



**Ontario Geological Survey
Open File Report 5921**

**Report of Activities 1994,
Resident Geologists**

1995



ONTARIO GEOLOGICAL SURVEY

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Report of Activities 1994, Resident Geologists

edited by

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Ontario Geological Survey

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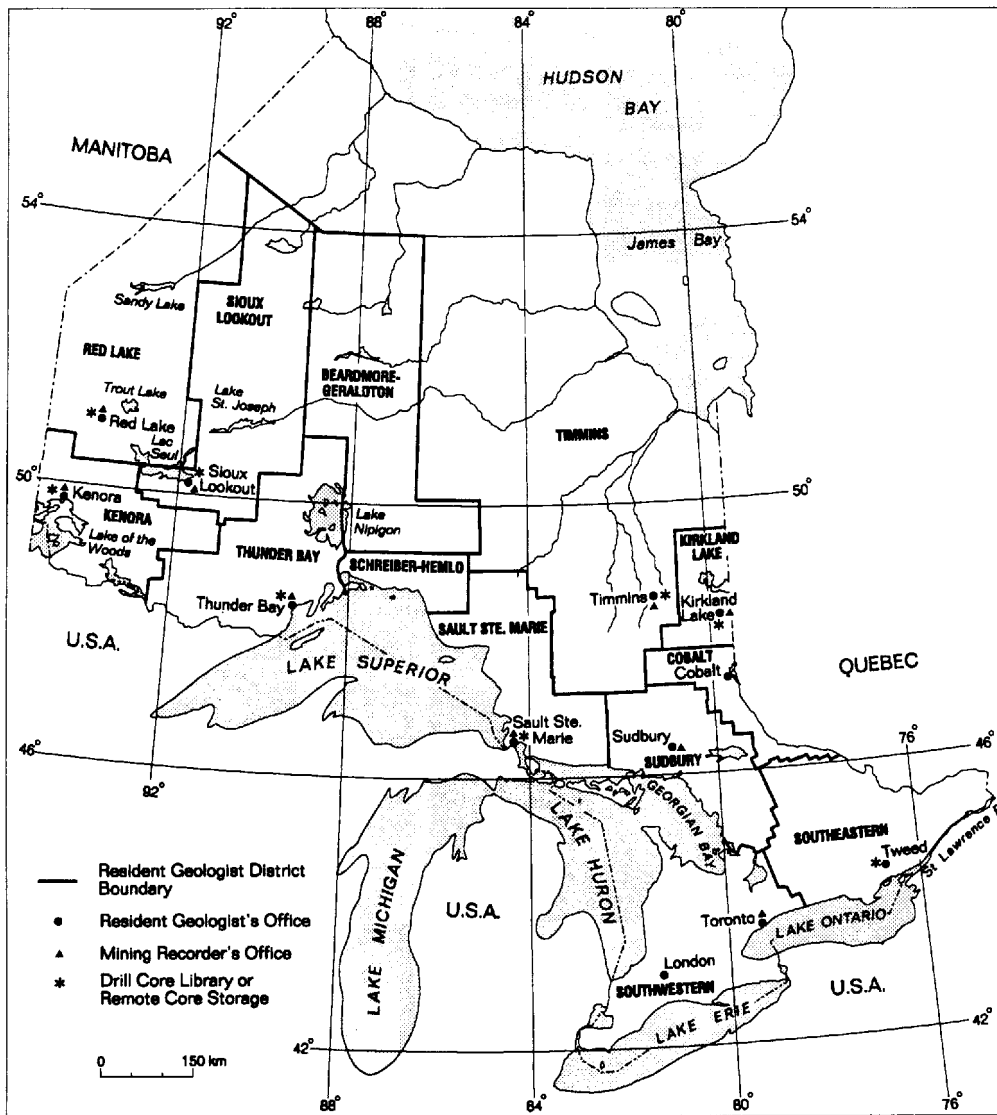
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Mines and Minerals Division Regional Offices

CITY	OFFICE(S)	ADDRESS	TELEPHONE	FAX
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Red Lake	●*	Box 324, 227 Howey St. P0V 2M0	(807) 727-3272	(807) 727-3553
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Tweed	●*	B.S. 43, Old Troy Rd. K0K 3J0	(613) 478-3161	(613) 478-2873
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FIELD SERVICES SECTION--NORTHWEST: INTRODUCTION - 1994

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Section Chief, Field Services Section--Northwest, Ontario Geological Survey

INTRODUCTION

Field Services Section--Northwest, of the Ontario Geological Survey, encompasses 6 Resident Geologist districts (i.e. Kenora, Red Lake, Sioux Lookout, Thunder Bay, Schreiber-Hemlo and Beardmore-Geraldton), upon which are superimposed 4 Mining Divisions (i.e. Kenora, Red Lake, Patricia and Thunder Bay). The resulting area is approximately 700 km by 700 km in size, from the Manitoba-Ontario border in the west to the vicinity of the town of White River in the east, and from the United States-Canada border in the south to the midst of the Severn River basin in the north.

FIELD SERVICES SECTION--NORTHWEST

The goal of Field Services Section--Northwest is to stimulate and monitor mineral exploration, development and production in northwestern Ontario. This is accomplished primarily by means of the Resident Geologist Program, represented by the 6 offices. Other, significant contributions to this goal have been made by the Canada-Ontario Northern Ontario Development Agreement (NODA) Industrial Minerals Project and Manitouwadge Mineral Occurrence Inventory Project, and the Aboriginal Prospectors Training Program. Also supporting this goal are 2 Drill Core Libraries--1 in Kenora and 1 in Thunder Bay--and 6 Off-Site Drill Core Storage facilities--1 in each Resident Geologist district. Since 1993, these facilities have been managed as part of the Resident Geologist program.

In order to pro-actively communicate the services of the Resident Geologist Program, basic prospecting courses were conducted in all of the districts in the northwest, as were public information sessions on various topics, public displays for Mining Week, and classroom visits and presentations. Each Resident Geologist and the NODA Industrial Minerals project contributed poster displays and talks to the Northwest Regional Mines and Minerals Symposium in Thunder Bay in April, 1994; the Resident Geologists also contributed poster displays to the Mines and Minerals Symposium in Toronto in December, 1994. Summer field offices were also maintained in Beardmore, Geraldton and Marathon.

Work continued on reports and/or maps describing: mineral deposits in the Fort Hope-Miminiska Lake area, the Nipigon-Marathon area and the Sturgeon Lake area; volcanogenic massive sulphide potential in the Kenora District; and the geology of Killala Township in the Red Lake area. Reports describing mineral occurrences in the Manitouwadge area, and industrial minerals in northwestern Ontario generally, were published by MNDM. These latter two reports represent the culmination of their respective NODA programs, both of which were completed on 31 March, 1994.

Note that several personnel changes occurred in the section during the past year. Mike Hailstone left Kenora, where he was Staff Geologist, to begin duties as Staff Geologist in Sault Ste. Marie. Peter Hinz, formerly Assistant Drill Core Library Geologist in Thunder Bay, assumed duties as Staff Geologist in Kenora. Carmen Storey, formerly Drill Core Library Geologist in Kenora, assumed duties as Staff Geologist in Red Lake. David Laderoute, formerly ERLIS Senior Topic Area Leader in Sudbury, took over as Section Chief, following the retirement of Ken Fenwick in October of 1993.

PRODUCTION AND HIGHLIGHTS

The metallic commodities produced in northwestern Ontario during the past year were gold, silver, copper, zinc, nickel, platinum group metals (PGM) and lead. Note that four of the top ten gold producers in Canada--the Golden Giant, Williams, Campbell and David Bell mines--are located in Northwestern Ontario. Other mineral commodities produced in Northwestern Ontario during the year include: granite dimension stone; amethyst (on a seasonal basis); white quartz (also sold from an existing inventory); and soapstone.

Highlights in the northwest over the preceding year include the first full year of production at the Lac des Iles mine, north of Thunder Bay. This mine produces platinum group metals (PGM), copper and nickel, and is currently Canada's only primary producer of PGM. Placer Dome Inc., at their Musselwhite project at Opapimiskan Lake, north of Pickle Lake, is delineating a large, iron formation-hosted gold deposit with significant economic potential. A number of other exploration projects--for example, the Thunder Lake gold project of Teck Exploration Limited and Continental Caretech Corporation near Dryden, and a gold exploration project by Asarco Exploration Company of Canada Limited, in the vicinity of the past-producing MacLeod-Cockshutt Mine near Geraldton--are showing considerable promise. Another interesting development is the receipt by Falconbridge Limited of an Exploration Licence of Occupation on Nipigon Bay of Lake Superior, beneath which the company believes significant Noril'sk-type nickel and related mineralization may occur. West of Fort Frances, Nuinsco Resources Ltd. began an exploration program for gold in the overburden-covered Rainy River lowlands, in response to the results of recent research in the area by the OGS. Likewise, OGS research underscored the potential for pegmatite bodies in the Separation Lake area, north of Kenora, to host economic concentrations of lithium and related rare metals. Finally, there has generally been a significant increase observed in all districts in terms of new claim-staking and all types of exploration activity.

The following sections describe, for each Resident Geologist district in northwestern Ontario, mineral exploration, development and production activities in 1994, and recommend a variety of mineral exploration opportunities.

BEARDMORE - GERALDTON RESIDENT GEOLOGIST'S DISTRICT--1994

J.K. Mason¹ and G.D. White²

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²Staff Geologist, Thunder Bay, Field Services Section--Northwest, Ontario Geological Survey

INTRODUCTION

The Beardmore-Geraldton District is located within the Thunder Bay Mining Division. The communities of Beardmore, Jellicoe, Longlac, Geraldton, MacDiarmid, Nakina, Fort Hope, Lansdowne House, Summer Beaver and Webequie are situated within the district.

The Ontario Prospectors Assistance Program (OPAP) funded 37 programs in the Beardmore-Geraldton District totalling \$370,000, which represents 16% of the provincial total. The Ontario Mineral Incentive Program (OMIP) allocated \$404,093 to gold and base metal exploration programs, the third highest district total in the province.

EXPLORATION

Asarco Exploration Company of Canada Ltd. completed the third year of a major diamond drill program on the American Barrick Resources Corporation's MacLeod-Cockshutt, Mosher-Longlac and Hard Rock gold mines properties, located at Geraldton. Asarco's targets include feldspar porphyry-wacke contacts and replacement-sulphide banded iron formation. Gold is associated with sericite, quartz, arsenopyrite and pyrite at major fold axes and limb flexures. Asarco also undertook a sonic drill program to test the MacLeod-Cockshutt tailings pond, which is estimated to contain up to ten million tons of tailings.

Challenger Minerals Ltd. completed diamond drilling and down-hole PEM geophysics on the Marshall Lake property, located approximately 90 km northwest of Geraldton optioned from N.W.T. Copper Mines Limited. Drilling was focused east of, and down plunge of, current geological reserves and on geophysical targets. Significant volcanogenic massive sulphide hydrothermal alteration consisting of biotite-cordierite-anthophyllite-chlorite, stringer chalcopryrite and sphalerite were drill intersected in felsic metavolcanics. Reserves on the property stand at 2.2. M tons grading 1.22% copper and 4.2% zinc. (Canadian Mines Handbook, 1993-94, p. 256)

Other exploration was conducted by prospectors, junior companies and major companies for gold, copper, zinc, lead and building stone (Fig. 1 & 2). Prospectors and mining companies conducted a total of 85 exploration programs.

RESIDENT GEOLOGIST STAFF AND ACTIVITIES

Staff of the Beardmore-Geraldton Resident Geologist's District includes: J. Mason, Resident Geologist; G. White, Staff Geologist; C. Komar, Secretary; K. Furioso, Acting Secretary; and S. Warren, Assessment File Clerk.

Thirty-three property visits were conducted during the 1994 field season (Fig. 3). An introductory prospector's course was held in Geraldton in October. The Resident Geologist's Program also handled 1014 personal consultations and 487

telephone inquiries in the Beardmore, Geraldton and Thunder Bay offices. Assessment file inquiries for the Thunder Bay Mining Division totalled 480 inquiries and 99 phone calls. Prospectors and mining companies held 51 work permits in the district in 1994. Seasonal field offices were maintained in the communities of Beardmore and Geraldton.

Beardmore - Geraldton Resident Geologist's District

(South Map)

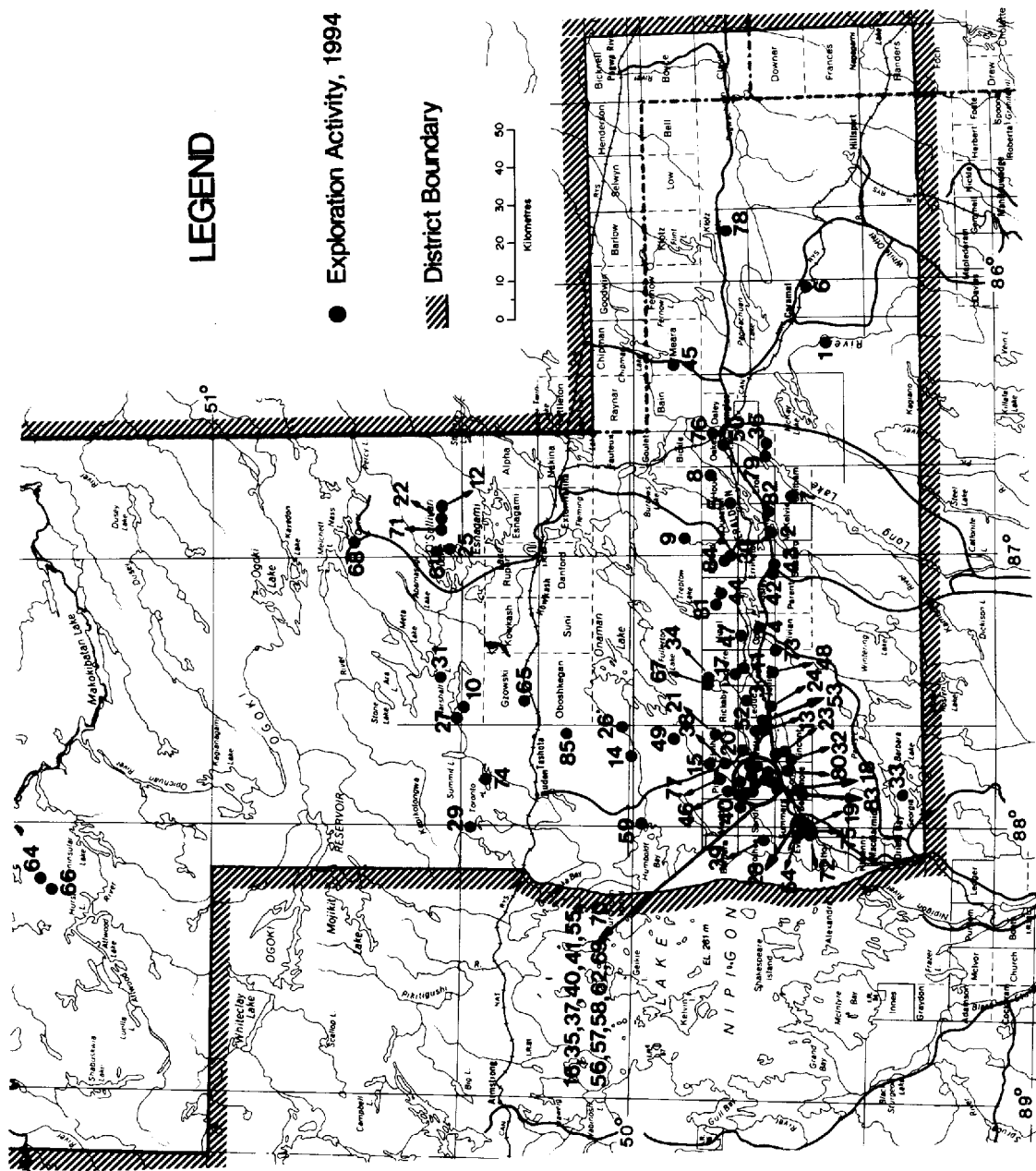


Fig. 1

Beardmore - Geraldton

Resident Geologist's District

(North Map)

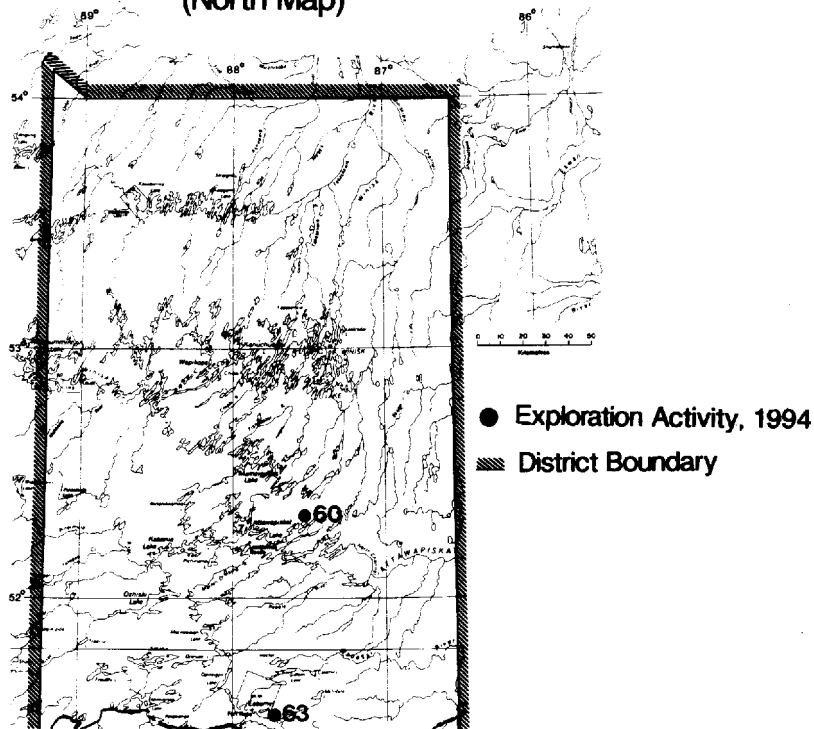


Fig. 2

Beardmore - Geraldton Resident Geologist's District

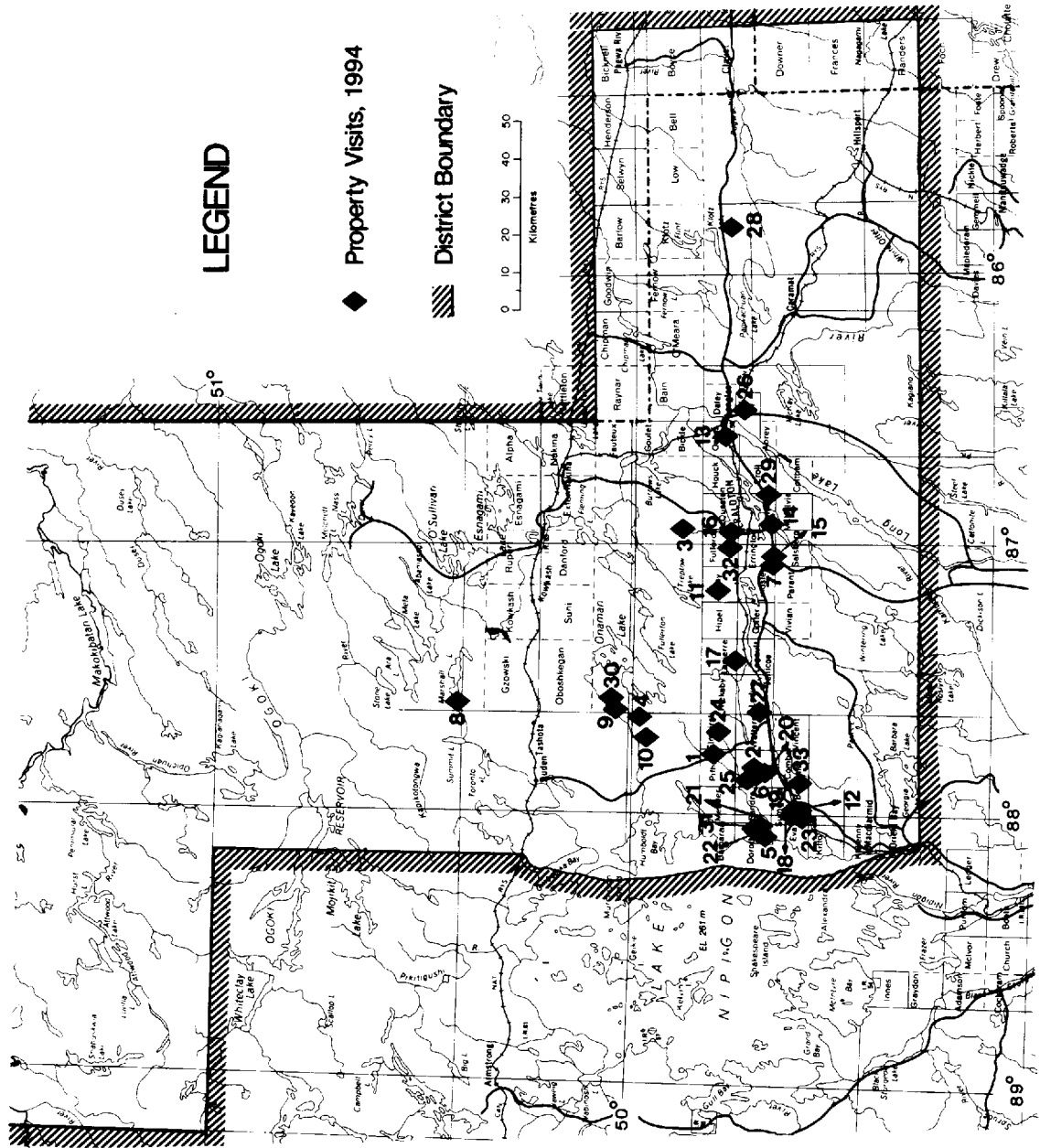


Fig. 3

EXPLORATION PROGRAMS IN THE BEARDMORE-GERALDTON DISTRICT 1994

ABBREVIATIONS

AEM	Airborne Electromagnetic Survey	HLEM	Horizontal Loop Electromagnetic Survey
AM	Airborne Magnetic Survey	IP	Induced Polarization Survey
ARA	Airborne Radiometric Survey	RES	Resistivity Survey
DDH	Diamond Drill Hole(s)	SP	Self Potential Survey
GEM	Ground Electromagnetic Survey	Str	Stripping
GC	Geochemical Survey	Tr	Trenching
GL	Geological Survey	UG	Underground Development
GM	Ground Magnetic Survey	VLEM	Vertical Loop Electromagnetic Survey
GRA	Ground Radiometric Survey	VLF-EM	Very Low Frequency Electromagnetic Survey

Company/Individual (Property Name)	Township/Area (Commodity)	Exploration Activity
1. Albert, O	Caramat (Cu, Ni)	GL, GEM, GM
2. Asarco Exploration Co. of Canada Ltd.	Errington/Ashmore townships (Au)	DDH
3. Auger, T.	Leduc Township (Au)	prospecting, Str, Tr
4. Bain, H.	Colter Township (Au)	prospecting, GM, GEM
5. Bortnick, J.	McQuesten/Houck townships (Au)	GM, GEM
6. Brinklow, R and B.	Caramat (Au)	prospecting, Str, Tr
7. Brinklow, R and B.	Coltham Township (Au)	prospecting
8. Brinklow, L.	Houck Township (Au)	prospecting
9. Burns, R.	Isobel/Greta lakes (building stone)	prospecting, Str
10. Challenger Minerals Ltd (Marshall Lake property)	Marshall Lake (Cu, Zn)	DDH
11. Checkley, F. (Sturgeon Bridge occurrence)	Legault Township (Au, Cu)	Prospecting, Str, Tr
12. Clark, G. Eveleigh, A. and Gagne, P.	Muriel Lake (Cu, Zn)	Str
13. Clarke, L. and L.	Walters Township (Au)	Prospecting, Str, Tr
14. Cote, R.	Coughlan Lake (Cu, Zn)	Prospecting, Str, Tr
15. Cote, R. (Greenspar occurrence)	Pifher Township (Au)	Prospecting, Str, Tr
16. Cowan, M. (Patter Lake occurrence)	Irwin Township (Au)	DDH
17. Cox, N. (Missing Link occurrence)	Lapierre Township (Au)	Prospecting, Tr, Str
18. Cox, N. (Windigo Pete occurrence)	McComber Township (Au)	Prospecting, Str, Tr
19. Cox, N.	Summers Township (Au)	Prospecting
20. Docherty, B. and Royer, G.	Walters Township (Au)	Prospecting, GM, GEM
21. Douglas, A (O'Neil Creek occurrence)	Elmhirst Township (Au, Cu)	Prospecting
22. Eveleigh, A.	Muriel Lake (Cu)	Str, Tr, GL, GM, GEM, Prospecting
23. Founder Resources Inc.	Vincent Township (Au)	GL
24. Founder Resources Inc.	Leduc Township (Au)	GL
25. Gagnon, F.	O'Sullivan Lake (Au)	Tr, DDH
26. Goldbrook Explorations Inc.	Onaman Lake (Cu, Zn)	DDH, Str, Tr
27. Goodman, F. and L. and Cote, R.	Gripp Lake (Cu, Zn)	Prospecting, Str, Tr
28. Goodman, H. (Morgan occurrence)	Summers Township (Au)	Prospecting, Str, Tr
29. Grant, J.	Toronto Lake (Au)	Prospecting
30. Greenland, H.	Geraldton (Au)	Prospecting
31. Hakala, J.	Marshall Lake (Au)	Prospecting
32. Harte Resources Corporation (Craskie-Vega occurrence)	McComber/Vincent townships (Au)	Prospecting, GL
33. Hayes, A.	Barbara/Keemle lakes (Cu)	GM
34. Hayes, A.	Rickaby Township/Lapierre lake (Au)	GM
35. Hodge, H.	Irwin Township (diamonds)	DDH
36. Hogg, V.	Abrey Township (diamonds)	DDH
37. Holt, L.	Irwin Township	Tr, Str
38. Holt, L.	Pifher Township (Au)	Prospecting, Tr, Str
39. Houghton, F. (Nortoba - Tyson occurrence)	Dorothea Township (Au, Cu, Mo)	Prospecting, Str, Tr
40. Houghton, F.	Irwin/Sandra townships (Au)	Str, Tr
41. Houghton, P. (Nordic Lake occurrence)	Irwin Township (Au)	Prospecting
42. Johansen, T. (Goldfields Road occurrence)	Errington Township (Au)	DDH
43. Johansen, T. (Marron Lake occurrence)	Errington Township (Au)	Prospecting, Str, Tr

