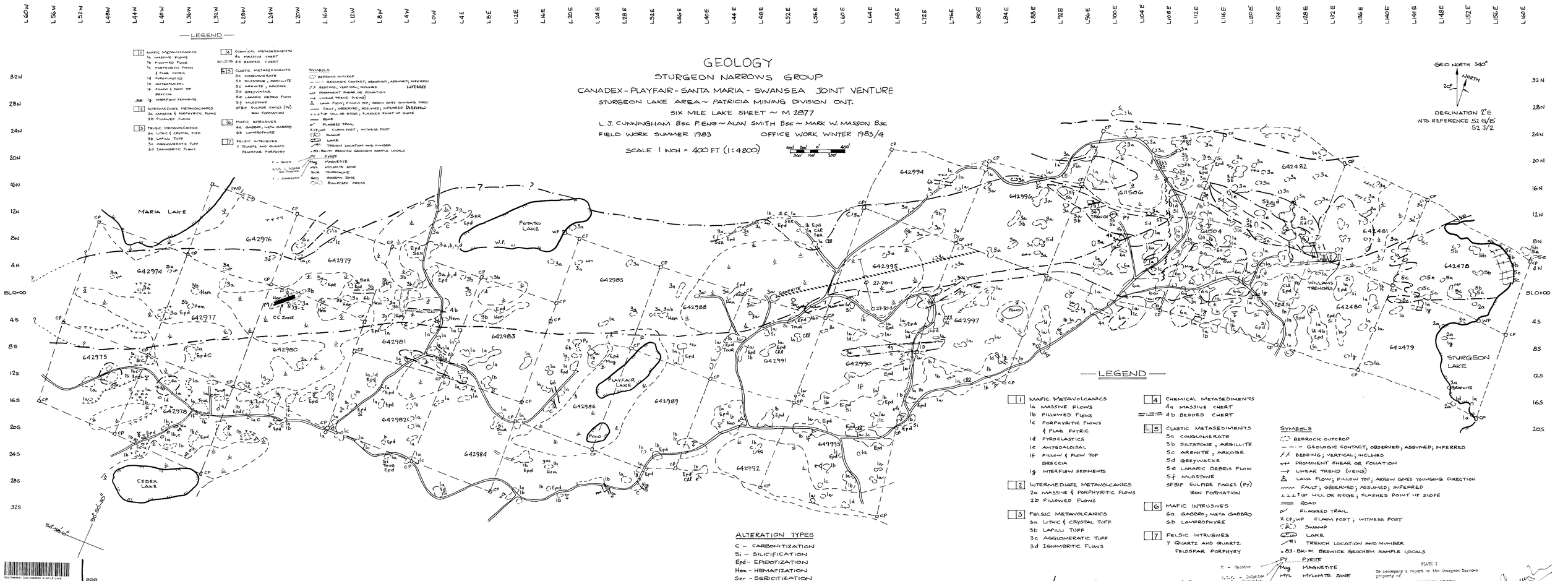
Whitney Block, Room 6643
Queen's Park
Toronto,Ontario
M7A 1W3
Phone:(416)965-6918

A.Barr:mc

cc: L.J. Cunningham
1 McPhee Avenue
Kirkland Lake, Ontario
P2N 1M1

FOR ADDITIONAL INFORMATION SEE MAPS:

52G/15NW-0050 #1


GEOLOGY
STURGEON NARROWS GROUP
CANADEX - PLAYFAIR - SANTA MARIA - SWANSEA JOINT VENTURE
STURGEON LAKE AREA ~ PATRICIA MINING DIVISION ONT.
SIX MILE LAKE SHEET ~ M 2877
L. J. CUNNINGHAM Bsc P.ENG ~ ALAN SMITH Bsc ~ MARK W. MASSON Bsc
FIELD WORK SUMMER 1983 OFFICE WORK WINTER 1983/4
SCALE 1 INCH = 400 FT (1:4800)
GRID NORTH 340°
DECLINATION 2°E
NTS REFERENCE 52 G/15 52 J/2
LEGEND
1 MAFIC METAVOLCANICS
1a MASSIVE FLOWS
1b PILLOWED FLOWS
1c PORPHYRITIC FLOWS & FLAG PHYRIC
1d PYROCLASTICS
1e AMYGDALOIDAL
1f PILLOW & FLOW TOP BRECCIA
1g INTERFLOW SEDIMENTS
2 INTERMEDIATE METAVOLCANICS
2a MASSIVE & PORPHYRITIC FLOWS
2b PILLOWED FLOWS
3 FELSIC METAVOLCANICS
3a LITHIC & CRYSTAL TUFF
3b LAPILLI TUFF
3c AGGLOMERATIC TUFF
3d IGNIMBRITIC FLOWS
4 CHEMICAL METASEDIMENTS
4a MASSIVE CHERT
4b BEDDED CHERT
5 CLASTIC METASEDIMENTS
5a CONGLOMERATE
5b SILTSTONE ; ARGILLITE
5c ARENITE ; ARKOSE
5d GREYWACKE
5e LAHARIC DEBRIS FLOW
5f MUDSTONE
SFBIF SULFIDE FACIES (PY) IRON FORMATION
6 MAFIC INTRUSIVES
6a GABBRO ; META GABBRO
6b LAMPROPHYRE
7 FELSIC INTRUSIVES
7 QUARTZ AND QUARTZ FELDSPAR PORPHYRY
SYMBOLS
BEDROCK OUTCROP
GEOLOGIC CONTACT; OBSERVED; ASSUMED; INFERRED
BEDDING ; VERTICAL ; INCLINED
PROMINENT SHEAR OR FOLIATION
LINEAR TREND (VEINS)
LAVA FLOW ; PILLOW TOP ; ARROW GIVES YOUNGING DIRECTION
FAULT ; OBSERVED ; ASSUMED ; INFERRED
TOP HILL OR RIDGE ; FLASHES POINT UP SLOPE
ROAD
FLAGGED TRAIL
CLAIM POST ; WITNESS POST
SWAMP
LAKE
TRENCH LOCATION AND NUMBER
.89 - BK-01 BESWICK GEOCHEM SAMPLE LOCALS
PY PYRITE
Mag MAGNETITE
MYL MYLONITE ZONE
TOUR TOURMALINE
GOS GOSSAN ZONE
BULLDOZED AREAS
DRILL HOLE
ALTERATION TYPES
C - CARBONITIZATION
Si - SILICIFICATION
Epd - EPIDOTIZATION
Hem - HEMATIZATION
Ser - SERICITIZATION
Kao - KAOLINIZATION
MARIA LAKE
POTATO LAKE
PLAYFAIR LAKE
CEDEX LAKE
STURGEON LAKE
WILLIAMS TRENCHES
CC ZONE
642974
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642996
642997
642478
642479
642480
642481
642482
611506
611504
27-70-1
27-70-2
873-2
52G/15NW-0050, #1
52G/15NW-0050, #1
PLATE I
To accompany a report on the Sturgeon Narrows property of
CANADEX RESOURCES LIMITED
PLAYFAIR RESOURCES LIMITED
SANTA MARIA EXPLORING LIMITED
SWANSEA GOLD MINES INC.
by L. J. Cunningham, B.Sc., P.Eng. Mining Engineer
dated 11th February, 1984.
M. SMITH FEB 1984