44. Johansen, T. (Kirby Lake Zinc occurrence)	Kirby Township (Pb, Zn)	Prospecting, Tr, DDH
45. Kakeeway, D.	Chipman Lake (Au)	Prospecting
46. Kindla, D.	Pifher Township (Au)	Prospecting, Tr, Str.
47. Koivisto, R.	Colter Township (Au)	GM, VLF-EM
48. Kopystinski, D.	Legault Twp. (Au)	Prospecting, Tr
49. Lassila, P.	Castlewood Lake (Cu, Zn, Pb)	GL, GM, GEM
50. Long Lake Aggregates	Oakes Township (granite aggregate)	Str
51. Maki, N.	Vincent Township (Au)	Str, Tr
52. Master Plan Mineral and Petroleum Developers Corp.	Walters Township (diamonds)	DDH
53. Master Plan Mineral and Petroleum Developers Corp.	Leduc Township (diamonds)	DDH
54. McMahan, J. (Undersill Property)	Summers Township (Au)	Prospecting, GL, VLF-EM
55. Metalore Resources Limited (Brookbank deposit)	Irwin Township (Au)	Tr, DDH
56. Metalore Resources Limited (Cherbourg prospect)	Irwin Township (Au)	DDH
57. Metalore Resources Limited (Foxear prospect)	Irwin Township (Au)	DDH
58. Metalore Resources Limited (Watson Lake)	Irwin Township (Au)	DDH
59. Michon, R.	E. shore Lake Nipigon (Au, Cu)	Prospecting
60. Moonias, D.	Lansdowne House (Au)	Prospecting
61. Murgor Resources Inc.	O'Sullivan Lake (Au)	Prospecting, GL
62. Nelson, M.	Irwin Township (Au)	Prospecting
63. Noranda Exploration Company Ltd. (Reserve Creek prospect)	Fort Hope (Au)	GM, DDH
64. Noranda Exploration Company Ltd. (Parent property)	Atwood Lake (Cu, Zn)	GL
65. Noranda Exploration Company Ltd. (Royal Crown occurrence)	Gzowski Township (Zn)	GL, GC, GM, HLEM
66. Parent, S.	Atwood Lake (Cu, Zn)	GM, GEM
67. Parres, J.	Rickaby/Lapierre townships	Tr, GL, GM
68. Patrie, D.	Briarcliffe Lake (Au)	GM, GEM, DDH, Tr
69. Pettit, C.	Irwin Township (Au)	DDH
70. Pettit, C.	McComber Township (Au)	DDH
71. Pierre Gagne Construction	Muriel Lake (Cu, Zn)	Str, Tr
72. Rentz, E. (OBK occurrence)	Summers Township (Au)	Prospecting, Str
73. Rentz, M. (Colter Lake property)	Colter/Legault/Vivian townships	Tr, VLF-EM
74. Reukl, R.	Toronto Lake (Au, Cu, Zn)	Prospecting
75. Robertson Minerals (Lafontaine-Summers township occurrence)	Summers Township (Au)	Prospecting, Str, Tr
76. R. J. K. Explorations Ltd.	Oakes Township (Au)	DDH
77. Stevon Resources Inc. (Crooked Green Creek occurrence)	Pifher Township (Au)	Str, Tr
78. Swereda, M.	Klotz Lake (Au)	Prospecting, DDH
79., Telstar Resources Ltd.	Abrey Township (Au)	DDH
80. Ternowesky, J. (Craskie-Vega prospect)	McComber/Vincent townships (Au)	Prospecting, Str
81. Theriault, O.	Kirby Township (Au)	Str, Tr
82. Wilson, A. (Wilson-Hollinger property)	Ashmore Township (Cu)	DDH
83. Windigo Pete Resources (Windigo Pete occurrence)	McComber Township (Au)	Prospecting, Str, Tr
84. W.N.W. Prospecting Syndicate (McLellan property)	Fulford Township (Au)	Prospecting, Str, Tr, GL
85. Yzerdraat, W.	Metcalf Lake (Au, Cu, Zn)	GM, VLF-EM

PROPERTY VISITS - 1994

1. Augmitto Occurrence (L. Holt): Au, Cu
2. Brookbank Gold Deposit (Metalore Resources Limited): Au
3. Crib Road Granite Property (B. Burns): Granite
4. D-9 Conductor Gold Occurrence (N. Cox): Au, Cu
5. Dorothea Gold Occurrence (F. Houghton - P. Lassila): Au, Cu
6. Foxear Creek Occurrence (Metalore Resources Limited): Au
7. Gold Fields Road Occurrence (T. Johansen): Au
8. Gripp Lake Occurrence (F. Goodman, L. Goodman, R. Cote): Cu
9. Johnston - Tashota Goldfields Prospect: Au
10. Kenty Au -Mo Prospect (W. Langridge): Au
11. Kirby Township - Theriault Au - Zn Occurrence (O. Theriault): Au
12. Lafontaine Summers Township Property (A. Lafontaine): Au
13. Long Lake Quarry (Long Lake Aggregates): Granite Aggregate
14. MacLeod - Cockshutt Mine (Asarco Exploration Co. of Canada Ltd.): Au
15. Marron Lake Occurrence (T. Johansen): Au
16. Maylac Mines: Au
17. Missing Link Extension (N. Cox): Au
18. Morgan North Occurrence (H. Goodman Jr.): Au
19. Morgan South Occurrence (H. Goodman Jr.): Au
20. Nordic Lake Occurrence (F. Houghton - P. Lassila): Au
21. Nortoba Cu -Au Diorite Occurrence (F. Houghton): Cu, Au
22. Nortoba Mo - Vein Occurrence (F. Houghton): Mo
23. OBK Occurrence (E. Rentz): Au
24. O'Neil Creek Property (A. Douglas): Au, Cu
25. Patter Lake Occurrence (M. Cowan): Au
26. Reserve #77 Sulphides
27. Solomon's Pillars Prospect (INCO): Au
28. M. Swereda - Chowder Lake Occurrence (M. Swereda): Au
29. M. Swereda - Eldee Lake Rd. Occurrence (M. Swereda): Au
30. Tashota - Nipigon Mine: Au
31. Tyson Gold Prospect (N. Cox - F. Houghton): Au
32. West McLellan Occurrence (W.N.W. Prospecting Syndicate - A. Willy): Au
33. Windigo Pete Occurrence (Windigo Pete Resources - C. Bowdidge): Au

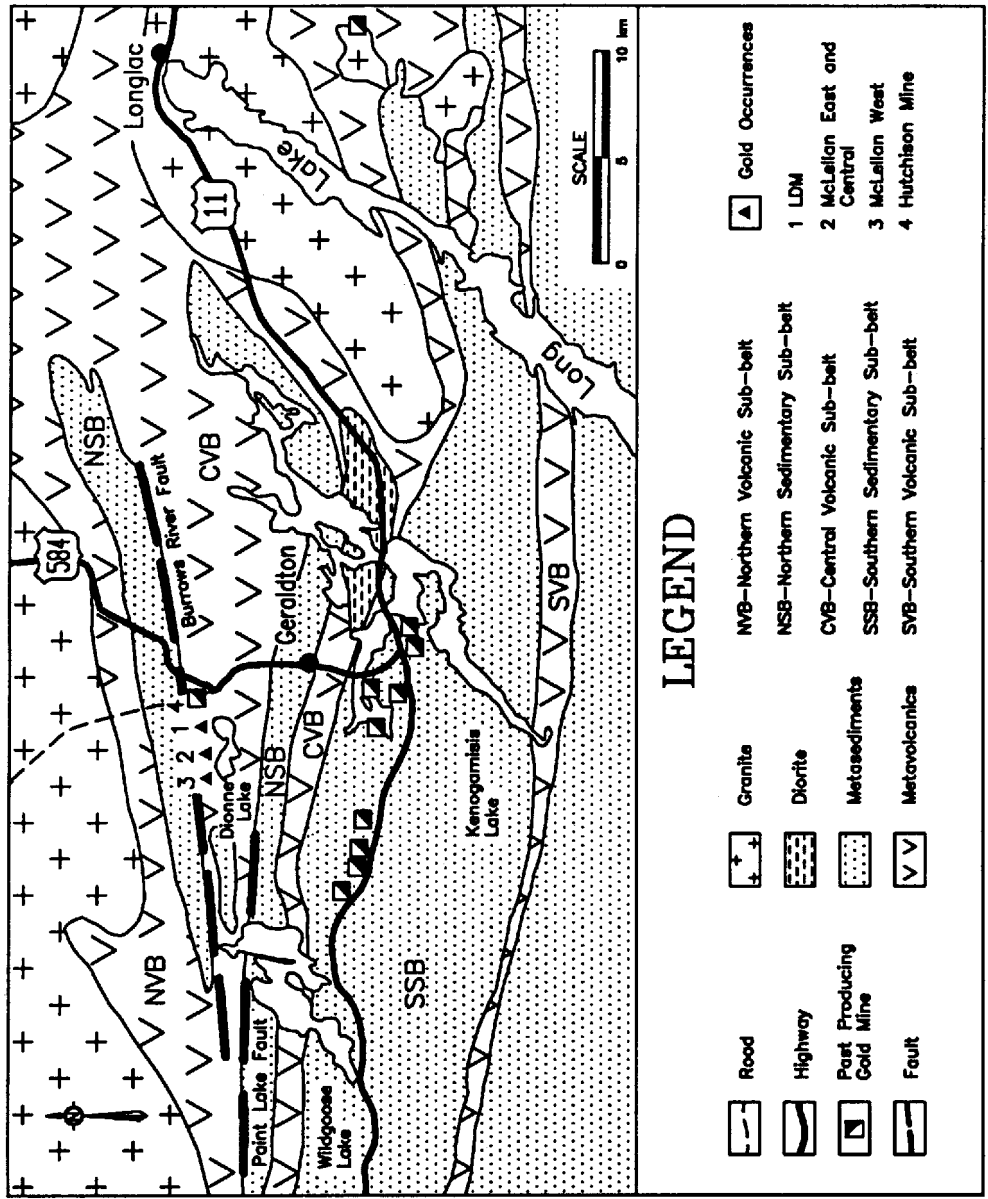


FIGURE # 4 LDM-McLellan Occurrences, Geraldton, Ontario

PROPERTY EXAMINATIONS

The following are summaries of 5 property examinations conducted in 1994.

Gripp Lake - Goodman Copper Occurrence

The Gripp Lake copper-zinc property is located approximately 70 km west-northwest of Nakina, Ontario and 5 km west-southwest of Marshall Lake. The main copper occurrence is located on the west side of Gripp Lake, between the two arms of the lake on claim TB1195968. The property is held by F. Goodman, L. Goodman and R. Cote of Beardmore, and consists of 56 claim units. Access to Gripp Lake can be gained by float plane from Nakina or Geraldton. Alternatively, one can access Gripp Lake by boat or canoe from Toronto Lake via the Ombabika River through Summit Lake and the Gripp River. Toronto Lake is road accessible from the Auden Road north extension, a distance of 104 km from Hwy. #11.

Exploration activity in the Gripp Lake-Marshall Lake area commenced in 1954 after prospectors employed by Teck-Hughes Gold Mines Ltd. discovered copper-zinc mineralization 1.6 km south of Gripp Lake. The Marshall and Gripp lakes area was staked during the resultant staking rush. Exploration work from 1954 to present was concentrated mainly east of Gripp Lake. Work west of Gripp Lake was conducted by: Jacobus Mining Corp. - (electromagnetic and magnetic ground geophysical surveys in 1962); Kendon Copper Mines Limited - (induced polarization geophysical survey in 1966), and Imperial Oil Limited - (induced polarization geophysical survey in 1976).

The Gripp Lake area is located in the Onaman-Tashota metavolcanic belt. It is underlain by felsic to intermediate metavolcanics and is intruded by quartz diorite of the Summit Lake (Junior Lake) Intrusion. (Amukun 1989)

The Goodman property is underlain by felsic, amphibolite-grade, altered tuff to lapilli tuff, (specifically feldspar-biotite-quartz schist). Sericite, chlorite, boitite, silica, magnetite, and garnet are the main alteration minerals present. The main zone consists of two parallel stringer zones of massive to disseminated chalcopyrite, up to 0.3 m wide each and striking 40°. A third zone to the west strikes northwesterly. Grab samples taken by the owner assayed up to 13.52% Cu and 0.68 g/t gold (F. Goodman, Prospector personal Communication, 1994).

Patter Lake Gold Occurrence

The Patter Lake occurrence is located in the west central portion of Irwin Township, approximately 14 km northeast of Beardmore. The property consists of eighteen contiguous claims adjoining the northwest boundary of Metalore Resources Limited's Brookbank gold prospect and is currently held by prospector/geologist M.F. Cowan of Vancouver. Under 1993 and 1994 OPAP grants, extensive stripping, trenching and four diamond drill holes (totalling 462 m) were completed on the occurrence. Access to the property is gained by travelling 20.7 km from Hwy 580, north of Beardmore along the camp 72 and Corrigan Lake Roads, to a point on the north shore of Patter Lake. The occurrence is located 1 km due north, on claim TB768665.

A limited amount of work has been conducted over the area since the original discovery was made by Karl Springer Exploration Company Limited in 1935. During this period, a series of 9 north striking trenches were excavated along an easterly striking, 40-foot wide, rusty shear zone (Laird, 1936). With the exception of a geological survey conducted by Dajaty Gold Mines Ltd. in 1945, further development was initiated by M. F. Cowan. From 1984 to 1994, the owner completed airborne geophysical and ground magnetometer geophysical surveys, extensive geological mapping, stripping, trenching and diamond drilling.

The Patter Lake occurrence lies just south of the Paint Lake fault, within mafic metavolcanics of the northernmost portion of the main Beardmore-Geraldton belt. The occurrence is exposed from the east edge of a small pond, for 280 m along an easterly strike. It consists of a highly gossaned, altered shear zone varying from 1 m to 20 m wide. Generally, the mafic metavolcanics with this shear horizon are silicified and host discontinuous lenses or boudins of grey-white quartz vein material and prominent, rusty quartz-carbonate alteration. Pyrite and arsenopyrite mineralization occur in

amounts from 5% to 7% at numerous sites along the zone, in close association with the alteration. Units of siliceous feldspar porphyry, felsic fragmentals (with fragments up to 4 cm in size) and Proterozoic diabase dikes up to 1 m wide were noted within the main zone.

Selected grab and channel samples collected from altered sections of the main shear horizon assay as high as 0.13 ounce Au per ton and 0.07 ounce Au per ton respectively (M.F. Cowan, Personal Communication, 1994).

LDM- McLellan Gold Occurrences

The LDM-McLellan gold occurrences are located 7 km northwest of Geraldton, in the southeastern corner of Fulford Township. The property is accessible by a well-maintained bush road which heads west from the Kimberly-Clark Greta Lake road about 1.0 km north of the intersection of that road with Highway 584, which is in turn approximately 10 km from Geraldton. Prospector/geologist Allan J. Willy, P. Eng., a member of the WNW Prospecting Syndicate, the property holders, has completed detailed prospecting and geological mapping, and extensive stripping, trenching and sampling in each year from 1992 to 1994. This work was OPAP funded. Approximately \$100,000 has been spent to date on the 15 claim property. Exploration work in 1994 concentrated on the McLellan West occurrence, where grab samples of a galena-chalcopyrite-bearing quartz vein returned values up to 0.87 ounce Au per ton.

In 1935, discovery of the rich Hutchison Lake Mine gold vein, located about 3.0 km east of the LDM-McLellan area, led to exploration to the east and west along the strike of the mine. The Loudon-Daoust-McBurnie (LDM) Syndicate conducted surface prospecting and limited trenching and diamond drilling on an arsenopyrite- and pyrite-bearing altered basalt in the vicinity of the LDM occurrence. W. Loudon of Geraldton reported that gold values of up to \$4.50 per ton (0.13 ounce Au per ton with gold at \$35 per ounce) were obtained from quartz veins in the sheared metavolcanic rocks. At the same time, McLellan Long Lac Gold Mines Limited were conducting extensive overburden and some bedrock trenching over their claims located immediately to the west. During 1986-87, Noranda Exploration Company conducted ground magnetic and VLF-EM geophysical surveys and diamond drilling on claims which covered the LDM-McLellan occurrences. A Noranda grab sample of an altered, sulphidized basalt from an LDM trench returned 0.11 ounce Au per ton. A Noranda diamond-drill hole collared near the trench intersected the altered zone, but no assay results were indicated in the assessment files. (Resident Geologist's files, Beardmore-Geraldton District, Thunder Bay)

The LDM-McLellan occurrences lie immediately south of the northern metasedimentary sub-belt, in metabasaltic rocks belonging to the central metavolcanic sub-belt. (Beakhouse 1989). The Burrows River fault is interpreted to separate these two sub-belts and is possibly a splay off of the regional Paint Lake fault, which is associated with the Metalore Resources Brookbank deposit in Irwin Township. The Hutchison Lake Mine represented the only production in the area, with 792 ounces of gold produced in 1946 from 1500 tons of ore grading 0.52 ounce Au per ton. The Hutchison Lake Mine is located in intensely altered basalts cut by quartz-carbonate veins containing visible gold, pyrite, pyrrhotite, sphalerite, chalcopyrite and galena. (Macdonald 1943) (A. J. Willy, Prospector/geologist, personal communication, 1995).

In 1992, the area of the LDM occurrence that was trenched in the 1930's was stripped by the WNW Prospecting Syndicate to expose a silicified, quartz-veined and sulphidized (arsenopyrite and pyrite) 5 m by 45 m zone. Approximately 95 m of channel sampling was conducted; samples were sent for gold assay. The 88 samples collected returned geochemically anomalous gold up to a high of 549 ppb Au with 28 samples (32%) being >50ppb Au. (A.J. Willy, Prospector/geologist, personal communication, 1995)

In 1993, the WNW Prospecting Syndicate stripped and sampled the McLellan East (new zone) and the McLellan Central (1930's overburden trenching) occurrences located about 1.0 km west of the LDM occurrence. A total of 24 grab samples of narrow quartz-carbonate veins and pyritized wallrock from blasted pits or newly exposed basaltic outcrop were collected. Geochemically anomalous gold values up to 810 ppb were obtained. A grab sample of pyrite-bearing, altered basalt was taken from the dump of a 1930's blasted trench located about 1.0 km further to the west; it returned 0.08 ounce Au per ton. This occurrence was named McLellan West and consists of gold associated with sulphide-bearing quartz-carbonate veins in highly altered shear zones in metabasalt. About 300 m of overburden trenching and at least 4 blasted pits (up to 2 m x 5 m x 2 m deep) were completed in the 1930's.

In 1994, the WNW Prospecting Syndicate stripped, washed and sampled the McLellan West occurrence with approximately 2500 m² of outcrop being exposed (A. J. Willy, Prospector/geologist, personal communications, 1995). The main zone hosted in basalt, was traced over a distance of about 200 m, and was continuously exposed for 85 metres. Over this interval, the rusty, carbonatized, silicified and sheared main zone is 2.5 m to 5.0 m wide for a distance of 40 metres, then narrows. A total of 99 channel samples and grab samples from blasted pits, were sent for gold analysis, with 38 samples being analysed for 32-element ICP, 11 for Pt and Pd analysis, and 13 for whole rock analysis. Gold values ranged from <5ppb Au, up to 0.87 ounce Au per ton, with 29 samples being over 100ppb Au and 44 samples being over 50ppb Au. (A.J. Willy, Prospector/geologist, personal communications, 1995) The highest assays were from a 20 cm-wide quartz carbonate vein having a 1 cm wide by 1.0 m long sulphide seam containing pyrite, chalcopyrite and galena. No significant results were obtained for Pt, Pd and 30 element ICP. About 50 m south of the east end of the main zone is an old blasted pit, which exposes sphalerite and pyrite mineralization in quartz-carbonate veins. These veins are anomalous in gold and are folded into a series of minor open folds plunging at about 45° west. A northwest-striking, steeply-dipping minor fault cuts the east side of the main zone and has an apparent horizontal displacement of about 2.0 m (A.J. Willy, Prospector/geologist, personal communication, 1995).

The results of the exploration conducted by A. J. Willy and the WNW Prospecting Syndicate since 1992 has refocused attention on the gold potential of the northern metasedimentary sub-belt and central metavolcanic sub-belt north of Geraldton. Little subsurface exploration has been conducted along the south fault contact zone between the north metasedimentary and central metavolcanic sub-belts, which is mostly covered by glaciofluvial sediments. This deformation zone strikes for about 30 km northeasterly across Kirby, Fulford, McQuesten and Houck townships, and represents a broad, underexplored and favourable horizon for gold exploration.

Nortoba Property

The Nortoba property is located in the southeastern portion of Dorothea Township, 3 km east of Bish Bay on Lake Nipigon and 12 km northwest of Beardmore. The property is accessible by first travelling 6 km east on Hwy 580 from the Hwy 11 junction just north of Beardmore, to the 72 -road and proceeding north for approximately 12 km to a Bailey bridge crossing the Namewaminikan (Sturgeon) River. Immediately upon crossing the bridge, the Tyson open cut (No. 1 vein system) is reached by driving 8.2 km southwest along an old bush road. Upon a June 1, 1994 government re-opening of former leased claims, prospectors Frank Houghton and Nolan Cox staked 7 claims (12 claim units) covering the former Amorada Au-Mo occurrences (Laird 1936). During the 1994 field season, Frank Houghton conducted a preliminary evaluation of the property, involving prospecting, stripping and detailed sampling. Much of this work was concentrated along the southern portion of the claim group, west of what is historically known as the No. 3 vein system.

Extensive exploration work has been conducted over the property in the past, beginning with Amorada Gold Mines Limited from 1935 to 1940. During this period, stripping, test-pitting and cross-trenching uncovered five gold and molybdenite-bearing quartz vein systems (No. 1, 1A, 2, 7 and 3). A total of 530 m (1,737 feet) of diamond drilling was completed to a depth of 116 m (380 feet) on the No. 3 vein, and additional molybdenite-bearing quartz veins were intersected. Due to the strategic importance of molybdenite during World War II, the Federal Department of Mines and Resources sampled the No. 3 vein system in 1942. In 1958 Nortoba Mines Limited optioned a 52-claim group covering the Amorada occurrences. The company conducted a detailed resistivity geophysical survey, VLF-EM geophysical survey, further stripping and trenching, and completed 15 diamond-drill holes, totalling 1,112 m (3,649 feet), along the two largest anomalies. Plans were initiated to mine the No. 3 molybdenite vein by means of a decline following the purchase of a small mill, but lack of funds prevented further development work. In 1962, Mead Mining Corporation Ltd. diamond drilled seven holes totalling 920 m (3,018 feet) along the east and west strike extensions of the No. 3 vein system. The property was acquired by W. Woods and A. Tyson in 1963 and a 146-ton bulk sample of selected gold-bearing quartz vein material was removed from the No. 1 A vein by means of an open cut. The sample was shipped to both the Leitch and MacLeod-Cockshutt Gold Mines for processing and an average grade of 1.03 ounce Au per ton was obtained. In 1965, Candore Explorations Limited conducted geological mapping, stripping, trenching and diamond drilling totalling 1,200 m (3,927 feet) in 17 holes, to further investigate the southern molybdenite-bearing horizon. Gunnex Limited optioned the 37 - claim Tyson group (which included the Amorada occurrence) in 1971 and conducted geological mapping, soil geochemistry, magnetometer and horizontal loop - EM geophysical surveys over this property and a larger claim group to the southwest. A program involving prospecting,

power stripping, trenching, detailed mapping and sampling was completed by Stroud Resources Ltd. in 1983 to evaluate the gold potential of the Tyson property. (Resident Geologist's files, Beardmore-Geraldton District, Thunder Bay)

The Nortoba property, as it is called by the present owners, is situated within the extreme northwestern portion of the main Beardmore-Geraldton belt. The projected westward trace of the Paint Lake fault is approximately 4 km north of the claim group. Mackasey's (1975) stated that the Nortoba Property lies along the northern boundary of a small intermediate to felsic metavolcanic unit. This unit consists primarily of flow rocks and lesser amounts of tuff and pyroclastic-breccia. Most of the known gold and molybdenite occurrences on the property are located at the southern and northern edges of a locally prominent, easterly-trending ridge, which consists of fine-grained, highly altered diorite and quartz diorite. This lensoid body, which is roughly 300 m wide and 3 km long, lies at the contact of the felsic metavolcanic unit to the south and mafic metavolcanics to the north. Past work was primarily concentrated along the five main, sub-parallel quartz vein systems on the property. These are typically narrow, high-grade structures occupying shear zones which average 0.5 m wide (ranging up to 1.5 m wide) and can be traced from 366 m to 488 m (1200 ft to 1600 ft) along strike. Much of the gold exploration has focused on the No. 1A vein (in the north portion of the property), from which the 146.3 ton bulk sample of selected quartz vein material averaging 1.03 ounce Au per ton was removed (Lamble 1965). Numerous grab, chip and channel samples collected from the No. 1, 1A, 2 and No. 7 veins during past activity returned assay values ranging from 0.05 to 11.99 ounces Au per ton. (Resident Geologist's files, Beardmore-Geraldton District, Thunder Bay)

Base metal exploration, specifically for molybdenite, has been restricted to the southern portion of the property, in the area of the No. 3 vein system. The No. 3 vein lies approximately 300 m south of the No. 1A vein and consists of a molybdenite-bearing quartz-carbonate vein system which can be traced along strike (80°) for 457 m (1500 feet). The vein system averages 46 cm (18 inches) in width (Mackasey 1975); the single vein ranges up to 1 m wide, but at certain locations it splits into a series of parallel veins over a 2 m (6.7 foot) width. Molybdenite occurs as thin films and massive concentrations comprising up to 15% of the vein material. Additional molybdenite mineralization associated with quartz was intersected by Amorada Gold Mines Limited in 1940. Diamond drilling by Nortoba Mines Limited in 1959 also intersected 0.4 m (1.3 feet) of fine-grained, altered diorite containing 2% MoS_2 (Lamble 1959), indicating that the molybdenite is not restricted to quartz veins. In 1962, Mead Mining Corporation Ltd. cut a 1.2 m (4 foot) section containing chalcopyrite, pyrite and molybdenite mineralization west and north of the No. 3 vein extension. The area surrounding this pond, known as the Copper Pond, is the present focus of activity.

The importance of the Copper Pond area was highlighted by a Nortoba Mines Limited reference (Lamble 1959) to a new gold-sulphide zone ranging from 15 m (50 feet) to 21 m (70 feet) wide over a length of 120 m (400 feet). This zone is located 0.8 km (0.5 mile) southwest of the No. 1 vein (Mackasey 1975). This corresponds to the area just south of the

Copper Pond. Samples collected by prospector F. Houghton returned values up to 1.6% Cu and 0.03 ounce Au per ton. (F. Houghton, Prospector, personnel communication, 1995)

Grab samples collected by the author in this area assayed up to 1.04% Cu, and consistently assayed 0.03 ounce Au per ton. (Resident Geologist's files, Beardmore-Geraldton District, Thunder Bay) The host rock at this south pond location consists of a silicified, reddish, highly-altered, fine-grained diorite containing up to 10% patchy chalcopyrite and fine-grained, disseminated pyrite. It is also important to note the presence of two prominent resistivity geophysical anomalies detected by Nortoba Mines Limited in 1958. These are located across the western and northern portions of the Copper Pond and may represent additional sulphide-bearing horizons. Minor quartz vein stockworks were observed.

From a preliminary evaluation of the area, the diorite body appears to extend further south and is more extensive than previously reported. Further work by means of stripping, trenching and detailed sampling is needed to evaluate the Copper Pond south zone. Gold, copper (and, in the case of the Nortoba property, molybdenum) associated with mafic intrusions has seen little previous attention in the Beardmore-Geraldton belt. The southern portion of the Nortoba property is no exception to this.

Morgan Extension Property

The Morgan Extension property is located in the southwestern portion of Summers Township, 2.5 km due west of Beardmore. Access is via the waste disposal road which branches west off Hwy 11 0.5 km north of Beardmore. Bush roads branch north and south from this point, traversing southwest for 2.0 and 3.5 km respectively, to the two main occurrences (Morgan North and South extensions) on the property. Beardmore prospector Herb Goodman Jr. conducted detailed prospecting, stripping, trenching and sampling under a 1994 OPAP grant over a 4-claim block (6 units).

The property was first worked from 1934 to 1936 by the Empire Contact Gold Syndicate. Much of the activity was concentrated along what is presently known as the Morgan South extension (i.e. the southeastern portion of claim TB1196697). A quartz-bearing shear zone hosted in metavolcanics was traced for 823 m (2700 feet) by means of stripping, pits and trenches. The Canadian Mines Handbook (1938) indicated that by late 1937, twelve veins had been found on the Empire Contact ground. From 1959 to 1961, E. B. Rentz and G. Petrie diamond drilled nine shallow holes totalling 440 m (1445 feet) along the main quartz-bearing shear zone (Empire Contact occurrence). In 1981, Gold Fields Resources Canada Limited completed ground magnetometer and VLF-EM geophysical surveys over a 65-claim block covering both the Empire Contact and former Morgan properties. Strong VLF-EM geophysical anomalies appear to be coincident with what is known as the Empire or Blackwater River fault, along which these occurrences are located. Further work by Golden Dragon Resources Ltd. in 1989, which included geological mapping, stripping, trenching, EM and IP geophysical surveys, was conducted over a large claim group, including the Morgan Extension property. During the period 1993 - 1994, prospector Herb Goodman Jr. staked 4 claims and concentrated exploration work along two main zones, termed the Morgan North and South extensions.

The Morgan Extension property is situated within the extreme southwestern portion of the main Beardmore-Geraldton belt, along a major structure known as the Blackwater River or Empire fault. The fault at this location transects the claim group in a northeasterly direction and is the contact between the southern mafic metavolcanic sub-belt to the south and the southern metasedimentary sub-belt to the north. Both the north and south Morgan Extension zones lie within the mafic metavolcanic horizon. The Morgan South Extension is part of the original Empire Contact occurrence, which was first worked in 1934. The North Extension zone (TB1196695) lies along the eastern trace of the Morgan showing, which is located just outside the western boundary of the current Goodman claim block.

The North Zone consists of a highly gossaned, vitreous to sugary, crack-seal quartz vein and sugary, cherty banded iron formation system hosted in highly sheared and silicified pillowed metavolcanics. The system averages 1 m in width (reaching a maximum width of 3 m) and strikes approximately 78°. Mineralization ranges from up to 5% disseminations and stringers of mainly arsenopyrite and pyrite within the vein, to lenses of massive pyrrhotite (plus lesser amounts of pyrite and pyrrhotite) in the iron formation. The host metavolcanics immediately adjacent to the zone (roughly 0.3 m on either side) are highly sheared and mineralized, with chlorite-sericite alteration. An area extending roughly 10 m south and 25 m north of the zone exhibits chloritization and carbonatization in moderately foliated metavolcanics. At the extreme northeast end of the exposure, a 5 m wide gossaned, graphitic unit containing up to 50% coarse pyrite crosscuts the pillowed metavolcanics. Limited chip sampling across 3 m returned up to 0.08 ounce Au per ton; selected grab samples collected by the author and property owner assayed up to 0.11 and 0.48 ounce Au per ton (H. Goodman, Prospector, personal communication, 1995). The character of this zone is consistent with the Morgan occurrence, which lies along strike approximately 700 m to the west. Of greater importance is the fact that both these occurrences are part of the Blackwater River or Empire fault, a potential hydrothermal conduit which is easily traced to the east along the Goodman property and has been the subject of limited exploration work.

The South Extension zone is located in the southeastern portion of claim TB1196697 and consists of a boudinaged, blue-grey quartz vein system up to 2 m wide, which strikes approximately 65°. It is hosted in a sheared, siliceous, fine-grained pillowed metavolcanic exhibiting chlorite-sericite alteration. Sulphide mineralization within the zone ranges up to 3 to 5% and consists of arsenopyrite, pyrite, pyrrhotite and lesser amounts of coarse chalcopyrite. Sampling along the Empire Contact occurrence (South Extension zone) in 1936 by Wetuskewin Gold Mines Ltd. returned assay values from 0.06 to 0.53 ounce Au per ton (Resident Geologist's files, Beardmore-Geraldton District, Thunder Bay). During the latter portion of the 1994 field season, continued exploration work by the property owner uncovered additional veining in sheared metavolcanics, sulphide (pyrrhotite) iron formation and graphitic horizons, over a 100 m width, south of the

South Extension zone (i.e. along the southern boundary of claim TB1196697). Grab samples collected across a stripped portion of this area assayed from 0.09 to 0.13 ounce Au per ton (Resident Geologist's files, Beardmore-Geraldton District, Thunder Bay). Further work for the 1995 season will be concentrated in this area.

RECOMMENDATIONS FOR EXPLORATION

Beardmore-Geraldton Area

Gold - copper (\pm molybdenum) mineralization associated with feldspar porphyry (\pm diorite/gabbro) should be evaluated in the Beardmore-Geraldton District. Examples of this style of mineralization includes the Augmitto Exploration Occurrence in Pifher Township (Lyle Holt, OPAP 1994). One drill hole from a 1972-73 program intersected 11.5 m averaging 0.02 ounce Au per ton and 0.76 percent copper (Kresz, 1989). The second example is the Nortoba occurrences (i.e. the southern portion of the Tyson project) in Dorothea Township (Frank Houghton, OPAP 1994) which consist of a number of copper-gold (\pm molybdenum) occurrences. Mineralization is associated with a large quartz diorite lens intruding the contact between "strong to weakly foliated metavolcanics which include amygdaloidal and porphyritic intermediate to mafic flows and intermediate to felsic tuffs, tuff-breccia and flows" (Mackasey, 1975, p. 69). Both of these properties came open for staking on the June 1 re-opening of former leased claims.

New forest access roads should be prospected for gold and base metals. One example is a planned road departing the Ogoki Road at mile 40.5, which is designed to cut southwest toward the Gzowski Lake area. The east portion of the Marshall Lake metavolcanic belt will be transected by this road.

Arsenopyrite-pyrite-sericite-gold mineral associations are another important gold model, which should be used by explorationists when undertaking exploration for gold in the district.

Fort Hope Area

The Fort Hope area is located within the eastern portion of the Uchi Subprovince. It is underlain by a tabular, easterly-trending belt (i.e. approximately 0.80° strike) of metavolcanic and metasedimentary rocks forming a semi-continuous, supracrustal network. The Uchi Subprovince extends for over 625 km and includes such prolific gold producing camps as Red Lake and Pickle Lake. Volcanogenic massive sulphides have been mined (i.e. South Bay Mine) and are being actively explored for, in the Uchi Subprovince.

Gold Deposits

Gold deposit types in the Fort Hope area have been subdivided as follows:

- (1) quartz veins in mafic metavolcanics and feldspar (\pm quartz) porphyry (Currie occurrence, Fort Hope Gold Mine, Hansen gold occurrence, Pioneer Lake occurrence, Schist Lake occurrence)
- (2) quartz veins, silicification and carbonatization in clastic metasediments (Szetu-Bayne occurrence)
- (3) banded iron formation and arsenopyrite or pyrrhotite association (Asarco occurrence, Goss Lake prospect, Wottam Lake occurrence)
- (4) quartz vein + feldspar porphyry and antimony association in mafic metavolcanics (Howells Lake prospect)
- (5) feldspar \pm quartz porphyry exhibiting silicification \pm shear zone (KL-12 Zone, Talbot Lake gold prospect)
- (6) quartz-tourmaline veins in wackes (North Wottam Lake occurrence)
- (7) strongly foliated to sheared mafic to felsic metavolcanics (OL-12/OL-29 zones, Zulapa prospect)

(8) quartz-tungsten veins, intensely foliated to sheared mafic metavolcanics hosting pyrite-pyrrhotite-magnetite (Reserve Creek occurrence, Rich Lake occurrence)

ONTARIO GEOLOGICAL SURVEY ACTIVITIES AND RESEARCH BY OTHER AGENCIES

There was no OGS field project activity in the Beardmore-Geraldton District in 1994.

K. Y. Tomlinson, R. P. Hall and D. J. Hughes, Department of Geology, University of Portsmouth, U. K. in conjunction with P. C. Thurston, OGS, Sudbury continued with a lithochemical study of mafic to intermediate metavolcanic rocks of the Beardmore-Geraldton belt.

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Kenora Resident Geologist's District - 1994

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INTRODUCTION

Dimension and monument stone, crushed stone, high-purity quartz and soapstone were all produced and marketed in the Kenora Resident Geologist's District in 1994, from a total of 7 quarries. As in other years, no metallic mineral production, other than that from a small scale gold mine, was recorded in the District. Advanced exploration, using a small scale mill to test a bulk sample, was continued at the Menary Township gold property of Western Troy Capital Resources Inc. Other advanced, underground, exploration programs, with developed gold reserves, at Shoal Lake and Cameron Lake, were inactive.

A stabilization in level of exploration activity in Kenora District over the past 3 to 4 years is indicated from data presented in Tables 1 and 2. Thirty one exploration and prospecting projects (Table 2) were conducted, compared to 35 projects in 1993. Eight projects were conducted with financial assistance from the Ontario Prospectors Assistance Program (OPAP). No exploration projects were funded under the Ontario Mineral Incentives Program (OMIP).

Six geoscience projects were conducted by staff of the Mines and Minerals Division. Staff of the Kenora Resident Geologist's Office made 16 visits to active and inactive mineral properties: these visits result in this report in discussion of two prospects available for option, along with broader recommendations for prospecting and exploration.

MINING ACTIVITY

There was no major production of either base or precious metals in the Kenora Resident Geologist's District in 1994. Programs are keyed, with letters in parentheses, to Figure 1.

Small-Scale Mining

A. Kozowy (Prospector, Dryden) (A) produced only a minor amount of gold concentrate in 1994 from his small mill at Flambeau Lake near Dryden. Mr. Kozowy has operated the mill since 1988, initially obtaining feed from gold-bearing quartz veins at his Flambeau Lake property. More recently feed has been obtained from similar vein material at the Brockman prospect, near Kawashegamuk Lake. Mr. Kozowy spent most of his time at the Brockman prospect in further opening up the open cut to access vein material (Alex Kozowy, personal communication, 1995).

Dimension and Monument Stone

Nelson Granite Ltd. (Division of Granite Monuments Ltd.) (B) continued year-round production from their quarry in Docker Township, 10 km southwest of Vermilion Bay. The quarry produces a homogeneous, medium-grained, pink granite from a granite plug, which is part of the Dryberry batholithic complex. Fracturing in the granite is negligible, allowing for removal of blocks of any size. In 1994, approximately 4000 m³ (150 000 cubic feet) was produced. The majority of material produced was shipped to fabrication plants in eastern Canada and elsewhere, to be made into monuments and architectural products (N. Nelson, Nelson Granite Ltd., personal communication, 1994).

Palin Granite Canada Inc. (a division of **Palin Granite Oy, Finland**), (C) suspended production from their **Pine Green Granite** quarry, located approximately 38 km north-northeast of Kenora, due to poor sales. Two stones have been produced on site: a yellow granite (**Crystal Gold**) which appears to be restricted to depths of 6 m; and a lower green granite (**Pine Green**). A total of 280 m³ (9,400 cubic feet) was sold from their existing stockpile in 1994. The quarry is slated to resume production in the spring of 1995 (T. Hendrickson, **Palin Granite Canada Inc.**, personal communication, 1994). **Palin Granite** is producing rough blocks for export to Japan, Italy and other overseas markets. Blocks are hauled approximately 12 km to a rail siding at Jones and loaded onto flatbed rail cars, which take the blocks to Montreal for shipping overseas.

Boundary Stone International Inc. (formerly **Universal Granite Systems Inc.**) (D), removed a small amount (3 m³) of grey granite from the past-producing **Butler Station Quarry**, 13 km west-northwest of Ignace (J. Peters Sr., **Boundary Stone International Inc.**, personal communication, 1994). The **Butler Station Quarry** last produced stone (8000 m³) in 1989, for the construction of the Ontario Government Building in Thunder Bay (Hinz and Lucas, 1993). **Boundary Stone** has been evaluating the possibility of resuming production at the **Butler Station Quarry**.

Decorative Stone

J.A. Minor and Sons of Kenora (E) suspended production on their **Cygnets Lake** quarry located approximately 45 km northwest of Kenora. A crushed red granite was produced for use as decorative landscaping stone and in precast concrete products. A total of 500 tons of crushed and screened granite was shipped in 1993. The material was stockpiled, with a small amount shipped to: Steinbach, Manitoba for use in precast concrete; and Red Lake for landscaping stone (J.A. Minor, **J.A. Minor and Sons**, personal communication, 1994).

High-Purity Quartz

Crystal Quarries Ltd. (F), owned by Ted Hansen of Keewatin, obtained a joint venture partner in **Crystal Quartz Dryden Inc.** headed by Frank Zobelein of King City, Ontario. The quartz quarry is located approximately 29 km south of Vermilion Bay. No quarrying occurred during 1994. Approximately 4000 tons of "contaminated" quartz was screened and washed to meet specifications. Some of this material was then shipped to market.

The partnership has obtained a building in the town of Dryden and is in the process of installing a vertical impact crusher and three screening machines. Material is to be crushed and screened to one quarter to one thirty second inch sizes (T. Hansen, **Crystal Quarries Ltd.**, personal communication, 1994).

Soapstone

Labyrinth Bay Stoneworks of Kenora (G) removed approximately 3 tons of soapstone from the waste dump of the past-producing **Grace Mining Company** quarry, located on Eagle Lake. A total of 4.5 tons of material was sold in 1994 for carving purposes. The soapstone is currently being used for carving by the Inuit of Fax Harbour, Northwest Territories and by the Arctic Co-op in Winnipeg, Manitoba (K. Fraser, **Labyrinth Bay Stoneworks**, personal communication, 1994). The soapstone occurrence is described in Gerow et al (1991).

Railway Ballast

Broda Construction Inc. of Kamsack, Saskatchewan (H) produced 400,000 tons of railway ballast from **Canadian Pacific Railways** ballast quarry near Dymont, 42 km southeast of Dryden. A 20 person crew was on site from August until November (E. Kerluk, **Broda Construction Inc.**, personal communication, 1994). The ballast is primarily an intermediate metavolcanic, with minor quartz carbonate veining and some carbonate and epidote alteration.

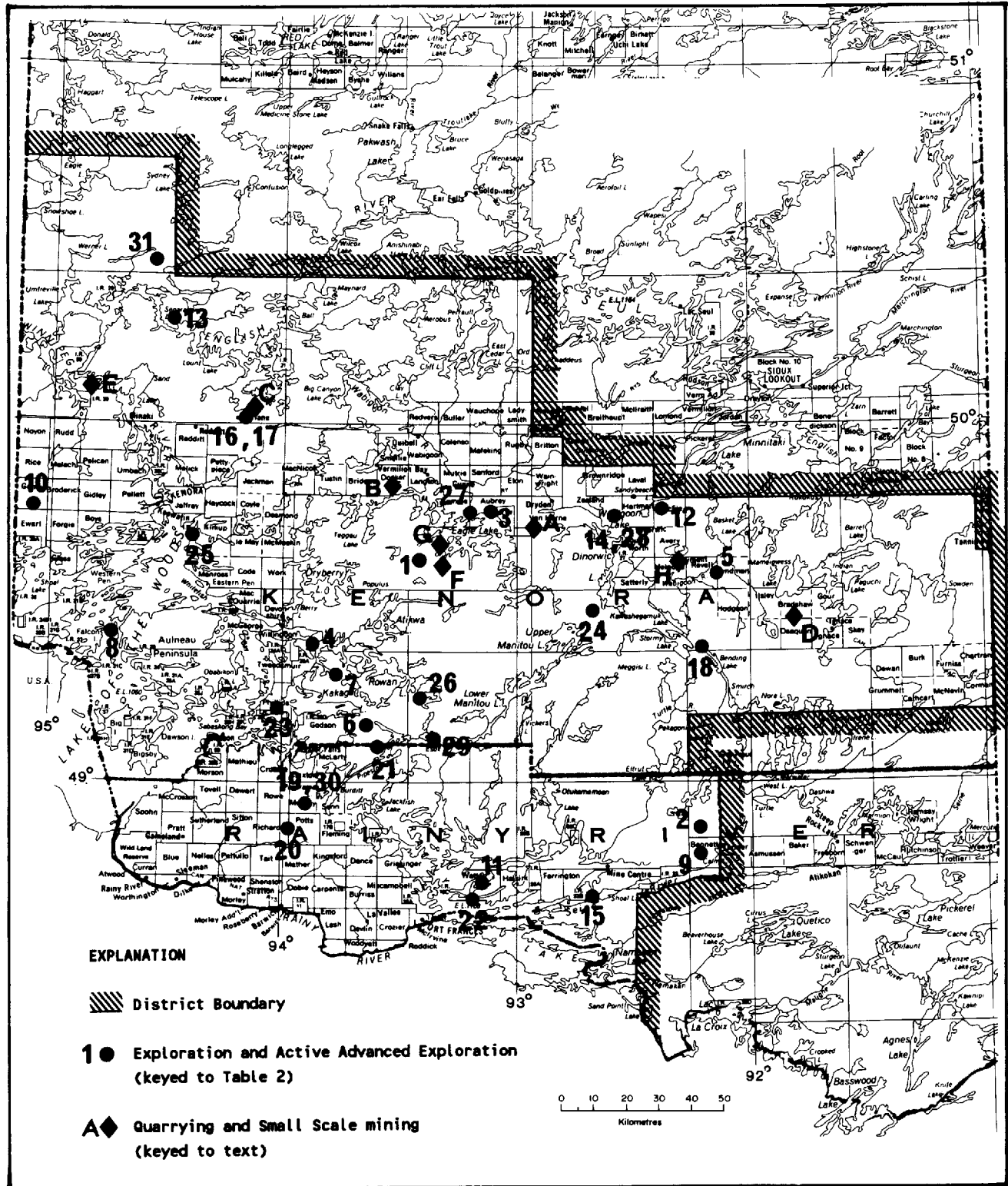


Figure 1. Kenora Resident Geologist's District: exploration, advanced exploration, quarrying, industrial mineral and small scale mining activity.

Table 1 Summary of claims recorded and assessment work credit

Year	Claim Units Recorded	Claim Units Cancelled	Claim Units Active	Diamond Drilling	Physical Sect.18 & Other	Geotechnical	Total
1994	2 946	3 173	9 823	\$529 825	\$ 64 718	\$521 086	\$1 115 629
1993	1 193	1 825	9 844	\$ 80 797	\$631 632	\$606 588	\$1 319 017
1992	3 124	1 278	10 139	\$657 218	\$202 950	\$174 598	\$1 034 766
1991	1 678	2 816	8 293	\$591 497	\$163 560	\$ 72 122	\$ 987 196

Table 2. Exploration activity during 1994 in the Kenora Resident Geologist's District

ABBREVIATIONS				
BM.....	Base Metals	Mag.....	Magnetometer Survey	
DD.....	Diamond Drilling	OD.....	Overburden Drilling	
DS.....	Dimension Stone	P.....	Prospecting	
EM.....	Electromagnetic Survey	SA.....	Sampling	
GC.....	Geochemical Survey	STR.....	Stripping	
GL.....	Geological Survey	Tr.....	Trenching	
IP.....	Induced Polarization Survey			

No.On Figure	Individual or Company	Area/Township	Commodity	Activity
1	Barton, Bernard	Garnet Bay area	Au	STR, SA
2	Bolen, J.	Sandbeach Lake area	Cu	EM
3	Champion Bear Resources Ltd.	Aubrey Township	Au	GL, IP, DD
4	Champion Bear Resources Ltd.	Lobstick Bay area	Au	Tr
5	Champion Bear Resources Ltd.	Revell and Hyndman townships	Cu, Ni	P, GC, SA
6	Chute, Michael	Brooks Lake area	Au, BM	GL, P, SA
7	Chute, Michael	Dogpaw and Rowan lakes	Au, BM	GL, P, SA
8	Consolidated Newgate Resources Ltd./Prior Resources Ltd./SouthernEra Resources Limited	Monument Bay and Astron Bay areas	Diamonds	DD
9	Cousineau, Louis	Bennett Lake area	BM	P, STR, SA
10	Etherington, R.	Gundy Township	BM	P
11	Eveleigh, A., Twomey, T. and Glidden, D.	Watten Township	Zn, Cu	GL, Mag, EM
12	Glatz, A.	McFie Township	Au	P
13	Gossan Resources Ltd.	Peterson and Treelined lakes areas	Rare Metals	SA
14	Laramide Resources Ltd.	Zealand Township	Au	GL, IP
15	Larouche, C.	Bad Vermilion Lake area	Au, Cu, Zn	SA, P
16	Manex Granit Inc.	Wonderland Lake area	DS	SA
17	Nelson Granite Ltd.	Wonderland Lake area	DS	SA
18	Noranda Exploration Company Limited	Bending and Wapageisi lakes areas	BM	EM, Mag
19	Nuinsco Resources Ltd.	Menary Township	Au	DD, EM
20	Nuinsco Resources Ltd.	Richardson and Potts townships	Au	GL, SA, OD
21	Phelps Dodge Corp. of Canada	Dash and Brooks lakes areas	BM	EM, Mag, GL, GC
22	Phelps Dodge Corp. of Canada	Watten Township	BM	EM, Mag, GL, GC
23	Pitkanen, Reino	Phillips Township	Au	STR, SA
24	Redden, J.W.	Boyer Lake area	Au	GL, STR, SA
25	Roberecki, E.	Bigstone Bay area	Au	STR, SA
26	Sande, D.J.	Bluffpoint Lake area	Au	STR, SA
27	Teck Exploration Ltd.	Aubrey and Temple townships	Au	DD, SA
28	Teck Exploration Ltd.	Zealand Township	Au	DD, SA
29	Tri Origin Exploration Ltd.	Bluffpoint Lake area	Au	IP, STR
30	Western Troy Capital Resources Inc.	Menary Township	Au	Adv. Expl., DD
31	W.S. Ferreira Ltd.	Rex Lake area	Cu, Ni, Co	Mag, EM

Peat

There was no production from the peat moss processing plant of Barwick Peat Ltd., at Barwick, 35 km west of Fort Frances. The plant operated for a brief period in 1993 only, producing 6000 bales, following restoration of the former Arctic Peat Moss Products plant.

ADVANCED EXPLORATION

Western Troy Capital Resources Inc. continued an advanced exploration program on their property in Menary Township (30, Figure 1 and Table 2). A 500 ton bulk sampling program commenced in 1992, to assess 6 closely-related gold-bearing quartz veins at the Wagg prospect. The bulk-sampling program has been expanded to include excavation and milling of a 6 000 ton sample. As part of this program, diamond drilling was conducted in the first half of the year in 6 short holes, to intersect the A and B veins beneath the showing, and an open cut was started on the F, E, and D zones. Additional mineralized zones, locally containing visible gold, were uncovered in the open cut. Twenty eight grab, chip, composite and panel samples taken from 5 zones ranged in value from 0.001 to 5.27 ounce Au per ton and averaged 1.4 ounce Au per ton (Canada Stockwatch, August 30, 1994). Later in the year a further 3000 foot diamond drill program was conducted on the Wagg prospect, and other outlying prospects in Menary Township, including the Agassiz prospect (Wayne Holmstead, consulting geologist for Western Troy Capital Resources Inc., personal communication, 1995).

Other advanced exploration and development projects that were mostly on standby in 1994 include:

Consolidated Professor Mines Limited, Shoal Lake, Duport mine property, where proven and drill-indicated reserves stand at 2 million tons averaging 0.35 ounce Au per ton (Table 6). The company has made changes to its original proposal for review under the Ontario Environmental Assessment Act, that include relocation of the processing plant, and changes to the ore treatment process. The Ontario government is awaiting submission of the new proposals. Conwest Exploration Company Limited is a major shareholder, with 41% interest in the company.

Nuinsco Resources Ltd., Cameron Lake mine, currently under care and maintenance, where proven, possible and probable reserves stand at 3 million tons averaging 0.168 ounce Au per ton (Table 6). In 1994, the Northern Ontario Resources Transportation (NORT) program approved a \$403 600 subsidy to Nuinsco to upgrade its 22 km access road from Highway 71 to the Cameron Lake site.

Nipigon Gold Resources Ltd., Bad Vermilion Lake, following bulk sampling under an Advanced Exploration permit of 400 tons on their McKenzie-Gray prospect, and 50 tons on the adjacent Foley prospect by December of 1993, conducted no further work on site in 1993 (C. Larouche, Nipigon Gold Resources Ltd., personal communication, 1995). Drill indicated reserves on the McKenzie-Grey prospect are 100 000 tons grading 0.17 ounce Au per ton, 1.13 ounce Ag per ton, 3.0% Zn, 0.25% Cu, and 0.05% Pb.

Kenora Prospectors and Miners Limited, Shoal Lake, Cedar Island extension zone, where preliminary reserves of 1.2 million tonnes grading 9.62 g/t Au have been indicated. In the early part of the year, negotiations were underway with MacIsaac Gold Limited to assume cost overruns on a 50 000 ton bulk sampling project commenced in 1993 with joint venture partner Eastern Stone Products Ltd. (news release, February 16, 1994).

EXPLORATION ACTIVITY

A complete summary of exploration activity, including prospecting, is given in Table 2. Gold and base metals were the predominant targets, with dimension stone, rare metals and diamonds also sought. Described below are

results of programs with significant exploration expenditures and/or known results. Where a number of commodities were targeted or discovered, projects are described according to the predominant commodity targeted. Exploration information included in this section is taken from the assessment files of the Kenora Resident geologist's office, unless otherwise indicated. Programs are keyed with numbers in parentheses to Table 2 and Figure 1.

Gold

Teck Exploration Ltd. continued their exploration in the general area of Dryden, conducting a diamond-drill program on the Thunder Lake West property in Zealand Township (28), and a smaller diamond drill program on their Aubrey Township and Temple Township properties (27), both with joint venture partner **Continental Caretech Corporation**. In the Zealand Township program, Continental Caretech Corporation could earn a 50% interest in the Thunder Lake West property by spending \$1 million over 3 years (The Northern Miner, March 21, 1994). This expenditure was incurred by the end of 1994 (news release, January 10, 1995), in the completion of 66 drill holes between January and December, 1994. This brings the total number of holes drilled since 1991, at the commencement of the Zealand Township diamond-drill program (combined Thunder Lake West and Thunder Lake East properties), to 110. On the Thunder Lake West property, two gold-bearing shoots, about 500 feet apart along strike, have been defined within a 100 foot wide, east-trending envelope of quartz-sericite schist in felsic metavolcanic rocks. Early in the current year's program, an in-fill hole intersected a high-grade section of 3.84 ounces Au per ton over 6.2 foot true thickness within a 26.2 foot section grading 0.89 ounce Au per ton (The Northern Miner, February 7, 1994). Other holes have been diamond drilled that encountered similar assay values and widths. The strike length diamond drilled on the schistose zone is approximately 1500 feet, while deep drill holes test the depth extension of the number one shoot to 2000 vertical feet. Some of the later drill holes in the program confirmed gold mineralization up to 3410 feet west and up to 1800 feet east of the two high grade shoots (The Northern Miner, January 16, 1995).

In the Aubrey and Temple townships program, two holes totalling 945 feet were diamond drilled late in the year. One of these drill holes intersected a broad zone of anomalous gold mineralization, with values up to 550 ppb Au (The Northern Miner, January 16, 1995). The program is in the same general area as that conducted by **Champion Bear Resources Ltd.**

Nuinsco Resources Ltd. continued their regional exploration program, commenced in 1993, of the Rainy River lowlands. Land holdings consist of discontinuous blocks of claim units along an east-trending 60 km length between Potts Township and the mouth of the Rainy River. The area of interest lies within metavolcanic rocks, bordered on the north by the Sabaskong batholith, and on the south by the east-trending Quetico fault. In 1994, the main emphasis was in Potts and Richardson townships (20), where overburden drilling, geological survey and geochemical sampling were done. The program is mostly predicated on a Government of Ontario regional overburden sampling program (Bajc 1991), in which elevated gold grain counts were obtained, particularly in Richardson Township. The delicate nature of the grains suggested minimal transport distance from a bedrock source.

In the 1994 program the bedrock mapping and geochemical sampling in Richardson Township showed that both mafic and felsic units mapped by Blackburn (1976) returned anomalous gold values, and that a northeast-trending shear zone can be interpreted to cross the area (assessment files, Resident Geologist's office, Kenora). Forty overburden drill holes (20 reverse circulation and 20 rotasonic) were concentrated in Richardson Township, and 11 (all reverse circulation) were drilled in Potts Township. Overburden and bedrock geochemical sampling, drill-indicated bedrock lithology, and basal till gold grain counts correlated well with the interpreted northeast-trending shear zone. Strongly anomalous bedrock values (up to 2917 ppb Au) were encountered in some holes. However, the holes in Potts Township, targeted up-ice of the Richardson Township holes, yielded no anomalous till or bedrock samples. Paul Jones, project geologist, concluded that the anomalous area outlined in Richardson Township presented an excellent target for bedrock diamond drilling.

In Menary Township (19), Nuinsco Resources Ltd. conducted a limited program of ground horizontal loop electromagnetic (HLEM) geophysical surveying and follow-up diamond drilling. The target was sulphide mineralization that on surface was interpreted to be of sedimentary, exhalite origin, within mafic metavolcanics. Two holes were diamond drilled beneath such a northeast-trending zone. A third was diamond drilled to test quartz-carbonate veins.

Champion Bear Resources Ltd. conducted geological and induced polarization (IP) geophysical surveys and follow-up diamond drilling on ground in Aubrey Township (3) optioned from prospectors Fred Plomp and Alex Glatz. The Plomp gold occurrence was discovered in 1991 by Mr. Plomp, and subsequently described by M. Hailstone (Blackburn et al 1992) and J. Parker and D. Laderoute (Parker et al 1993). The original discovery was made in quartz-tourmaline veins in metasediments of the Warclub group, on patented land owned by Mr. Plomp. However, attention has moved to gold and sulphide mineralization to the north of the patented land, on claims staked by Plomp and Glatz. Here, sheared felsic metavolcanics have assayed anomalous copper and zinc, and up to 4.2 g/t Au. Late in 1994, Champion Bear Resources Ltd. diamond drilled 8 holes: 5 from north to south across the east-trending formations and including an IP target; and 3 others to test other IP targets. A broad, pyritic, sericite schist zone was intersected in an area of heavy overburden, and returned anomalous gold, lead and zinc values (Seymour Sears, consulting geologist for Champion Bear Resources Ltd., personal communication, 1995). Diamond drilling was resumed early in 1995.

Tri Origin Exploration Ltd. carried out IP geophysical surveys, and stripping and trenching on its 134 claim-unit property at Straw Lake, in the Bluffpoint Lake area (29). The property straddles the contact between the Lawrence Lake batholith and metavolcanic rocks to the south. The IP geophysical survey was conducted on selected portions of the property. Seven trenches, all within the metavolcanic rocks, were sunk to target IP geophysical anomalies, 5 of them along strike to the east of the past producing Straw Lake Beach mine, which is not part of the property. Gold assays reported were not anomalous, except for one sample assaying 559 ppb Au.

Base Metals

W.S. Ferriera Ltd. (31) continued a program started in 1993 on a single 16 unit claim midway between Bug Lake and Rex Lake, in the Rex Lake area. The initial claim covered 2 former copper occurrences, the Perkins and the North, and has been called the Pen property. Both had been trenched and sampled and diamond drilled for a total of 8 drill holes, with assays up to 12% Cu in surface grab samples, and 6.90% Cu, 0.06 ounce Au per ton over 13 feet in the best drill hole intersection. Host rocks are a narrow unit of mafic gneisses that have undergone local cordierite-garnet alteration, situated between granites of the Gone Lake stock and metasedimentary migmatites of the English River subprovince (Parker 1993). In 1994, ground magnetic and electromagnetic surveys were conducted over the original claim and a second, newly staked, contiguous 16 unit claim to the south, which extends over other formerly trenched and diamond drilled occurrences at Bug Lake. A strong north-trending magnetic anomaly was detected along the length of the claim group, which turns abruptly to the west at the north end. No electromagnetic conductors were detected. It is of note that Beakhouse (1994) has subsequently traced the northern extension of the mafic gneiss unit westward into the Rex Lake - Werner Lake area.

A. Eveleigh, T. Twomey and D. Glidden (11) continued work in Watten Township on separate 12 unit and 4 unit claims at the north end of Rice Bay of Rainy Lake and at Pocket Pond respectively. Subsequent to staking in 1993, ground magnetic and electromagnetic geophysical surveys were done over both claims, and geological mapping was done over the Rice Bay claim. In the mapping program T. Twomey identified felsic metavolcanic rocks, in addition to the metasedimentary rocks indicated on Map 2278 (Harris 1974). Whole rock analysis of 29 grab samples taken in 1993 led to the interpretation by T. Twomey of a broad alteration zone. This zone, outlined by 9 of the samples, is based on Na_2O , Hashimoto index, zinc and $\text{K}_2\text{O}/\text{Na}_2\text{O}$. Anomalous Zn values averaging 122 ppm were obtained for these 9 samples. The potential for base metal exploration in this area had been previously identified by D. Laderoute (Parker et al 1993).

Champion Bear Resources Ltd. (5) conducted soil geochemical surveys on two separate copper-nickel prospects, one near Tache in Revell Township, and the second in Hyndman Township. Both occurrences are in gabbroic lenses in greenstones, marginal to the Revell batholith. Scattered, anomalous values were obtained at both properties.

Noranda Exploration Company Limited (18) conducted ground magnetic and electromagnetic geophysical surveys, a geological survey, and geochemical sampling over their 82 unit claim group that straddles Highway 502 between Stormy and Bending lakes (personal communication, Reg Felix, Noranda Exploration Company Limited). The group includes claims optioned from Alex Glatz, prospector, Dryden, and others staked by the company. The acquisition of the property followed the discovery of anomalous zinc in the range 500 to 1200 ppm and copper in the range 500 to 900 ppm by Mr. Glatz within metavolcanic rocks at the east end of the Stormy Lake greenstone belt. A potentially altered sequence of felsic metavolcanics is defined by an unusually high garnet and amphibole content (Laderoute 1993).

Building Stone

Nelson Granite Ltd. (17) conducted a test block sampling program on staked claims in the vicinity of Red Deer and Wonderland Lakes (Nevin Nelson, Nelson Granite Ltd., personal communication, 1995). The program was intended to evaluate the stone for colour, texture and jointing characteristics. The Red Deer site is underlain by a reddish-brown, coarse-grained, porphyritic granite. The Wonderland Lake stone is a red porphyritic granite.

Manex Granit Inc. removed a number of small blocks, for colour testing, from their claims located on the west shore of Red Deer Lake (16). Manex has negotiated and signed a Resource Development Agreement with the Grassy Narrows First Nation. The agreement facilitates development of the site and provides the First Nation with training and employment programs (J.C. Corbeil, Manex Granit Inc., personal communication, 1995)

Rare Element Pegmatites

Gossan Resources Ltd. investigated a number of rare-element pegmatites in the Separation Rapids area, 54 km north of Kenora (13). Mapping by F. Breaks of the OGS revealed widespread petalite and cassiterite, and resulted in the discovery of the first wodginite occurrences in Ontario. The occurrence of wodginite is significant, as this mineral constitutes the chief tantalum ore mineral at the Tanco Mine in Manitoba (Breaks and Tindle 1994). Petalite-bearing samples taken by Gossan Resources contained up to 3.82% Li₂O and very low iron. The latter is an essential requirement for meeting ceramic industry specifications. A drilling program is planned for 1995 to delineate economic reserves of lithium-rich petalite (J.W. Campbell, Gossan Resources Ltd., personal communications, 1995).

Diamonds

Consolidated Newgate Resources Ltd. and joint venture partners **Prior Resources Ltd.** and **SouthernEra Resources Limited** (8) announced in a series of press releases dated January 24, March 15 and April 7 that exploration for diamonds was being conducted on 23 claims in the Lake of the Woods area. Chrome diopside and garnet indicator minerals from till sampling were used to target a drill program at Falcon Island. The results of the drill program have not been released.

Peat

Normiska Peat Inc. continued pre-production development of a peat bog in Miscampbell and Burriss townships. Approximately 65 hectares has been cleared and ditched and a road has been constructed on-site. Production is planned for 1995 (D. Graham, Normiska Peat Inc., personal communication, 1995).

TABLE 3. Property and other visits, Kenora Resident Geologist's District

No.	Individual or Company	Area/Township	Commodity
1	Bending Lake Road occurrence (Noranda Exploration Company Limited)	Bending Lake area	Cu, Zn
2	Black Fox quartz vein	Hodgson Township	white quartz
3	Blondeau-Merryth prospect (L. Cousineau, R. Cousineau)	Little Turtle Lake area	Au, Cu
4	Chute claims (M. Chute)	Brooks Lake area	Zn, Cu, Au
5	Dilman occurrence (Western Troy Capital Resources Inc.)	Menary Township	Au
6	Gundy Creek (R. Etherington)	Gundy Township	Au, Cu, Zn
7	Northeast Swimit Lake occurrence and June Lake sulphide zone (A. Glatz, A. Kozowy)	Keikewabik Lake area	Cu, Zn, Au
8	Plomp prospect (Champion Bear Resources Ltd.)	Aubrey Township	Au, Cu, Zn
9	Raleigh Lake pegmatites	Raleigh Lake area	rare metals
10	Redden Goldrock claims (J. Redden)	Boyer lake area	Au
11	Schmidt property, including S.V. 210	Melgund Township	Au
12	Taylor beryl occurrence (A. Glatz)	Zealand Township	Be
13	Thunder Lake West prospect (Teck Exploration Ltd.)	Zealand Township	Au
14	Trench 5+50W (Teck Exploration Ltd.)	Temple Township	Au
15	Wagg prospect (Western Troy Capital Resources Inc.)	Menary Township	Au
16	Werner Lake and Gordon Lake mines	Werner lake area	Co, Cu, Ni

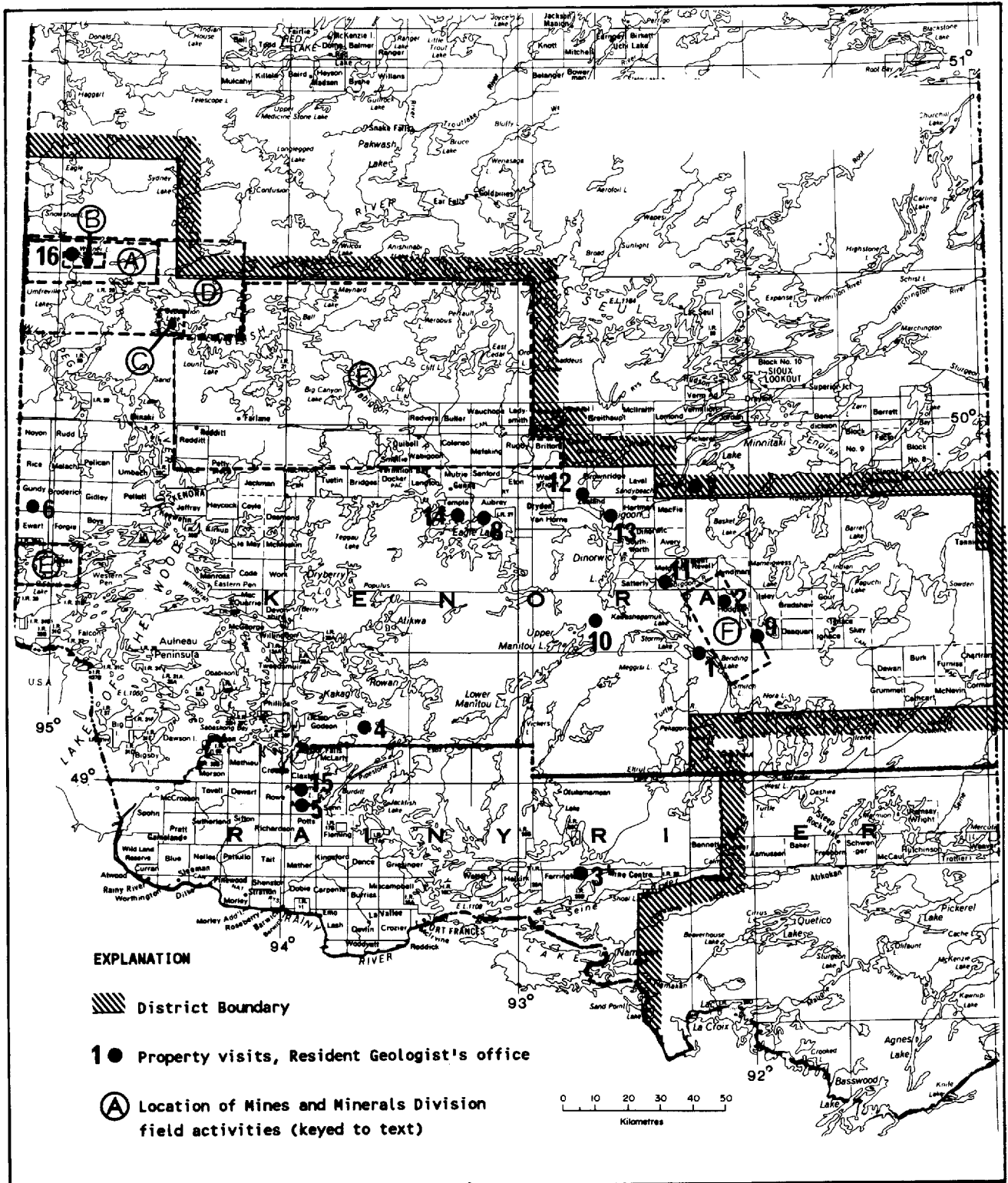


Figure 2. Kenora Resident Geologist's District: property visits and Mines and Minerals Division field activities.

RESIDENT GEOLOGIST STAFF AND ACTIVITIES

Staff changes during the year included the departure of M.R. Hailstone, acting Resident Geologist, and C.C. Storey, acting Staff Geologist, and the filling of the two positions on permanent basis by C.E. Blackburn and P. Hinz, respectively. M. Guderyan, Administrative Assistant, and A.J. Raoul, contract Geological Assistant, aided substantially in the preparation of this report.

In 1994, a total of 16 property visits were conducted by Resident Geologist office staff (Table 3 and Figure 2).

A talk and poster on exploration and development activities in the Kenora Resident Geologist's District were presented by M.R. Hailstone at the Northwestern Ontario Mines and Minerals Symposium, Thunder Bay, in April. C.E. Blackburn and P. Hinz presented a poster entitled, "Mineral Exploration and Development Activities in the Kenora Resident Geologist's District" at the Mines and Minerals Symposium, Toronto, in December.

A display and open house was hosted by the Kenora Resident Geologist's Office in May, in conjunction with Ontario Mining Week. C.E. Blackburn was an instructor for the Mineral Resources portion of the 38th Annual Dryden High School Conservation Course, also in May.

In October, C.E. Blackburn and P. Hinz conducted prospector information sessions in Fort Frances, Dryden and Ignace.

PROPERTY EXAMINATIONS

The following property examinations are authored by C.E. Blackburn.

Redden Claims, Goldrock, Boyer Lake Area

The Redden claims are located in the Boyer Lake area (NTS 52F/07 NE), about 35 km south of Dryden. The general area is reached via Highway 502 and two former portage trails extending northeast from Trafalgar Bay of Upper Manitou Lake, which are now crossed by the highway (Figure 3). The site of the former gold mining town of Gold Rock lies at the northeast end of Trafalgar Bay.

Since about 1988, Jim Redden has done a variety of work within an area currently covered by 88 claim units. The work includes prospecting, geological mapping, stripping and trenching of selected areas, humus geochemical sampling for gold, copper and zinc, and various geophysical surveys, including an airborne electromagnetic and magnetic survey. Portions of this work have been done with the aid of OPAP grants. The only other substantial work done in the area since the former mining activity to the southwest around Gold Rock was by Asamera Incorporated in a 1983 gold-exploration program.

The claim group straddles the axial planar trace of the Manitou anticline, about which are folded a mixed sequence of mafic to felsic flows and pyroclastics (Blackburn 1980a) that belong to the Pincher Lake group (Blackburn et al 1991). The general area has long been known for its potential to host gold. Mining was conducted during the period 1900 to 1948, with total recorded production from the former Laurentian, Elora and Big Master mines of 12 078 ounces Au and 480 ounces Ag. The association of this mineralization with felsic dikes within a northeast-trending "break" was noted by Thomson (1942), who also remarked on the apparent barren nature of another fault, the Manitou Straits fault, about 1 km to the east. The present writer (Blackburn 1980b) contested the fault zone hypothesis, suggesting on the basis of his detailed mapping of the former Gold Rock camp that the felsic units, termed felsites, were in fact flows or synvolcanic, shallow level sills, and that gold concentration may have been synvolcanic rather than epigenetic. Regardless of how these units were emplaced, formerly mined deposits were concentrated in quartz veins in the felsites.

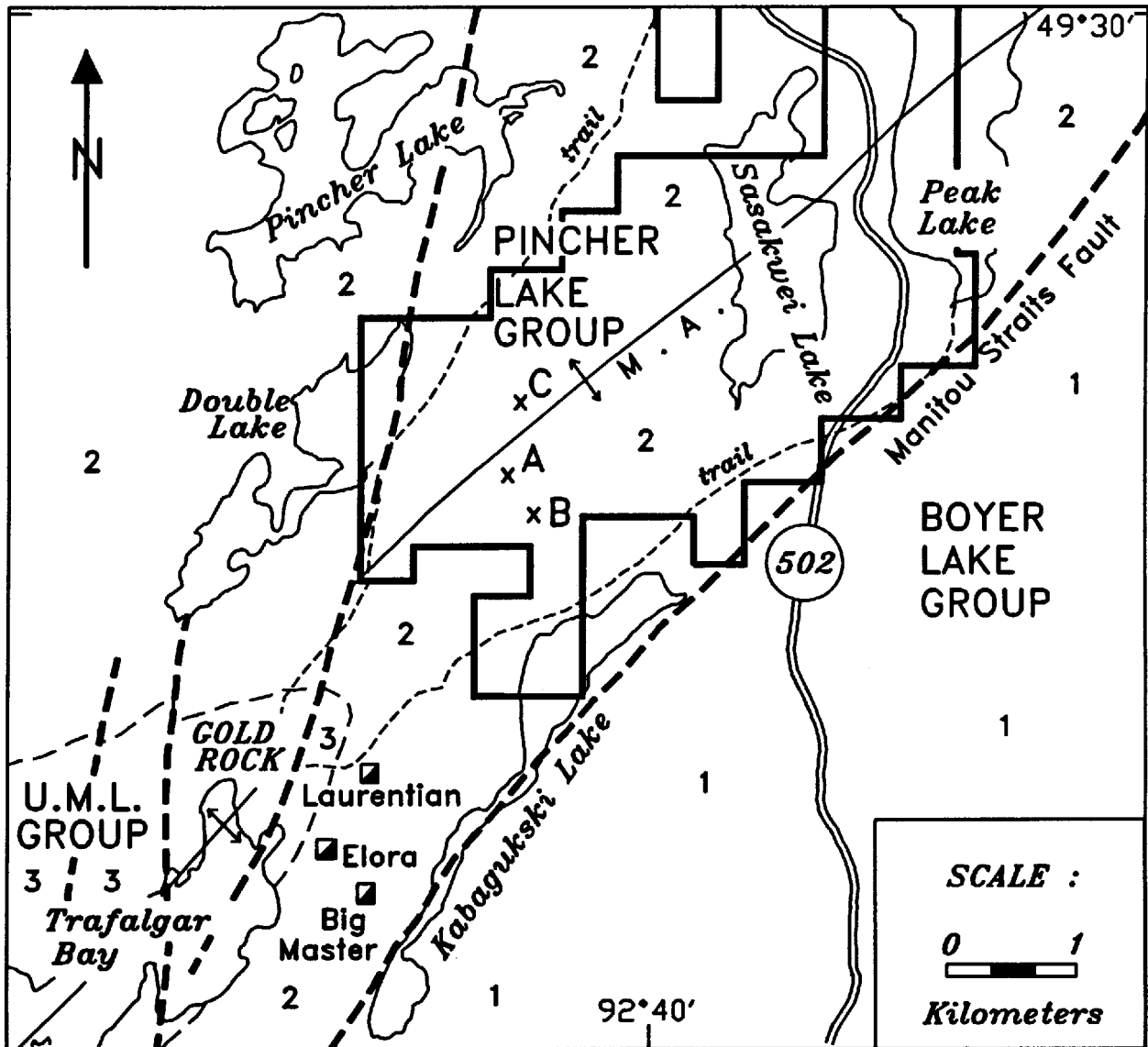


Figure 3. Redden claims, Gold Rock, Boyer Lake area. Legend: 1) mafic metavolcanic rocks and gabbro sills; 2) mafic to felsic flows and pyroclastic rocks; 3) felsic pyroclastic rocks; U.M.L. = Upper Manitou Lake; M.A. = Manitou Anticline. Locations A, B and C discussed in text. Geology after Blackburn (1980a).

Jim Redden has prospected other geologic features than these felsic units, which do not appear to be prevalent on his claim group. A pyritic sulphide zone (location A, Figure 3), variably silicified, has yielded anomalous gold assays. The zone has been stripped over a 165 m length; assays up to 0.4 ounce Au per ton have been obtained, with others in the range 600 to 1000 ppb Au. The sulphide zone lies in a northeasterly-trending shear zone approximately 3 km long by 100 to 200 m wide. At this location, small-scale planar structures that may be traces of original bedding within the heavily altered metavolcanic country rock, strike at a high angle to foliation of the shear zone. This supports the large scale observation (Figure 3) that the shear zone crosscuts the nose of the Manitou anticline. It should be noted that during the former regional geologic survey by the present writer (Blackburn 1980b), little evidence for closure of the Manitou anticline was gained on the outcrop scale, due to the intense, superimposed northeast-trending foliation.

In other places (e.g. location B, Figure 3) narrow (meter to centimeter scale), lensoid, felsite dikes occupy zones of carbonate and sericitic alteration of metavolcanic country rock. Anomalous gold values were obtained from dikes and altered rock, with high values up to 0.2 ounce Au per ton. Background values in the sheared metavolcanics are on the order of 5 ppb Au.

Strongly sericitized mafic metavolcanic rocks at location C, Figure 3, are typical of other zones that assay anomalous gold. Here, assays of up to 1230 ppb Au have been found in a 90 m long anomalous section.

The demonstrated association of gold with pyritic sulphide zones suggests that IP geophysical surveys could be used to identify unexposed disseminated sulphide zones that would offer further exploration opportunities. Mr. Redden has recently undertaken such a survey (J. Redden, personal communication, January, 1995).

Chute Claims, Sandhill Lake, Brooks Lake Area

The Chute claims are located in the Brooks lake area (NTS 52 F/4NE), about 70 km north-northwest of Fort Frances. The general area is reached via the Trilake Road, which intersects Highway 71 at Nestor Falls. The west end of the group, consisting of 3 contiguous claims each of 12 units, lies across the road at a distance of about 25 km from Highway 71, and Sandhill Lake lies in the central portion of the group (Figure 4).

With the aid of OPAP grants, Mike Chute has, since 1992, been prospecting and geologically mapping a portion of a carbonatised shear zone (Figure 4) that is the westward extension of a splay off the Pipestone-Cameron fault. The property lies in the vicinity of the easterly-trending contact between the Katimiagamak and Kakagi Lake stratigraphic groups of the Kakagi-Rowan lakes greenstone belt (Blackburn et al 1991). Previous mapping by Edwards (1975) indicated that the zone lies predominantly within felsic metavolcanic rocks of the Kakagi Lake group, close to their lower contact with mafic metavolcanics of the Katimiagamak group (Figure 4). However, Mr. Chute has identified pillow lava remnants within the alteration zone, which show that the rocks are in fact highly carbonatised and sericitised mafic metavolcanics. They therefore lie at the top of the Katimiagamak group, and are in contact with felsic pyroclastic rocks of the overlying Kakagi Lake group. In Figure 4, the new boundary between the two groups would lie 1 to 1.5 km north of that indicated, close to or along the east-trending fault that offsets the diabase dike, then eastward along the northern edge of the carbonatized zone to the Pipestone-Cameron fault.

Mineralization occurs within the alteration zone, and consists predominantly of finely disseminated pyrite. In places narrow quartz-carbonate breccia veins occur within the schistose mafic metavolcanics. Mr. Chute has extensively sampled both the schistose country rock and the breccia veins. Assaying to date has not indicated anomalous gold values in either the schist or the veins; however, in a section along the contact between the Katimiagamak and Kakagi lakes groups (location A, Figure 4), narrow quartz-carbonate veins with up to 20% disseminated pyrite, minor chalcopyrite, and sphalerite stringers assayed up to 6.23% Zn, 0.48% Cu, and 56 ppb Au.

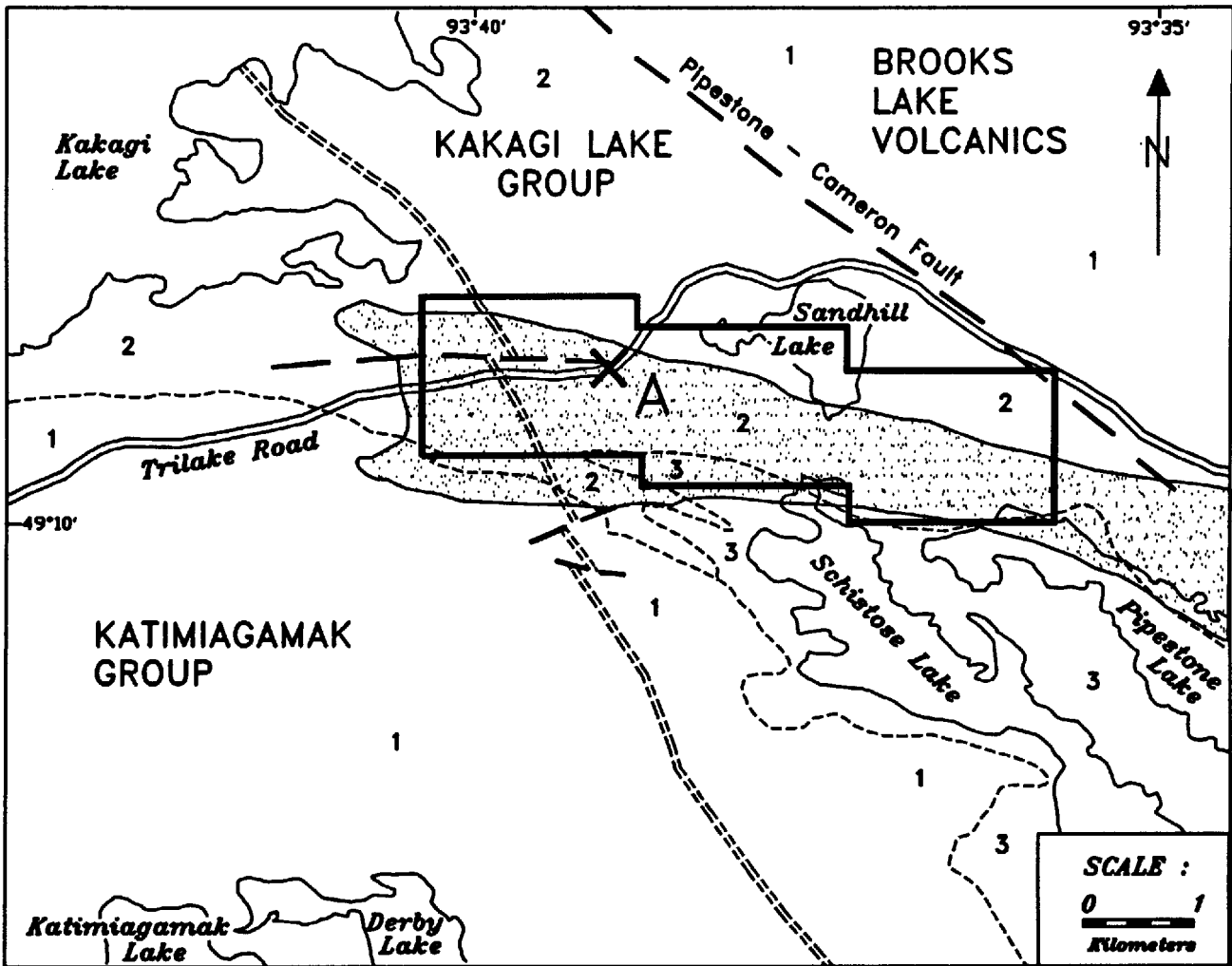


Figure 4. Chute claims, Sandhill Lake, Brooks Lake area. Legend: 1) mafic metavolcanic flows and gabbro sills; 2) felsic pyroclastic rocks; 3) metasedimentary rocks; 4) diabase dike; stipple = carbonatized zone. Location A discussed in text. Geology after Edwards (1975).

Although results to date have indicated no more than local concentrations of base metals, the general environment is very similar to that at other mineral occurrences along the Pipestone-Cameron fault system. For example, at the Cameron Lake property of Nuinsco Resources Ltd., situated about 12 km to the north on the northeast side of, and on a similar splay off of the Pipestone-Cameron fault, gold is concentrated in quartz-carbonate breccia veins in strongly carbonatized mafic metavolcanics. The original prospect was in a small outcrop of altered mafic metavolcanics. Reserves at the Cameron Lake property currently stand at 3 million tons averaging 0.168 ounce Au per ton (Table 4).

RECOMMENDATIONS FOR EXPLORATION

Within the western Wabigoon Subprovince portion of the Kenora Resident Geologist's District attention is here focused on two contrasting geological environments that have recently been targeted for gold exploration (Figure 5). These are:

- 1) predominantly clastic metasedimentary sequences that also include felsic metavolcanic to subvolcanic members; and
- 2) portions of predominantly mafic metavolcanic sequences that have been subjected to shearing and hydrothermal alteration.

The Warclub Assemblage - A Sedimentary/Felsic Volcanic Gold Host

Parker et al (1993) have emphasised the Warclub group from the Lake of the Woods via Dryden to Sioux Lookout, as being potentially fertile for gold and base metals. At the west end of the belt, the Berry River formation is a felsic volcanic edifice within the Warclub sandstones, in which a number of companies have explored for gold. At the east end of the belt, in the Sioux Lookout Resident Geologist's District, a number of porphyry stocks that occur in the Minnitaki sandstones have been shown to have a gold association. However, until recently little prospecting and exploration for gold had been done in the intervening central portion of the Warclub group.

Teck Exploration Ltd. has conducted a reconnaissance program in the Warclub group, and subsequently a more focused exploration program near Dryden since about 1990. Teck Exploration Ltd. geologist R. Page recognised that rocks mapped as metasediments in the 1930's and 40's may include felsic metavolcanics. In particular, a sequence of arkoses mapped by Satterly (1943) in Zealand Township, east of Dryden, have been shown to be felsic tuffs and porphyries (Parker et al 1993).

Results of the program conducted by Teck Exploration Ltd. and joint venture partner Continental Caretech Corporation in 1994, summarized under "Exploration Activity", have been very encouraging, with two potential ore shoots outlined, one to a depth of over 900 feet, and up to 250 feet in length, in a 100 foot band of sheared volcanics.

Other properties with similar geology include the Plomp property in Aubrey Township, where gold and base metal values have been found associated with a mixed sequence of altered metasedimentary and felsic metavolcanic rocks previously mapped by Breaks and Kuehner (1984) as entirely metasediments (see Parker et al 1993 for a description of this property). In 1994 Mr. Plomp optioned his ground--and, in partnership with Alex Glatz, eight adjoining claims--to Champion Bear Resources Ltd. Teck Exploration Ltd. holds claims over another felsic unit previously mapped as a granitic intrusion by Moorehouse (1941), to the west, in adjoining Temple Township. Further discussion of recent work on these properties is given under "Exploration Activity" (this report).

The discovery in several places of hitherto unrecognised felsic metavolcanic sequences within what was previously interpreted to be a predominantly clastic sedimentary sequence suggests that other such felsic units may be present within the Warclub group. First, it is likely that portions of the group that have not been

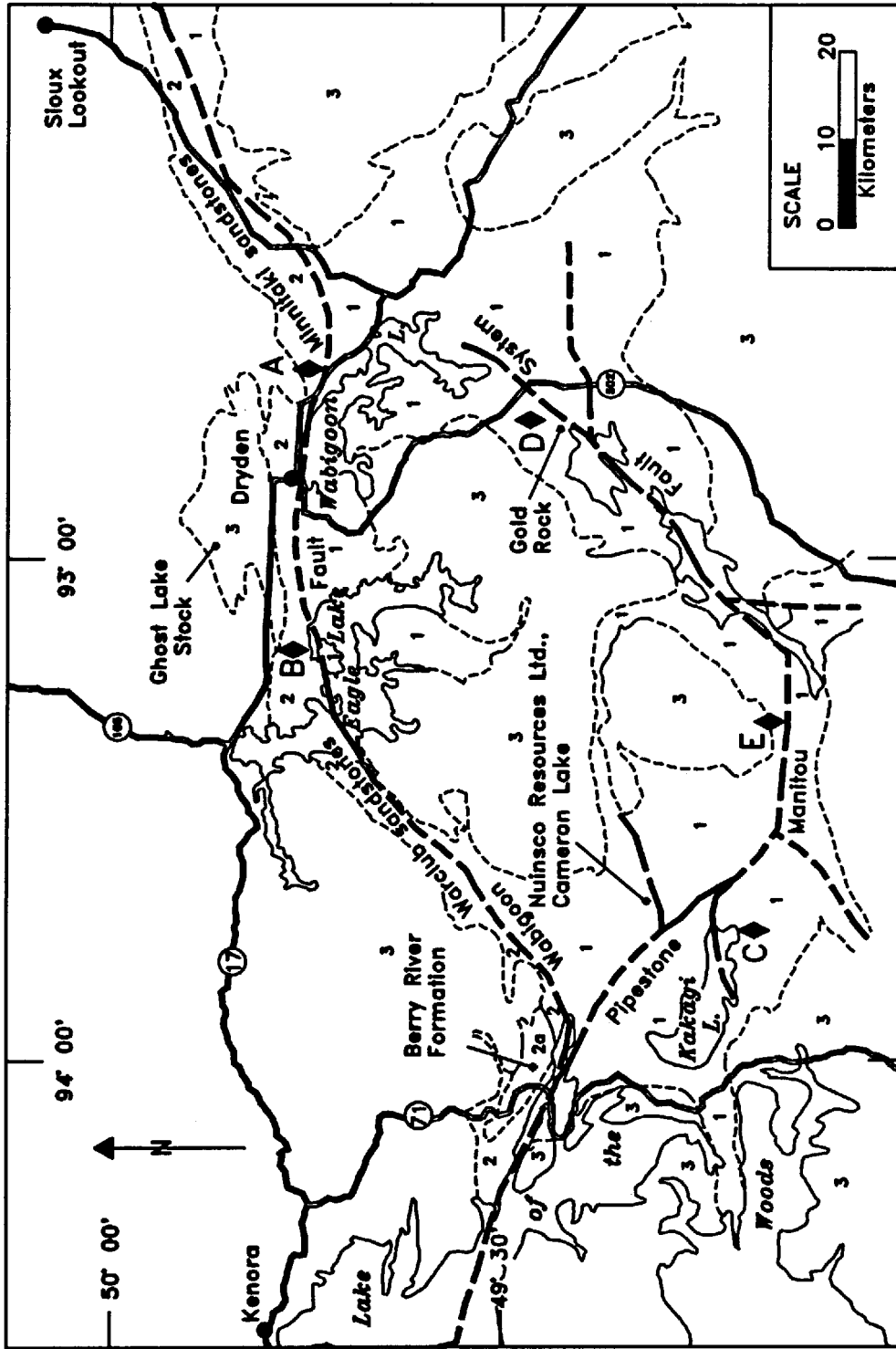


Figure 5. Location of the Warclub group and the Pipestone-Manitou fault system. Legend: 1) mafic and felsic metavolcanic rocks; 2) Warclub group metasediments; 3) felsic metavolcanic rocks; 3) granites; A) Teck Exploration Ltd., Thunder Lake West project, Zealand Township; B) Plompp occurrence, Aubrey Township; C) Chute claims, Kakagi Lake; D) Redden claims, Gold Rock; E) Tri Origin claims.

mapped by the Ontario Geological Survey in recent years, such as that from Warclub Lake to Aubrey Township which was last included in map 48d (Moorehouse 1941) and map 1956-3 (Davies and Watowich 1958), may contain such units. Second, high grade metamorphism leading to migmatization of Warclub group rocks, and culminating in melting to generate the Ghost Lake stock, is prevalent in the section from Temple Township to Zealand Township. Under these high-grade metamorphic conditions, discrimination between clastic sedimentary rocks and certain felsic to intermediate volcanic rocks is particularly difficult, so it is likely that other volcanic units remain to be discovered in this area as well.

While such felsic units offer the best potential for hosting new gold deposits, the gold-concentrating process remains problematical. Proximity of known occurrences to the Wabigoon fault suggests some genetic relationship with that structure. At the Zealand Township property of Teck Exploration Ltd., gold is concentrated within a shear zone, and this may also be the situation at the Plomp occurrence in Aubrey Township. These shear zones may be splays of, or in some other way related to movement on, the Wabigoon fault. A second possibility is that gold concentration and mobilization is related to the high grade metamorphism associated with development of the Ghost Lake stock.

The Pipestone-Manitou Fault System - A Within Greenstone Gold Host

Regional, through-going fault systems in the central portions of greenstone belts in the western Wabigoon subprovince have, for sometime, been recognised as an important focus for gold mineralisation. In particular, the Pipestone-Cameron fault and its continuation into the Manitou Straits fault, with attendant splays, is the host to Nuinsco Resources Ltd.'s Cameron Lake gold property, and to mines that produced gold from the turn of the century until 1943, at the old community of Gold Rock on Upper Manitou Lake.

The recent prospecting by Mike Chute in the Kakagi Lake area and by Jim Redden at Upper Manitou Lake, discussed under "Property Visits", has been conducted along these structures or their off-shoots. In the Kakagi Lake area, the carbonatised shear zone that underlies the Chute claims is the westward extension of a splay of the Pipestone-Cameron fault. In this regard, it is similar to the Monte Cristo shear zone that hosts the Cameron Lake deposit of Nuinsco Resources Ltd.

At Upper Manitou Lake, the Redden claims straddle a broad zone of shearing and alteration that has been interpreted to accompany folding about the northeast-trending Manitou anticline, and deformation along the Manitou Straits fault. This zone was host to the past producing gold mines at Gold Rock.

Both of these properties are on splays off the major Pipestone through to Manitou lakes fault zone, which itself does not appear to host gold occurrences. The recent work by Tri Origin Exploration Ltd. near the past producing Straw Lake Beach mine, discussed under "Exploration Activity", is similarly concentrated in sheared metavolcanics close to, but not along the same major fault system. Although numerous gold occurrences are located throughout the Kakagi-Rowan and Manitou Lake greenstone belts, many of them are local concentrations in narrow and discontinuous quartz veins, with no evidence of broad shear and alteration zones. Silicified horizons, quartz-carbonate breccia veins, and sulphide zones within shear zones and splays associated with the Pipestone-Manitou fault system offer better targets for gold exploration.

OGS ACTIVITIES AND RESEARCH BY OTHERS

There were 5 Ontario Geological Survey projects and one Mining and Land Management Branch project in the Kenora District in 1994. For the location of these projects, see Figure 2.

A) G.P. Beakhouse, Mineral Deposits and Field Services Section, OGS, conducted 1:50 000 scale mapping of the Rex Lake Area.

B) J.R. Parker, Mineral Deposits and Field Services Section, OGS, conducted 1:4 800 scale mapping of sediment-hosted Cu-Co and magmatic Cu-mineralization at Werner-Gordon-Rex Lakes.

Table 4. Mineral deposits not being mined in the Kenora Resident Geologist's

ABBREVIATIONS					
AFKRG	- Assessment Files, Kenora Resident	MLS	- Mining Lands, Sudbury		
CMH	- Canadian Mines Handbook	MRK	- Mining Recorder, Kenora		
GR	- Geological Report	NM	- The Northern Miner		
MDC	- Mineral Deposit Circular	OFR	- Open File Report		
MDIR	- Mineral Deposit Inventory Record	PCKRG	- Personal Communication, Kenora Resident Geologist		

Deposit Name (NTS)	Commodity	Tonnage-Grade Estimates and/or Dimensions	Ownership Referenced	Reserve References	Status
Bad Vermilion Lake-Seine Bay Prospect (52C/10 NE)	Fe,Ti,V	1 270 000 tons of 15% TiO ₂ and 45% Fe; there is potential for 177 800 tons of titanium sponge.	Champion Bear Resources Nov./94	NM 08/15/85,p.3 (Beaver Energy Resources)	Inactive 17 claims
Bending Lake Prospect Fe (52F/8SE)		Open pit reserves sufficient to maintain plant output of 2 million tons for 20 years. Main zone is 1500 m long by 300 m wide (grade of iron is unstated).	Noranda Mining and Exploration Inc.	MDIR AFKRG	Inactive K0133
Big Master (Kenwest Mine (52F/7NE)	Au	Proven and Probable: 123 000 tons of 0.30 ounce Au per ton; Indicated: 600 000 tons of 0.22 ounce gold per ton. Probable 25 000 tons @ 0.48 opt. 4 500 tons @ 0.58 opt. 8 500 tons @ 0.21 opt. Dump 1 000 tons @ 0.25 opt.	Goldcorp. Inc., Toronto; c/o David Sannes PCKRG	CMH,1988-89, p.92 (Canamerica Precious Metals Inc.) OFR 5332, vol.1, Table 6.8	Inactive HP366,373,301
Bonanza Mine (52F/10NW)	Au	5000 tons of 0.25 ounce Au per ton across an average width of 1-foot.	CMH, 1994-95, p.386 (Wiscan Resources Inc.)	Van Horne Gold Expl. Inc., AFKRG	Inactive 59 claims K53304 (site)
Canadian Arrow (Dogpaw Lake) Prospect (52F/5SW)	Au	Indicated: 96 650 tons of 0.43 ounce Au per ton in 3 veins. Probable 30 000 tons @ 0.30 opt. Possible 70 000 tons @ 0.30 opt. Spec. 80 000 tons @ 0.30 opt.	CMH,1994-95,p.84 (Canadian Arrow Mines Ltd.)	Canadian Arrow Mines Ltd., AFKRG OFR 5332, vol.1, Table 4	Inactive 17 claims
Canamerica E Zone (52F/7NE)	Au	455 000 tonnes of 0.117 ounce Au per tonne indicated and inferred. 529 650 tonnes of 0.103 ounce Au per tonne indicated and inferred.	CMH,1990-91, p.119(Co-Maxx Energy Group Inc.	NM 07/13/87,p.17 (Canamerica Precious Metals Inc.) Cochrane Oil & Gas Ltd., AFKRG	Inactive 45 claims
Cameron Lake Prospect Au (52F/5SE)		Proven, possible, probable: 3 160 148 tons of 0.168 ounce Au per ton.	CMH,1994-95, p.275 (Nuinsco Resources Ltd.)	Nuinsco Resources Ltd.	Care and Maintenance 61 leased claims
Cedar Island (Cornucopia)-Mikado Mines (52E/10 SW)	Au	Preliminary reserves: 1 234 069 tonnes of 9.62 g/t Au.	CMH,1994-95, p.217 (Kenora Prospectors and Miners Ltd.)	CMH,1994-95 p.217	Advanced Exploration Permit; Patents D212, D265
Central Prospect (52L/7NW)	Cu,Ni	2 200 000 tons of 0.65% Cu and 0.45% Ni.	NM 05/28/53 (Quebec Nickel Corp.)	AFKRG	Inactive KRL 19097, 30055

Deposit Name (NTS)	Commodity	Tonnage-Grade Estimates and/or Dimensions	Ownership Referenced	Reserve References	Status
Duport Mine (52E/11SE)	Au	Total geological reserves: 2 000 000 tons of 0.35 ounce Au per ton; Proven and Probable: 944 000 tons of 0.39 ounce Au per 450 tpd. Est pre-production cost \$52.8 million.	CMH,1994-95, p.114 (Consolidated Professor Mines Ltd.)	CMH,1994-95 p.114	Environmental assessment in progress Patents S.170, K1332, K1333, K2374
Earngey-Lindburg Occurrence (52E/9NW)	Au	50 m long by 5 m wide quartz vein assaying 1.42 ounce Au per ton across 7.5 feet and 0.37 ounce Au per ton across 9.7 feet.	Dean Pickell Winnipeg PCKRG	OFR 5695,p.86	Inactive Patent K9333
Electrum Lake Occurrence Arsenic Zone (52E/11NE)	Au	97.5 m long by 1.76 m wide by 39.6 m deep(minimum) zone averaging 0.36 ounce Au per ton.	G. Pogson Thunder Bay MRK	OFR 5695,p.98	Claim 1149561
Electrum Prospect A-C Zones (Contact Zone) (52E/11NE)	Au,Cu	A Zone-30 m long by 1.5 m wide by 45 m deep averaging 0.34 ounce Au per ton and 0.14% Cu	Gladys Stephens Kenora MLS	OFR 5695,p.101	Inactive Lease K23942, K23943
		B Zone-45 m long by 0.9 m wide by 61 m deep averaging 0.27 ounce Au per ton and 1% Cu		OFR 5695,p.101	
		C Zone-45 m long by 1.5 m wide by 30 m deep averaging 0.32 ounce Au per ton and 0.94% Cu. 15 000 tons of 0.24 ounce Au per ton estimated in the C Zone.		OFR 5695,p.101 Sherritt Gordon Mines Ltd.,AFKRG	
Electrum Prospect-P Zone (Electrum Fault Zone or Porphyry Zone) (52E/11NE)	Au	30.5 m long by 30.5 m wide by 3.4 m deep averaging 0.40 ounce Au per ton.	Nellie R. Alcock Surrey, B.C. MLS	OFR 5695,p.106	Inactive Lease K20695
Electrum Prospect-W Zone (Fault zone or West Zone) (52E/11NE)	Au	61 m long by 2.1 m wide by 19.8 m deep averaging 0.23 ounce Au per ton.	unknown	OFR 5695,p.108	Inactive Leases K20696-K28663
		100 000 tons of 0.33 ounce Au per ton in the P and W zones combined.		Laramide Resources Inc., Annual Report,1987	
Errington Prospect (52F/6SW)	Au	24 000 tons of 0.73 ounce Au per ton in a zone 450 feet long by 32 inches wide by 240 feet deep.	Lawrence Mattson Linnstrom, Minn U.S.A., MLS	MDC 16, p.16	Inactive K7181, 7183, 7184, 7186
Evenlode Prospect (Eco Occurrence) (52E/11 NE)	Mo,Au	126 000 tons of 0.68% MoS ₂ and 0.015 ounce Au per ton. Indicated: 200 000 tons of 0.63% MoS ₂ ; Inferred: 550 000 tons estimated to a depth of 800 feet.	NM 11/11/65 (Evenlode Mines Ltd.)	OFR 5695,p.114	Inactive Patents K8705, 8707, Claim 1150113
Flambeau Lake Prospect (52F/10NW)	Au	Diamond drilling partially outlined a zone with potential for 572 000 tonnes (gold grade unstated).	Alex Kozowy, Dryden, PCKRG	AFKRG	Inactive Patent AL88
Flint Lake Prospect (52F/5SW)	Au	148 000 tons @ .235 opt. 62 500 tons @ .260 opt. 50 000 tons @ .200 opt.	P.Dubenski, Kenora, PCKRG	AFKRG	Lease
Foley Mine (52C/10NE)	Au	40 000 tons @ 0.5 opt proven/probable; 400 000 tons @ 0.5 opt speculative.	R. Cone	NM 09/25/80 (Seaforth Mines Ltd.); OFR 5539, p.194	Advanced Exploration in 1993 50-ton bulk sample from Bonanza vein by Nipigon Gold; Patents K475101,374102, 475103

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Deposit Name (NTS)	Commodity	Tonnage-Grade Estimates and/or Dimensions	Ownership Referenced	Reserve References	Status
Gaffney Prospect (52F/7SW)	Au	300 000 tons of 0.15 ounce Au per ton.	CMH, 1990-91, p.393 (San Paulo Expl. Inc.)	CMH, 1990-91 p.393 (San Paulo Expl. Inc.)	Inactive Patent K3594, 3595
Golden Star Mine (52C/10NE)	Au	10 000 tons of 0.45 ounce Au per ton. 20 000 tons of 0.42 ounce Au per ton and 35 000 tons of 0.15 ounce Au per ton in tailings dump.	PIRP Holdings Inc., AFKRG	OFR 5512,p.44 MDC 16,p.20	Inactive Patent AL116 Lease K44632
High Lake Prospect (52E/11NE)	Cu,Mo,Au	2000-foot long by 250-foot wide zone containing assay values of 0.10 to 1.35% Cu and 0.01 to 0.05 ounce Au per ton.	unknown	GR 41,p.46	Inactive Lease K32307
Kenbridge Prospect (52F/5NE)	Ni,Cu	3 271 390 tons of 1.06% Ni and 0.54% Cu.	CMH,1986-87, p.209,(Falconbridge Limited)	GR 111,p.44	Inactive Patents K6672, 6634, 6635
Mavis Lake Prospect (52F/15SE)	Li,Ta	500 000 tons of 1% Li ₂ O.	CMH, 1983-84, p.245, (New Claymore Resources Ltd.)	OFR 5718,p.151	Inactive Lease K498288, 498289, 498290, 498292, 498308, 498140
Maybrun Mine (52F/5NE)	Cu,Au	2 824 825 tons of 1.18% Cu and 0.08 ounce Au per ton including 1 508 454 tons of 1.48% Cu and 0.11 ounce Au per ton.	CMH,1994-95, p.111(Consolidated Maybrun Mines Limited)	GR 111,p.36	Inactive; Care and Maintenance Patent K15364-K15381, K15524-K15527
Mironsky Prospect (52C/11NE)	Cu	400 feet long by 35 feet wide zone to a minimum depth of 300 feet averaging .53 to 1.01% Cu. 300 000 tons of 0.8% Cu (estimated).	Open	GR 115,p.59	Inactive
New Campbell Island Mines (Richard Lake) Prospect (52F/13SW)	U	650 000 tons of 0.10% U ₃ O ₈ in a zone 700 feet long by 10 feet wide and 1000 feet deep.	unknown	GR 130,p.46	Inactive Patent K18761
Norpax (Reynar Lake) Prospect(52L/6NE)	Ni,Cu	1 010 000 tons of 1.2% Ni and 0.5% Cu.	CMH,1970,p.264 (Norpax Nickel Mines Ltd.)	Norpax Nickel Mines Ltd., AFKRG	Inactive Patent KRL35010, KRL34767
Northrock (South Grassy) Prospect - Beaver Pond Zone (52C/11NE)	Cu	1 020 458 tons of 1.17% Cu over a strike length of 400 m including 265 230 tons of 2.08% Cu over a length of 300 m (all estimates valid to a vertical depth of 91 m).	Nor-Norock Mining Company Limited	OFR 5512,p.50	Inactive Lease K12314, K12315, K12319, K12320
Olive (Preston) Mine (52C/15SE)	Au	12 500 tons of 0.34 ounce Au per ton in 2 mineralized shoots and 1100 tons of broken ore averaging 0.31 ounce Au per ton in the second level stope.	CMH,1993-94, p.250,(Noront Resources Inc.)	NM 05/18/87,p.6 NM 06/29/87,p.21 (HSK Minerals Ltd.), AFKRG	Inactive Lease K475146, 475193, 475269, 475190, 475191, 475192

Deposit Name (NTS)	Commodity	Tonnage-Grade Estimates and/or Dimensions	Ownership Referenced	Reserve References	Status
Purdex Prospect (A-D Zones) (52E/11NE)	Au	76 500 tons of 0.308 ounce Au per ton (combined indicated tonnage in 4 zones). 241 000 tons at 0.226 ounce Au per ton in the P,A,B and C zones.	CMH.1994-95, p.232,(Locke Riche Minerals Ltd.)	OFR 5695,p.273 CMH, 1994-95 p.232, (Locke Riche Minerals Ltd.)	Inactive Patents K25130, K25131
Redgut Bay Prospect (52C/11NE)	Cu	1000 m long zone with diamond drill intersections such as 0.31% Cu over 17 m, 0.3% Cu over 6 m, 1.04% Cu over 4 m and 0.83% Cu over 1.5 m.	Belacoma Mines Ltd., AFKRG	OFR 5512, p.71	Inactive Open
Regina Mine (52E/8NE)	Au	Speculative 19 650 tons of 0.44 opt. 30 000 tons at 0.106 ounce Au per ton in tailings.	unknown	Lodi Metals Inc. AFKRG; NM 07/25/88,p.7 (Sweeney Gold Corp.)	Inactive Patent P566, P567
Scramble (Homestake) Mine (52E/16SW)	Au	1200- to 1500-foot long by 12-foot wide zone averaging 0.15 ounce Au per ton. 150 000 tons at 0.24 opt and 1500at 0.24 opt and 70 000 ounces (using co @ 0.05opt.) drill indicated.	Boise Cascade Corporation PCKRG	NM07/25/88 (Madeline Mines Ltd.). CIMM, Dist. 4 Field Trip Guide-book, p.44.	Inactive Underground development (1988-89) Jaffray Twp., Con.6, Lot 13 and 14
Tabor Lake Mine (52F/9SW)	Au	Possible 14 000 @ 0.41 opt; Speculative 3000 @ 0.41 opt.	Sulpetro Minerals Ltd., AFKRG	OFR 5332, vol.1, Table 12	Inactive 37 claims - 502044 (site)
Vanlas Prospect (Kidd Zone) (52F/10NW)	Au	100 000 tons of 0.20 ounce Au per ton.	Power Expl. Inc. Annual Report, 1988	Power Expl. Inc. AFKRG	Inactive Patent K70627
Victor Island Prospect (52F/5SE)	Au	Drill indicated reserves: 300 000 tons at 0.12 ounce Au per ton to a depth of 700 feet.	CMH, 1994-95 p.275(Nuinsco Resources Ltd.)	MP 128,p.16	Inactive Patent 4712 Claims 690655, 718785
Virginia Prospect (52F/5NE)	Au	100-foot wide zone averaging 0.10 ounce Au per ton.	Unknown	G111,p.40	Inactive Patent F.M.73A
Wind Bay Prospect (52C/10SW)	Zn,Cu	1300 m long by 50 m wide zone hosts several 10 m wide mineralized lenses. Typical diamond drill hole intersections assayed 1.5% Zn, 0.2% Cu and 1.1% Zn, 0.09% Cu across 7 m and 8.6 m, respectively.	George Armstrong, Fort Frances PCKRG	OFR 5512,p.89	Inactive
Witch Bay Occurrence (52E/9SE)	Au	8.2 g/t Au to 29.5 g/t Au across 30 to 36 cm for a length of 240 m.	G. Pogson Thunder Bay MRK	OFR 5695,p.370	Claim 1125631

Table 5. Selected publications received during 1994

Title	Author	Type of Publication/Year
Geology of Marko's Pegmatite, Separation Rapids, pegmatite group, Separation Lake greenstone belt	F.W. Breaks, M. Nurmikivi, J. Burton and A. Robitaille	OGS Map P.3302, scale 1:100, 1994
Mining exploration agreements; a guide to their negotiation and use.	Karl J.C. Harries, QC	Centre for Resource Studies, Queen's University, 314p, 1994
Industrial mineral occurrences and deposits in northwestern Ontario.	P. Hinz and R.H. Landry	OGS OFR 5889, 145p., 1994
Dimension stone occurrences in northwestern Ontario.	P. Hinz, R.H. Landry and M.C. Gerow	OGS OFR 5890, 191p., 1994
Quaternary geology and drift composition, Lake of the Woods region, northwestern Ontario.	G.V. Minning, W.R. Cowan, D.R. Sharpe and T.A. Warman	Geological Survey of Canada, Memoir 436, 239p., 1994
Quaternary geology of Lennan Lake area, District of Kenora.	T.F. Morris	OGS, MAP P.3266, scale 1:50 000, 1994
Dispersal of rare-element bearing minerals in till from a known Be-pegmatite intrusion in northwestern Ontario.	A. J. Robitaille	Unpublished HBSc thesis, Laurentian University, Sudbury, 49p.
Precambrian geology of Wild Potato Lake area, District of Rainy River.	W.S. Shanks	OGS, OFR 5879, 137p. 1994

C) F.W. Breaks, Mineral Deposits and Field Services Section, OGS, and A.G. Tindle, The Open University, Milton Keynes, England, conducted detailed mapping of granite-related mineralization in northwestern Ontario and a detailed examination of the Separation Rapids rare-element pegmatites.

D) T.F. Morris, Sedimentary and Environmental Geoscience Section, OGS, conducted 1:50 000 scale mapping of the Quaternary geology of the Fletcher and Reynar Lakes area.

E) R.D. Dyer, Sedimentary and Environmental Geoscience Section, OGS, conducted a geochemical baseline study of the northern half of Shoal Lake.

F) D.G. Farrell, Mining and Land Management Branch, Kenora, began a multi-year study of the building stone potential of northwestern Ontario. The study involves reconnaissance for favourable sites, followed by detailed mapping and sampling. In 1994, a large area northeast of Kenora, and a second area in the Revell batholith, were investigated.

Prof. A.R. Cruden, University of Toronto, commenced a study of structural relationships along the Wabigoon-Winnipeg River subprovincial boundary between Kenora and Dryden. The study is in connection with the Lithoprobe Western Superior Transect Program, and will involve post-graduate student investigations over a 5 to 6 year period.

Steven Wetherup conducted a study of microfabrics across the proposed Winnipeg River-English River subprovincial boundary in the Separation Lake area (BSc thesis, University of Manitoba).

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RED LAKE RESIDENT GEOLOGIST'S DISTRICT - 1994

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INTRODUCTION

Exploration continued at traditional levels in the Red Lake district. The number of claims staked and amount of assessment work recorded is comparable to the previous two years. Table 1 presents a five year summary of exploration data recorded by the Red Lake Mining Recorder's office.

Table 1. Summary of claims recorded and assessment work credit.

Year	Claims Recorded (Units)	Claims Cancelled	Claims Active (Units)	Diamond Drilling Man Day (\$ value)	Geophysical Surveys Man Day (\$ value)	Geological* Surveys Man Day (\$ value)	Total Man Days (\$ value)
1994	178 (958)	1 544	7 947	49 314 (1 084 900)	17 030 (374 673)	-	71 850 (1 580 689)
1993	133 (787)	1 086	8 355	36 880 (811 336)	28 015 (616 330)	-	67 700 (1 489 392)
1992	111 (763)	766	7 038	30 340 (667 486)	24 037 (528 825)	-	61 380 (1 350 363)
1991	1 146	2 248	8 106	18 398.8	46 796.8	1 871	71 591.46
1990	2 264	3 648	9 844	39 162	91 499	7 540	151 384

* As of 1992, Geological and Geophysical Survey data are combined as Geotechnical Surveys.

Prospectors were assisted with grants totalling \$60 000 for 6 projects funded by the Ontario Prospectors Assistance Program (OPAP). Four exploration projects received total funding of \$312 843 from the Ontario Mineral Incentive Program (OMIP).

Fourteen exploration companies explored for gold and/or base metals. A number of prospector-staked claims were optioned by major companies for exploration purposes; several of the properties were diamond drilled. Table 2 summarizes exploration activities, while project locations are identified on Figures 1a and 1b.

MINING ACTIVITIES

Gold production continued at the district's 2 producing mines, Placer Dome Canada Limited's Campbell Mine and Goldcorp Inc.'s Red Lake Mine Division (formerly Dickenson Mines Ltd.'s Arthur W. White Mine).

Historical Red Lake gold production, including that from the 2 operating mines, is presented in Table 3.

RED LAKE DISTRICT-1994

Table 2. Exploration activity in the Red Lake Resident Geologist's District.

Abbreviations			
AEM	.....Airborne electromagnetic survey	GRA	.....Ground radiometric survey
AM	.....Airborne magnetic survey	HLEM	.....Horizontal loop electromagnetic survey
ARA	.....Airborne radiometric survey	IP	.....Induced polarization survey
Au	.....Gold	PEM	.....Pulse electromagnetic survey
BM	.....Base Metals	RES	.....Resistivity survey
DD	.....Diamond drilling	SP	.....Self potential survey
DDH	.....Diamond-drill hole(s)	Str	.....Stripping
GC	.....Geochemical survey	Tr	.....Trenching
GEM	.....Ground Electromagnetic survey	UG	.....Underground development
GL	.....Geological survey	VLEM	.....Vertical loop electromagnetic survey
GM	.....Ground magnetic survey	VLFEM	.....Very low frequency electromagnetic survey

No	Company/Individual (Occurrence Name) or Property	Township/Area (Commodity)	Exploration Activity
1	Akiko Gold Resources Ltd/ Santa Fe Canadian Mining Ltd.	Casummit Lake map sheet (Au) (Springpole Lake Prospect)	DDH(4)=6021', assays
2	Cumberland Resources Ltd.	Gerry and Slate Lakes map sheets (BM)	GC, GL, DD, Geophysical Surveys, Linecutting
3	English, P.	Dent Twp. (Au, BM)	Tr, Linecutting
4	Goldcorp Inc.	Balmer Twp. (Au)	DD, Linecutting
5	Goldquest Exploration Inc.	Dome Twp. (Au) (Chevron Zone)	DD, IP
6	Hawke, D.R.	Gerry Lake map sheet (BM)	HLEM, GRA, Linecutting
7	Hemlo Gold Inc./Noranda Exploration Company Ltd.	Todd and Ball Twps. (Au)	Property Examinations
8	Hermiston, W.	Dedee Lake map sheet (Au, BM)	Tr
9	Huston, C.	Dent Twp. (BM)	DD, Geophysical Surveys
10	Inco Exploration & Technical Services	Ball and Mulcahy Twps. (BM)	DDH(6)=1200m, Linecutting
	(Moose Creek Property)	South of Otter Lake map sheet (BM)	DD, Linecutting
	(Rogers Lake (Rogard) Property)	Baird Twp. (BM)	GL
11	Kinross Gold Corporation	Shabumeni Lake map sheet (Au)	GL, Prospecting
12	Maciejewski, A.J.	Dent, Mitchell, Mulcahy and Todd Twps. (BM)	Tr, Str, Linecutting
13	Madsen Gold Corp.	Baird Twp. (Au)	Mine Rehabilitation
14	Melville, R.	South of Byshe & Willans Twps. map sheet and Ball Twp. (Dimensional Stone)	Str, Sampling
15	Metall Mining Corp.	Mitchell Twp. (BM)	GL
16	Nelson, L.	Heyson Twp. (BM)	Prospecting, Str, Tr

Table 2. Continued

No	Company/Individual (Occurrence Name) or Property	Township/Area (Commodity)	Exploration Activity
17	Noranda Exploration Company Ltd.	Gerry and Fredart Lakes map sheets (BM)	DD
		Gerry Lake map sheet and Belanger Twp. (BM)	DD, Linecutting
	(Dixie South - Snake Falls Project)	Karas Lake map sheet (BM, Au)	DDH(2)=1313M, Assays, Bore Hole PEM
	(Pakwash Project - East Lake Project)	Bruce Lake map sheet (Au, BM)	DDH(1)=155.1M, GM, HLEM, Assays
	(Huston Option - Pakwash Project)	Dixie Lake map sheet (BM, Au)	DDH(1)=104.5M, GM, HLEM, Assays, Linecutting
		Mitchell Twp. (BM)	Mag, HLEM, Linecutting
18	Peterson, C.	Dome Twp. (Au) (Skookum Property)	DD
19	Placer Dome Canada Inc.	McDonough and Willans Twps.	GL, Linecutting
		Bateman Twp. (Au)	DD, Linecutting
		Red Lake Greenstone Belt (Au)	Airborne Geophysical Surveys
		Dome and Todd Twps. (Au)	GL
20	Rio Algom Exploration Inc.	Bowerman and Mitchell Twps. (BM)	DDH(3)=700m, GL, HEM, Assays, Linecutting
21	Rivard, O.	Bateman and Todd Twps. (Au)	DD, Tr
22	Rosenthal, L.	Belanger Twp. (BM)	DDH(2)=178', Str, Tr
23	Sano-Lakeview Realty Corp./ Intelisano, J.	Bateman Twp. (Au)	DD, Str, Tr
24	Soltermann, R.	Todd Twp. (Au) (Wolf Bay Property)	VLF-EM, Prospecting
25	St. Jude Resources Ltd.	Uchi Lake & Earngey Twp. map sheet (Au)	DD

Placer Dome Canada Ltd. - Campbell Mine

Gold production at Campbell Mine has steadily increased over the last five years. For 1994, the mine produced 323 168 ounces of gold from 534 974 tons of ore milled. The mill operated at a rate of 1501 tons per day and gold recovery was 94.9%.

A major expansion program was announced for the Campbell Mine by Placer Dome during the year. At a projected cost of 46 million dollars, the expansion will include shaft deepening to 1871 m from the present depth of 1316 m, and decline excavation to access gold mineralization below existing mine workings. Milling and hoisting capacities will be upgraded to sustain current gold production levels.

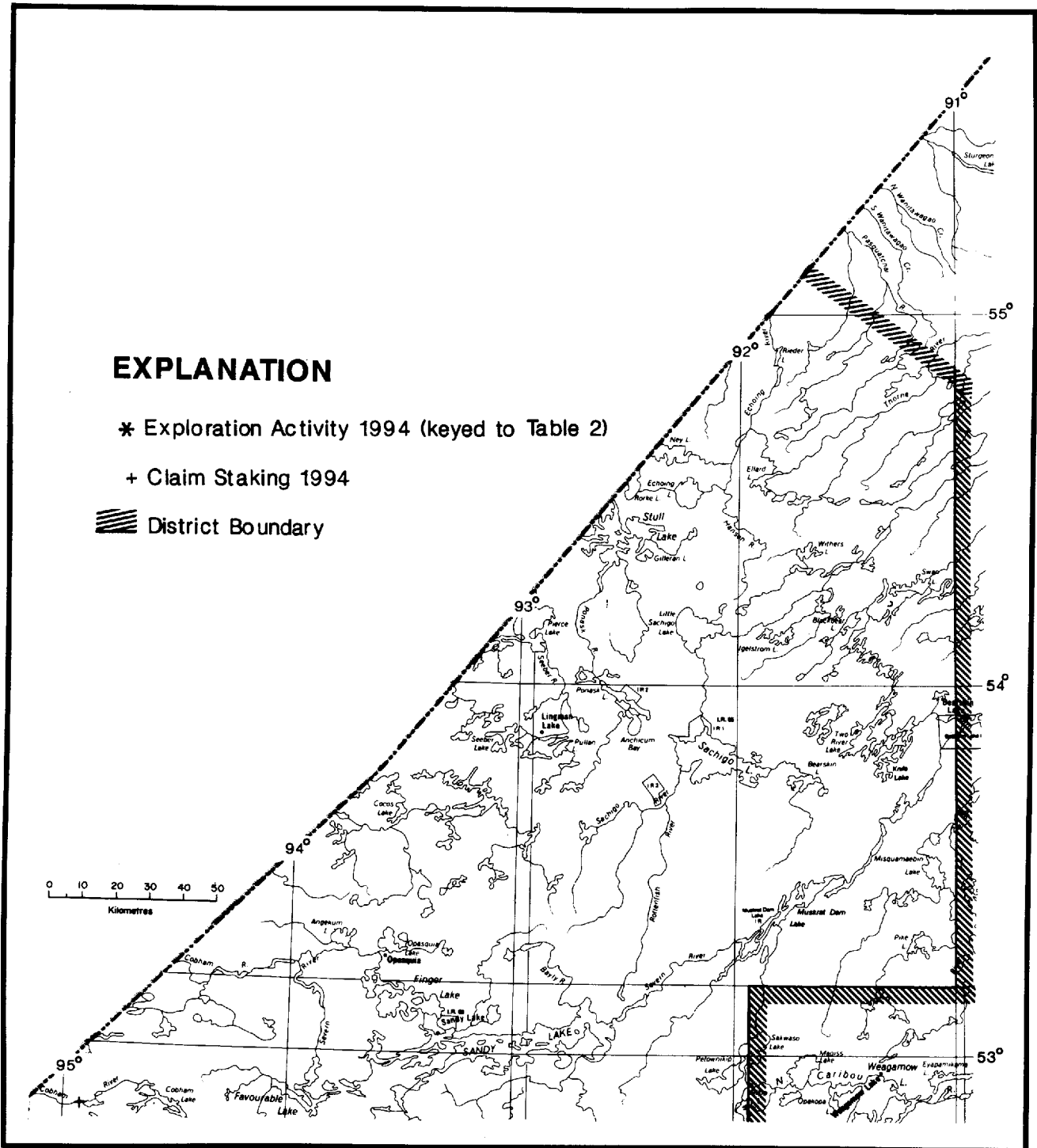


Figure 1a. Red Lake Resident Geologist's District, north part

EXPLANATION

* Exploration Activity 1994 (keyed to Table 2)

● Producing Mines, 1994

1. Placer Dome Canada Ltd. - Campbell Mine
2. Goldcorp Inc. - Red Lake Mine Division

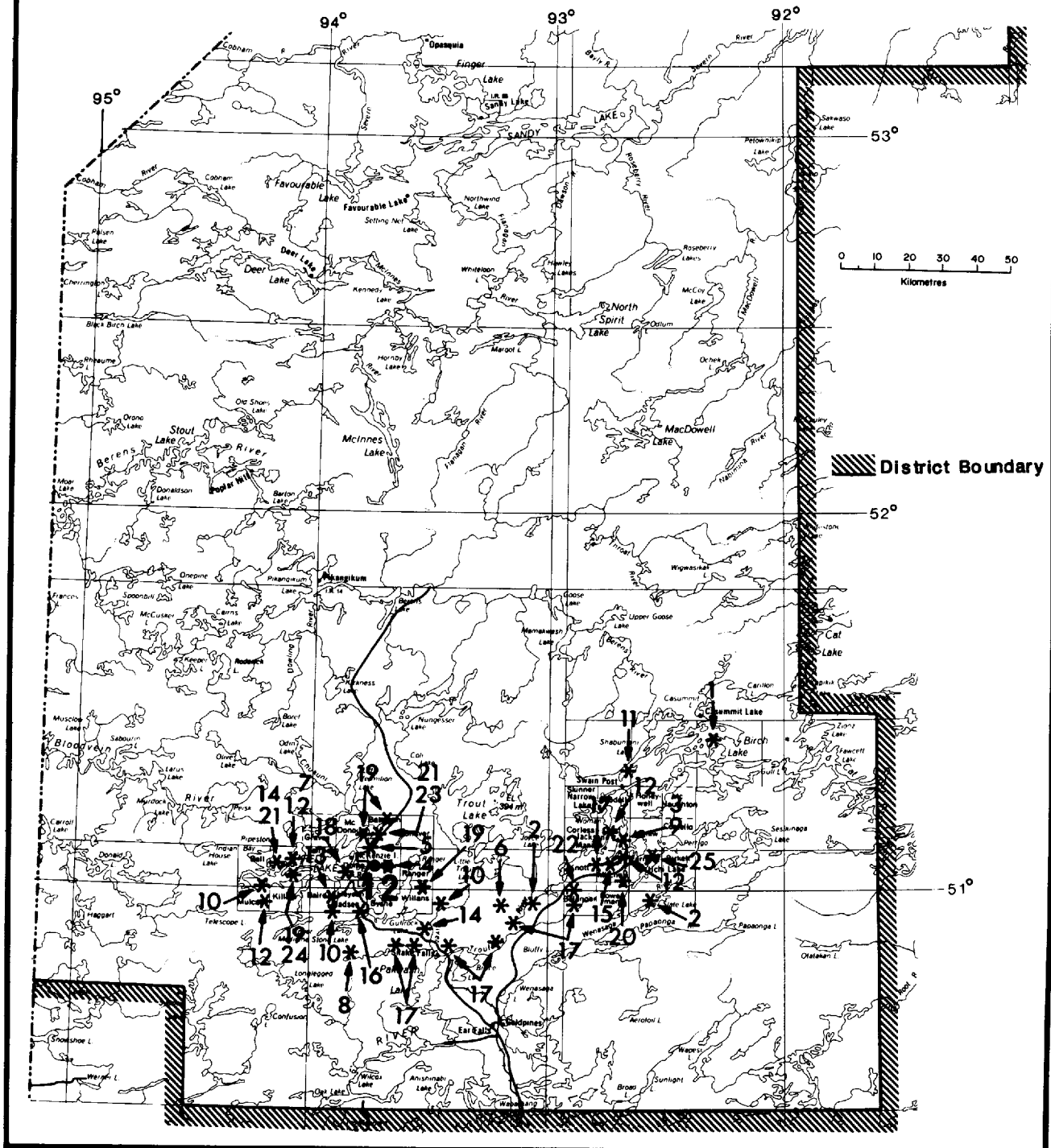


Figure 1b. Red Lake Resident Geologist's District, south part

EXPLANATION

+ Claim Staking, 1994

◆ Property Examinations, 1994 (see text)

- | | |
|----------------------|--------------------|
| 1. Chevron Zone | 4. Heath Property |
| 2. Fly Lake Property | 5. Killoran Creek |
| 3. Fredart Lake | 6. Carbonate Rocks |

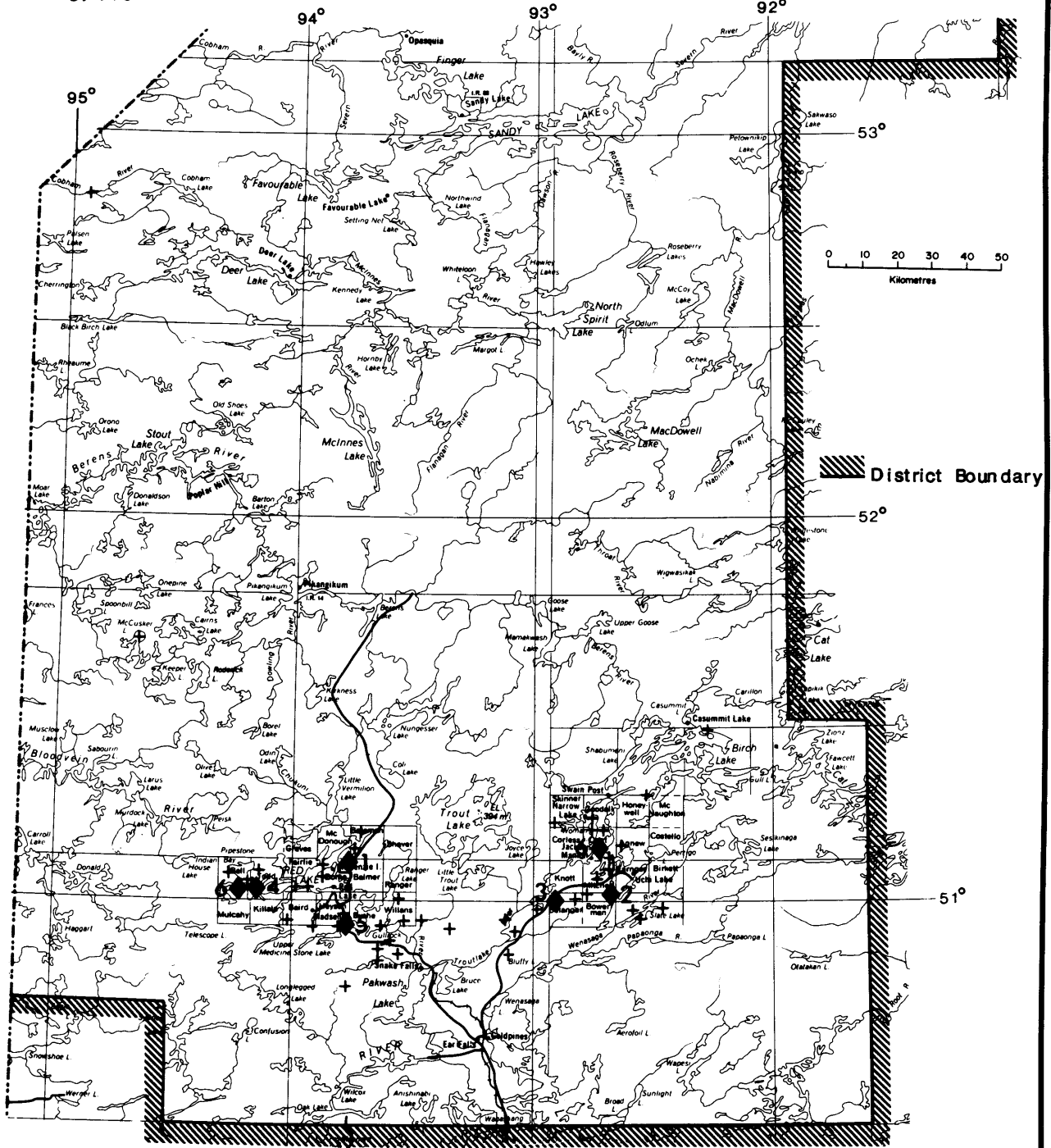


Figure 2. Claim Staking and Property Examinations, Red Lake Resident Geologist's District, south part

Reserves at the mine total 3 797 000 tonnes at a grade of 18.9 g/tonne Au in the proven and probable category and 2.63 million tonnes grading 26.7 g/tonnes Au in the possible category (Placer Dome Inc. 1993 Annual Report).

The mine has a work force of 387 people. T. Mann served as the General Mine Manager, until year end, when M. Winship took over as Mine Manager. T. Stubens is Chief Mine Geologist.

Goldcorp Inc. - Red Lake Mine Division

In March 1994, CSA Management Limited, Goldcorp Inc. and Dickenson Mines Ltd. reorganized operations and merged their combined assets into Goldcorp Inc. The former Dickenson - Arthur W. White Mine constitutes Goldcorp Inc. Red Lake Mine Division.

For 1994, gold production at the Goldcorp - Red Lake Mine was 65 499 ounces from 318 127 tons of ore. The mill operated at a rate of 930 tons per day and achieved a gold recovery of 81.44%.

Ore reserves at the mine in the proven and possible category are 3 million tons at a grade of 0.31 ounce Au per ton. Possible reserves are 1 million tons at a grade of 0.29 ounce Au per ton (Goldcorp Inc. 1993 Annual Report).

Underground exploration of the mine concentrated in the lower mine levels. The 34th level was opened up to permit exploration drilling below the 30th level.

Surface exploration included diamond drilling of 2 fences of drill holes across the east side of the property. Additional diamond drilling tested the North C Zone down to the 3rd level, and the North Shaft Zone. Fill-in diamond drilling was completed on the South Shaft Zone.

The mine presently employs 259 people. Of these, 201 are hourly employees and 58 are staff employees.

D. Bruce served as Mine Manager until November. D. Brown is the Acting Mine Manager and S. McGibbon is Senior Geological Supervisor.

EXPLORATION ACTIVITY

Exploration activities are listed in Table 2. A number of companies and individuals sought volcanogenic massive sulphide mineralization in the felsic rocks of the Confederation assemblage (extending from the former copper-zinc producing South Bay Mine in Dent Township, westward to Red Lake). Gold continued to be sought in the Red Lake and Birch-Uchi-Confederation lakes greenstone belts.

Madsen Gold Corp. continued site rehabilitation of the Madsen Mine, located in Baird Township, 10 km southwest of the town of Red Lake. Underground rehabilitation and refurbishing of the mine commenced in the latter part of the year. Installation of a temporary hoisting system and retimbering of the upper shaft has permitted access to the dry upper levels of the mine workings. A pre-feasibility study based on mine records indicates that the mine has a gold reserve figure of 606 460 tons averaging 0.316 ounce Au per ton in the proven and probable category, and 226 400 tons averaging 0.22 ounce Au per ton as possible ore (Canadian Mines Handbook 1994-95, p.238). A longitudinal section of the underground workings of the Madsen Mine is shown in Figure 3.

Reflecting concerns over land tenure and Aboriginal issues, no notable exploration occurred in the northern greenstone belts of the district.

Goldquest Exploration Inc. completed magnetic and induced polarization geophysical surveys and 7820 m of diamond drilling in 32 holes on the Chevron Zone, at the south end of East Bay of Red Lake in Dome

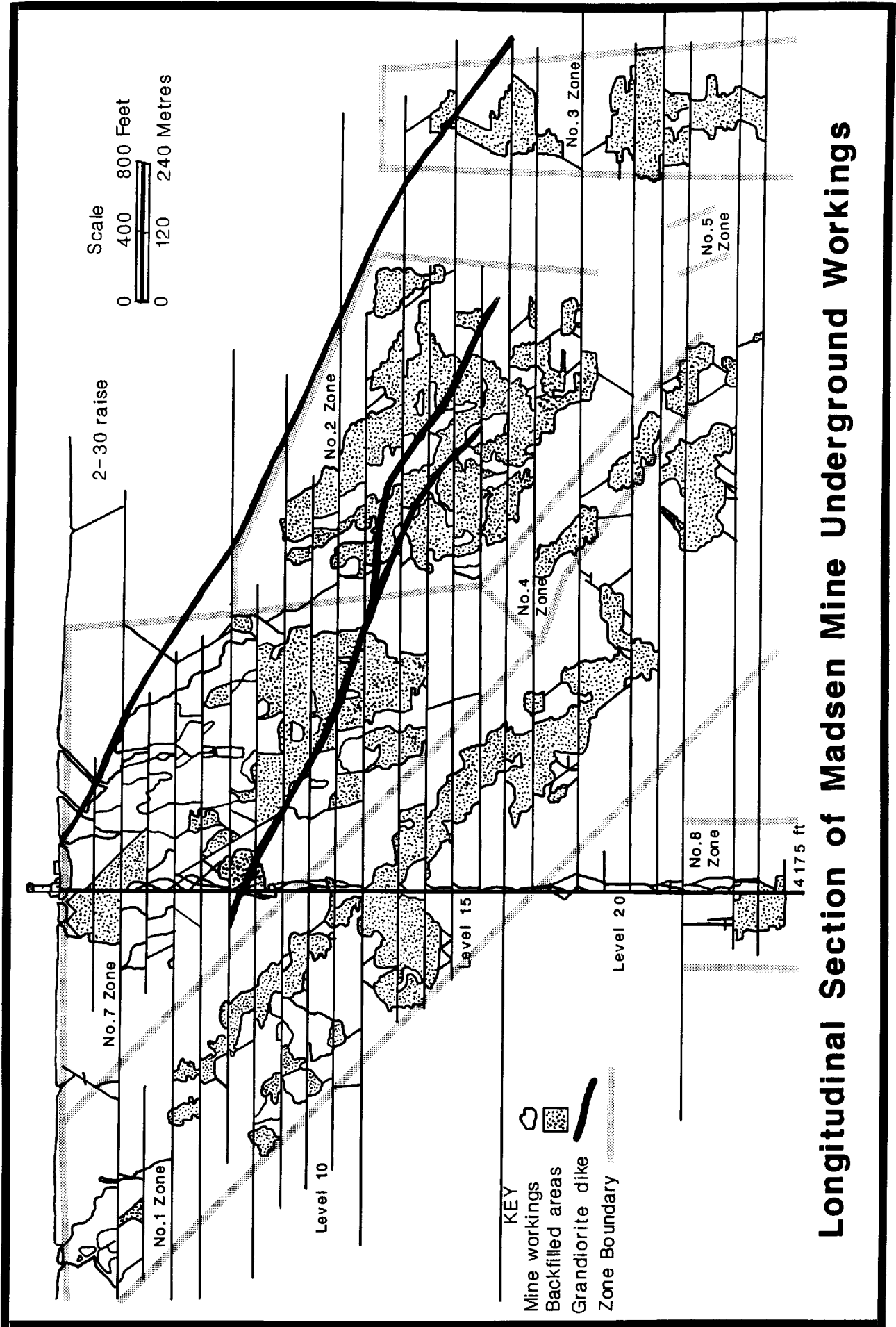


Figure 3. Longitudinal section of the Madsen Mine underground workings, Baird Township.

Township. The 1994 diamond drilling was follow-up work to that completed by Chevron Minerals Ltd. in 1989 and 1990 (see Property Visits).

RESIDENT GEOLOGIST STAFF AND ACTIVITIES

The Red Lake Resident Geologist's office was staffed by B.T. Atkinson, Resident Geologist, C.C. Storey, Staff Geologist and L. Kosloski, Administrative Assistant. N. Beauschene served as summer assistant and C. Spicer was contracted as winter assistant. E.J. Nabigon continued on a Northern Ontario Development Agreement (NODA) funded contract as Lecturer to First Nations.

Office staff visited 16 properties through the year to examine their mineral potential. Twelve field trips were conducted for industry geologists, university researchers and the public. Several in-office information sessions were presented to public school children.

C.C. Storey presented an Industrial Minerals Information Session, jointly sponsored by the Ministry of Northern Development and Mines (MNDM) and The Canadian Institute of Mining Metallurgy and Petroleum (CIM) - Red Lake Branch.

B.T. Atkinson completed 1:12 000 scale mapping of Killala Township.

Table 3. Red Lake Gold Production April 2, 1930 to December 31, 1994

Mine	Years of Production	Ore Milled Short Tons	Gold Produced		Grade	
			Troy Ounces	Kilo-grams	Ounces Per Ton	Grams Per Ton
Howey	1930-1941; 1957 ⁽¹⁾	4 630 779 ⁽²⁾	421 592	13 113	0.091 ⁽²⁾	3.35
McKenzie Red Lake	1935-1966	2 353 833	651 156	20 253	0.277	9.50
Red Summit	1935-1936	591	277	8.6	0.469	16.08
Red Lake Gold Shore	1936-1938	86 333	21 100	656	0.244	8.37
Gold Eagle	1937-1941	180 095	40,204	1 250	0.223	7.65
Madsen	1938-1976	8 371 631	2 416 609	75 165	0.289	9.91
Hasaga	1938-1952	1 515 282	218 213	6 787	0.144	4.94
Cochenour-Willans ⁽³⁾	1939-1971	2 311 165	1 244 279	38 701	0.538	18.45
McMarmac	1940-1948	152 978	45 246	1 407	0.296	10.15
Goldcorp Inc. (Dickenson) ⁽⁴⁾	1948-Present	7 973 796	3 070 149	95 492	0.385	13.20
Starratt Olsen	1948-1956	907 813	163 990	5 100	0.181	6.20
Campbell	1949-Present	14 030 655	8 392 706	269 832	0.598	20.50
H.G. Young	1960-1963	288 179	55 244	1 718	0.192	6.58
Mount Jamie	1976	552	265	8.2	0.480	16.46
Buffalo	1980-1982	31 986	1 656	52	0.052	1.78
Abino	1985-1986	2 733	1 397	44	0.51	17.49
Lake Rowan	1986-1988	13 023	1 298	40	0.10	3.42
Total		42 851 424	16 745 381	529 626.8		

Notes:

(1) Continuous production 1930 to 1941; includes 268 ounces recovered from clean up in 1957.

(2) From 1930 to 1941, the ore mined at Howey, before sorting, totalled 5 158 376 tons.

The average production from run-of-mine ore was therefore 0.0817 ounce Au per ton (2.80 g/t).

(3) Includes production from Amco and Wilmar properties.

(4) From 1970, includes production from Robin Red Lake.

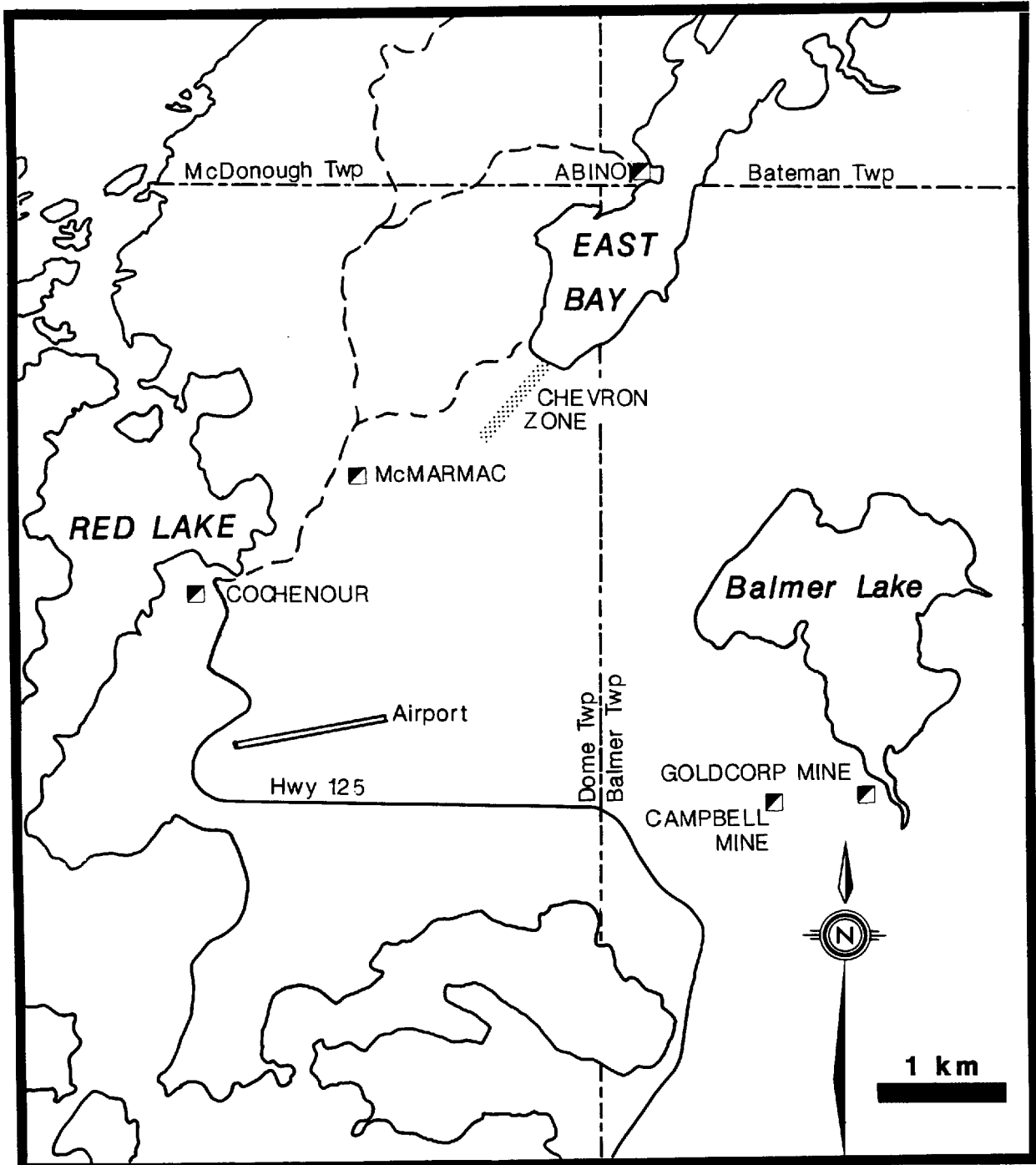


Figure 4. Location map of the Chevron Zone, Dome Township.

ACKNOWLEDGEMENTS

L. Kosloski typed the manuscript, compiled information, and, with C. Spicer, drafted several of the figures. D.G. Laderoute, Section Chief, Field Services Section, edited the text.

Information on past work included in this report is taken from assessment files of the Red Lake Resident Geologist's Office, unless otherwise indicated. Prospectors, explorationists and mine geologists significantly added to the authors' understanding of the district's geology.

PROPERTY REPORTS

Property reports completed by office staff include the Heath and Chevron Zone gold prospects, the Fly Lake and Fredart Lake base metal occurrences and an examination of carbonate rocks of Red Lake and Woman Lake for industrial mineral applications.

Gold Prospects

Chevron Zone - Goldquest Exploration Inc. - Dome Township

The Chevron Zone is a recent (1989-90) diamond drill gold discovery made by Chevron Minerals Ltd. on Goldquest Exploration Inc. property at the south end of East Bay of Red Lake. The property is situated between the McMarmac and Abino mines in Dome Township (Figure 4). The mineralized zone is located on leased claims KRL 1014 and KRL 1015 and is accessed by a gravel road from Cochenour.

The Chevron Zone occurs under the 500 m wide valley of East Bay and doesn't outcrop. Overburden cover reaches depths of 52 m in drill holes. Rocks bordering the valley consist of pillowed to massive mafic metavolcanic flows with variable carbonate alteration. Gold mineralization is associated with pyrite, pyrrhotite and rare chalcopyrite in silicified, biotitic talcose and carbonate-altered mafic and ultramafic rocks of the East Bay Serpentinite.

The Chevron Zone mineralization consists of an upper and a lower gold bearing horizon. Host rocks and gold mineralization strike northeast and dip steeply to the northwest, consistent with regional structural trends. Preliminary mineralized reserves, based on limited diamond drilling on 50 m centres completed by Chevron, are 550 000 t grading 8.76 g/t Au (0.256 ounce Au per ton) based on a cut off grade of 3 g/t Au and a minimum 1.5 m horizontal width (Goldquest 1994).

Heath Prospect - Todd Township

The Heath prospect (Figure 5) is located in west central Todd Township. Access to the site is by means of the Pine Ridge forest access road along the north side of Red Lake to the Mount Jamie Mine. A 2 km trail leads south from the Mount Jamie Mine to the Heath prospect. Distance by road from the town of Red Lake is approximately 55 km. Boat access to Sadler or Hall Bay of Red Lake, followed by a 1 km walk, is a preferable alternative route. An abandoned hydro-electric power line crosses the property. The Heath prospect presently consists of 6 leased mining claims, including KRL 509637 to 509641 inclusive and KRL 509715.

Previous work on the property consists of prospecting, trenching and about 400 feet of diamond drilling conducted by Dupont-Hodgson Gold Mines Ltd. in 1936 and 1937. Extensive stripping, geological mapping and a bulk sample program was done by Heath Gold Mines Ltd. between 1944 and 1946. Results of the bulk sampling reported in the Heath Gold Mines prospectus indicate an unspecified but large tonnage of mineralization with a grade of 0.195 ounce Au per ton. A different report suggests the sampling program outlined a zone of mineralization 610 feet long grading 0.11 ounce Au per ton over 15.4 feet (The Northern Miner, August 24, 1972).

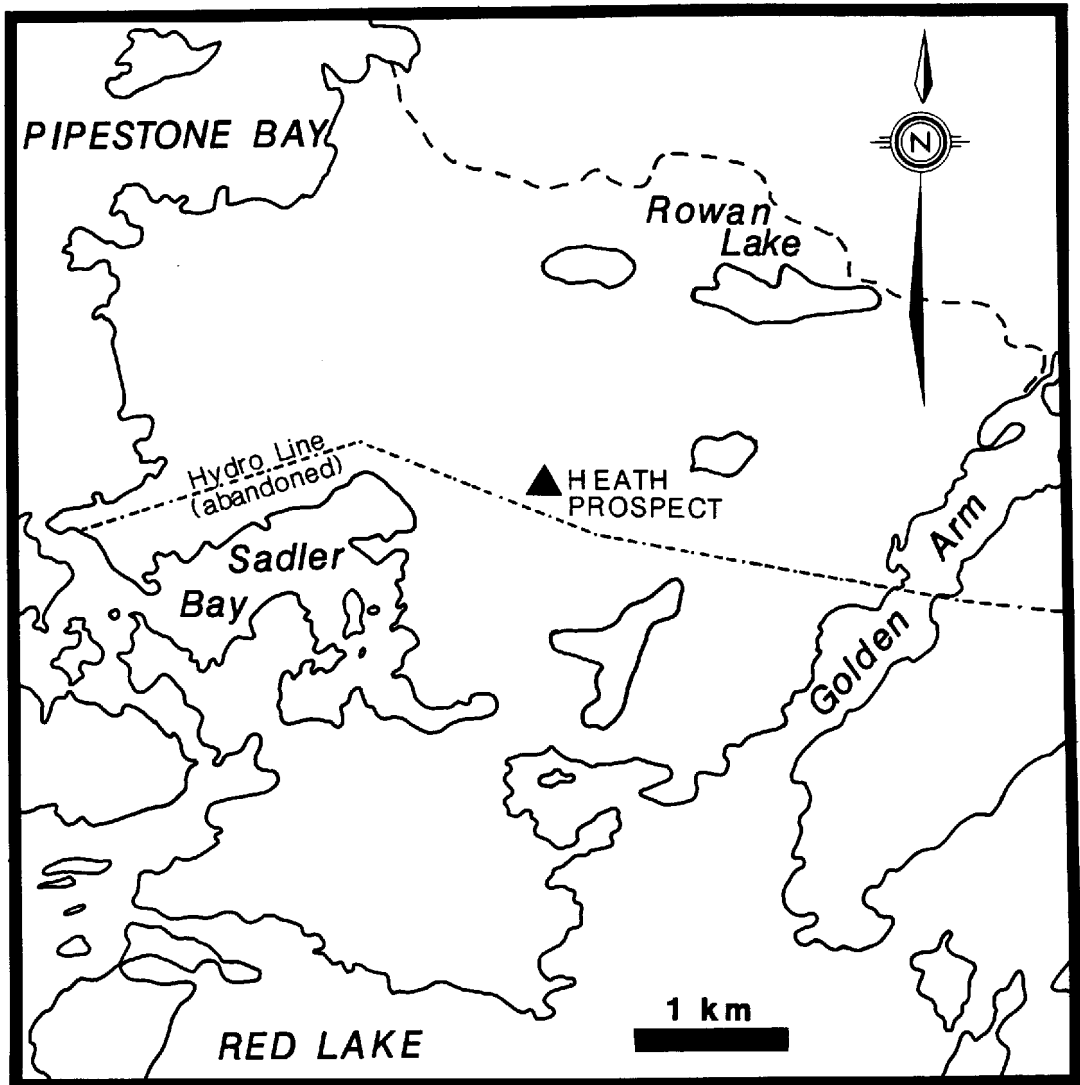


Figure 5. Location map of the Heath Prospect, Todd Township.

Geology

The Heath property is underlain by strongly foliated felsic volcanic tuffs and massive to foliated quartz porphyry. A 2 m thick bed of monolithic, clast-supported felsic tuff breccia provides a semi-continuous stratigraphic marker across the stripped area of the prospect on claim KRL 509715. Graded bedding in the tuff breccia indicates the sequence is east facing; bedding is oriented 020/90°. Lithologies are part of the Ball assemblage (Stott and Corfu 1991). Foliations in the breccia and enclosing rocks generally strike west and dip steeply southward. Rare carbonate-altered mafic dikes up to 2 m wide intrude the felsic rocks.

Alteration

Sericite alteration is common where the felsic rocks are most strongly foliated, resulting in distinctive, yellow schists. Pervasive fuchsite alteration imparts a brilliant emerald green colour to some of the massive felsic rocks.

Subsequent iron carbonate occurs as veins and patches within the felsic rocks. Late-stage silicification is expressed as narrow quartz veins demonstrating several preferred orientations including i) 020/70°W, ii) strike between 120° and 150° and iii) strike of 090°. Within the strongly fuchsite-altered rocks, very fine-grained magnetite occurs as disseminations and stringers.

Mineralization

Quartz vein sets i) and ii) are auriferous and carry visible gold. No gold was observed in the 090° vein set. Visual examination of gold mineralization revealed a typical brilliant gold and a second, less common occurrence of gold with a paler hue. Neither genesis nor timing of the two gold varieties was determined.

Economic Considerations

Individual gold bearing quartz veins are narrow, i.e. generally 1 to 3 cm wide, and are widely spaced. Although the potential to economically mine individual veins is unlikely (other than as a very small operation), the high visual gold grade of the veins, combined with their widespread distribution, suggests the possibility for an open pit bulk tonnage mining operation.

Hosted by felsic metavolcanic rocks, the Heath property represents a completely different style of gold mineralization from that mined in the east part of the Red Lake camp.

Base Metal Occurrences

Fredart Lake Occurrence - Belanger Twp.

The Fredart Lake occurrence is presently staked as claim KRL 1143902, covering the east part of Fredart Lake in Belanger Township. The claim consists of 6 claim units.

Access to the property is by means of the South Bay Mine road to a point 45 km north of Ear Falls, where a 3 km bush trail leads east to Fredart Lake. A boat is required to complete access to the trenched, mineralized showings on the east side of the lake. Alternatively, float-equipped aircraft can land on Fredart Lake.

Previous work on the property includes prospecting by D. Ross in 1932. Molybdenite mineralization returned values of up to 0.28% MoS₂ and 0.1% Sn from a grab sample. Split Rock Mines Ltd. diamond-drilled 9 holes totalling 1515 feet in 1958, and encountered minor pyrite and chalcopyrite mineralization.

In 1969, Roxmark Mines Ltd. diamond-drilled 4 holes totalling 1862 feet on the east side of Fredart Lake, flew an airborne magnetic and electromagnetic geophysical survey and did an induced polarization geophysical survey

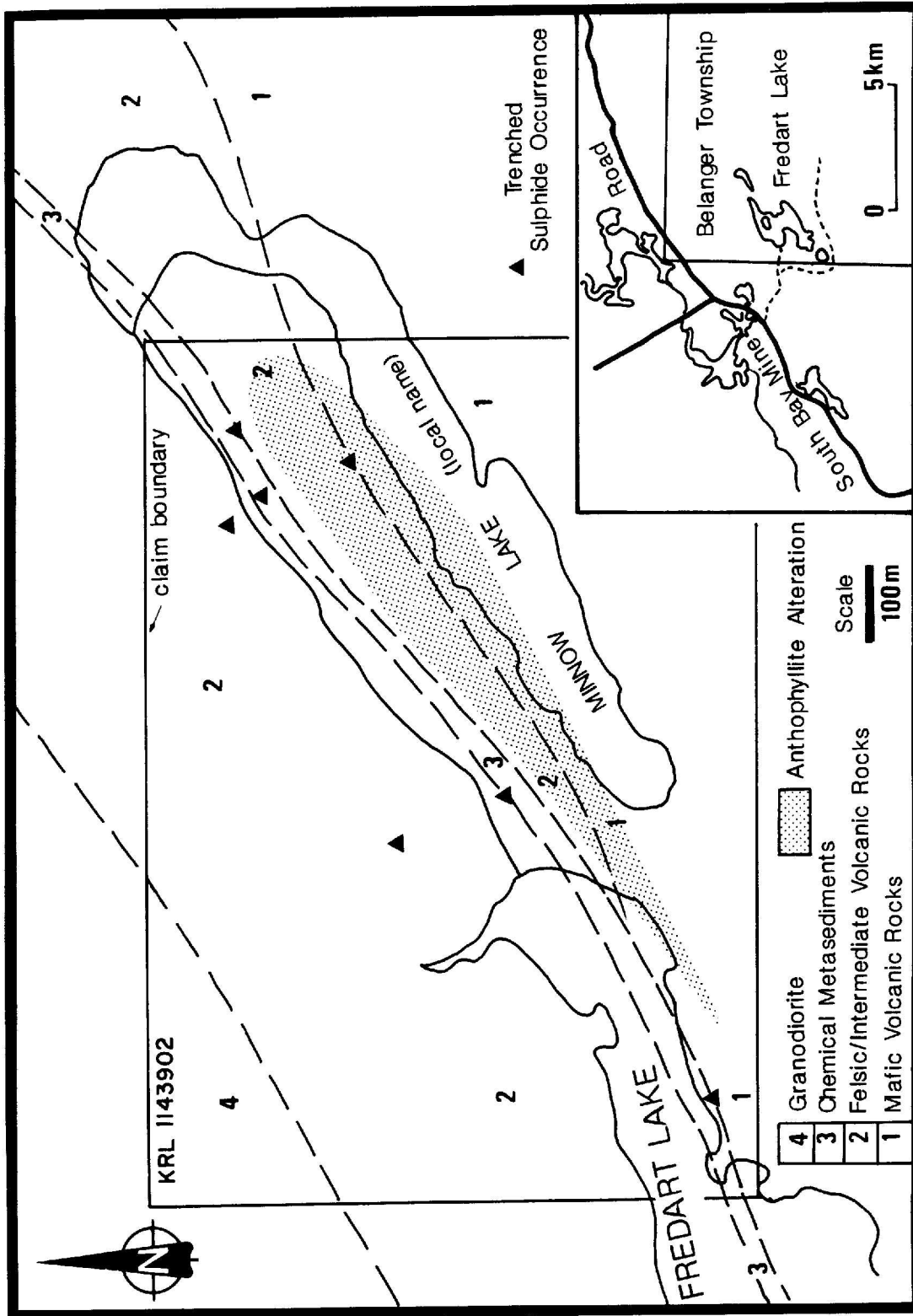


Figure 6. General geology of the Fredart Lake Prospect, Belanger Township.

covering the occurrence. The diamond-drill program encountered minor pyrite and chalcopyrite mineralization in chlorite-altered rocks.

In 1988, Noranda Exploration Company Limited flew an extensive airborne magnetic and electromagnetic geophysical survey that covered the Fredart Lake area. A. Rosenthal and L. Rosenthal staked the property in 1991 and conducted prospecting, sampling, and trenching, and diamond-drilled 2 holes totalling 178 feet by the end of 1994. A self-potential geophysical survey was completed over selected areas of the occurrence.

Geology

The Fredart Lake property geology is depicted in Figure 6. From north to south, the property is underlain by granodiorite of the Trout Lake batholith, which is in contact with northeast-striking intermediate to felsic metavolcanic rocks and associated metasedimentary rocks of the Woman assemblage. Chemical metasedimentary rocks occur as a thin horizon up to 3 m thick, consisting of marble and magnetite-chert ironstone. The marble horizon is altered to a calc-silicate skarn assemblage. Outcrops on the south side of the northeast arm of Fredart Lake consist of very coarse-grained diopside skarn; elsewhere on the property, the marble is crystalline, but unaltered.

Minor mineralization, including pyrite, pyrrhotite, sphalerite and chalcopyrite, occurs with the ironstone in several trenched areas. Grab sampling of the mineralized trenches returned values of up to 2.45% Cu and 0.25% Zn.

Confederation assemblage rocks to the south of the marble horizon are extensively anthophyllite-altered over an observed width of 100 m. Due to the intensity of the alteration, the protolith of the anthophyllitized rocks is unclear. Minor sulphide mineralization, including pyrite and chalcopyrite, occurs in the altered rocks. Mafic flows outcrop south of Minnow Lake (local name).

Molybdenite mineralization occurs in 1 m wide, trenched quartz veins hosted by granodiorite of the Trout Lake batholith, at the contact with the Woman assemblage rocks.

The widespread hydrothermal, anthophyllite-rich alteration of the rocks underlying the Fredart Lake occurrence is similar to alteration associated with base metal mineralization elsewhere in Confederation assemblage rocks. Consequently, the Fredart Lake occurrence, and similar occurrences along the contact between the Woman and Confederation assemblages, warrant consideration as high-priority base metal targets.

Fly Lake Property - Rio Algom Ltd. - Mitchell and Bowerman Townships

The Fly Lake property (Figure 7) is on the east side of Fly Lake in the southeast corner of Mitchell Township. It extends into the southwest corner of Earngey Township and south into Bowerman Township. The property consists of a large claim block held by Rio Algom Exploration Ltd., and an adjacent block optioned from Breakwater Resources Ltd. The area has been mapped by Bateman (1940), Pryslak (1970), Thurston et al (1974), Thurston and Paktunc (1985) and Thurston (1985). The property is underlain by felsic tuff, and mafic to intermediate flows of the Confederation assemblage.

Exploration activity in this area was focused on gold, until the discovery of the South Bay Mine in Dent Township to the north in 1968. The early gold exploration efforts by-passed the south east side of Fly Lake. After the South Bay Mine discovery, Selco Exploration Ltd. carried out magnetic and electromagnetic geophysical surveys and follow-up diamond drilling. Ground and airborne magnetic and electromagnetic geophysical surveys were carried out subsequently by Kerr Addison Mines Ltd. (1975, 1976), Dome Exploration Ltd. (1970), Hudson Bay Exploration and Development Co. Ltd. (1977), St. Joseph Exploration Ltd. (1978, 1979, 1980), Hollinger Mines Ltd. (1972), Canadian Eagle Exploration Ltd. (1988), Placer Dome Inc (1988), Noranda Exploration Co. Ltd. (1988) and Breakwater Resources Ltd. (1989, 1992). Diamond drilling was carried out by

Geology from maps P593, P932, 2498 and Rio Algom Exp. Ltd. maps

Geology from map P2859

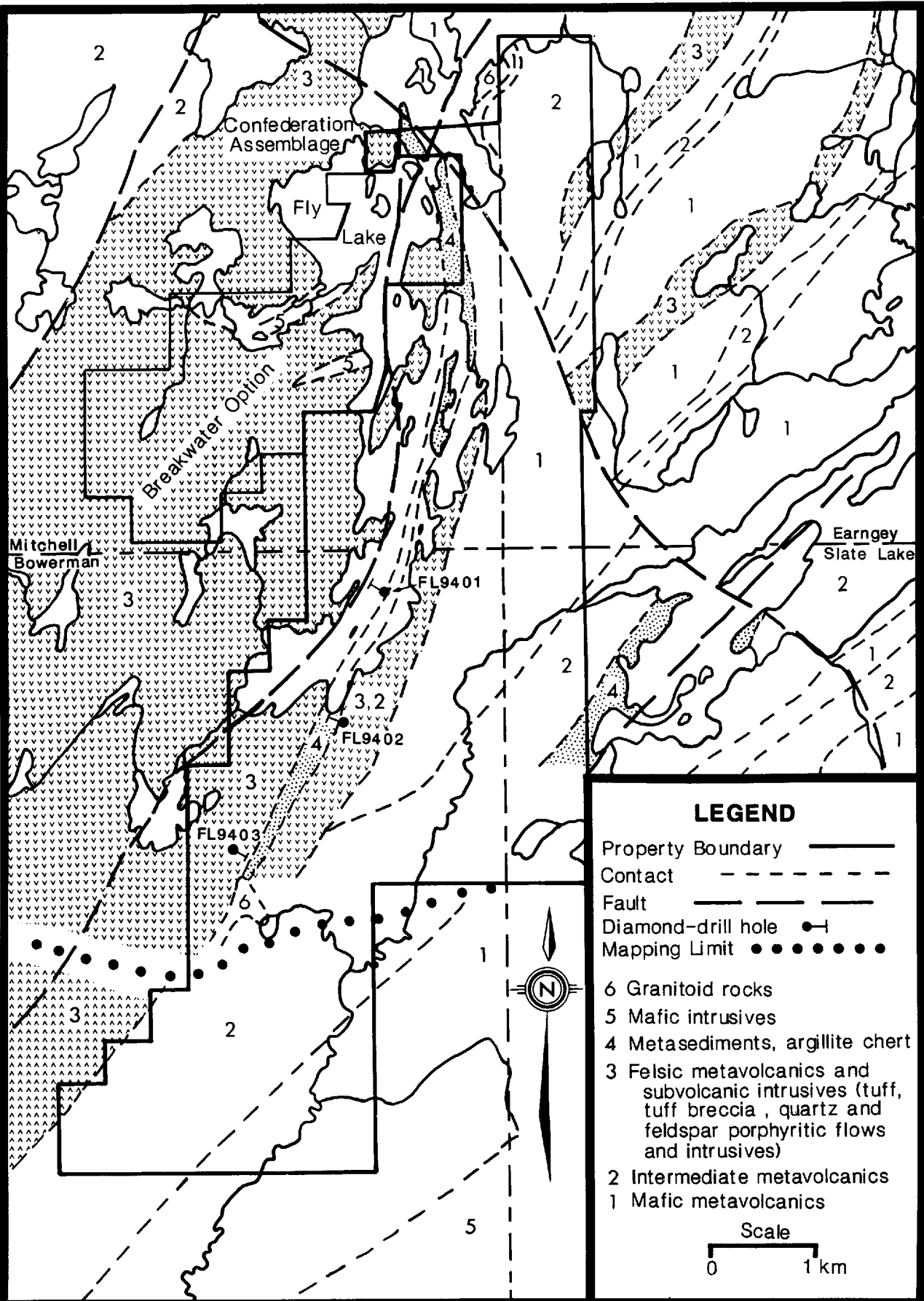


Figure 7. General geology of the Fly Lake property, Mitchell and Bowerman Townships.

Dome Exploration Ltd. (1969-70), Hollinger Mines Ltd. (1972), Kerr Addison Mines Ltd. (1975), Sulpetro Minerals Ltd. (1981), Breakwater Resources Ltd. (1990) and Noranda Exploration Co. Ltd. (1990). The present holder, Rio Algom Exploration Ltd., carried out geological mapping, geochemical and magnetic and electromagnetic geophysical surveys and diamond drilling from 1991 to 1994.

Geological mapping by Pryslak (1970) and Thurston (1985) indicate that a 5 km thick sequence of felsic and intermediate rocks interpreted as tuff, pyroclastic breccia and porphyritic flows occur along Fly Lake and continue to the south-southwest into Bowerman Township. The felsic units thicken to the southwest. Diamond drilling intersected zinc mineralization in these rocks in several places. To the west of Fly Lake, on the Breakwater Option part of the property, zinc assays as high as 6.84% Zn over 0.5 m by Breakwater Resources Ltd. are reported in the assessment files.

Property-scale mapping by geologists from Rio Algom Exploration Ltd. concentrated on the felsic rocks exposed around Fly Lake. The felsic rocks consist of tuff, tuff breccia and agglomerate, plus a large volume of fine-grained rhyolite and quartz- and feldspar-porphyritic flows and subvolcanic intrusives. A unit of rock up to 300 m thick is mapped as arkosic sandstone and conglomerate. It extends southward from the north boundary of the property to where it is cut off by a small granitoid body. A horizontal loop electromagnetic anomaly coincides with the west contact between the metasedimentary rocks and felsic subvolcanic intrusive rocks south of Fly Lake. This is referred to as the Fly Lake West Horizon by Rio Algom Exploration Ltd. Diamond drilling in 1975 by Kerr Addison Mines Ltd. along this contact intersected sphalerite and chalcopyrite mineralization, with zinc assays up to 3.11% Zn over 2.5 feet. In 1994, diamond drilling by Rio Algom Exploration Ltd. intersected base metal mineralization south of the south end of Fly Lake along the Fly Lake West Horizon. The mineralization intersected in diamond drilling consists of pyrite and pyrrhotite with lesser amounts of sphalerite, chalcopyrite and rare galena associated with siliceous argillite. Assay values of 12.6% Zn over 1 m and 11.8% Zn over 1.5 m from hole (FL94-03) were reported. Drill hole locations are shown on Figure 7.

The Fly Lake property exhibits widespread mineralization and chlorite alteration of felsic rocks similar to the altered rocks that host the volcanogenic massive sulphide mineralization at the South Bay Mine.

Killoran Creek Sulphide Occurrence

The Killoran Creek sulphide occurrence was described in Atkinson and Storey (1994). Since that report was published, analytical and assay work on the samples collected was completed. Selected analyses are listed in Table 4. Sample locations are depicted in Figure 8. The highest zinc and copper values are found in an outcrop of felsic tuff 600 metres east of the main sulphide zone. That sample contained 173.9 ppm Cu and 427.7 ppm Zn. The other metal values are all quite low, including those from the channel samples at the Main Sulphide Zone and Zone A. In Table 4, the channel sample results have been averaged. Sample 'Chan A' is the average of samples 94CS-047 and 048, while sample 'Chan B' is the average of samples 94CS-049, 050 and 051. Channel sample 94CS-043 from Zone A had no metal values above the analytical detection limit. Three samples showing large amounts of alteration minerals from the Main Sulphide Zone were submitted for X-Ray diffraction mineral identification. Sample 94CS-044 thought to contain anthophyllite, was found to contain dravite (magnesium-rich tourmaline), clinocllore and muscovite. Sample 94CS-045, thought to contain cordierite nodules, was found to contain quartz and clinocllore in the nodules. Sample 94CS-046, from a biotite-rich shear zone, was found to consist almost exclusively of clinocllore and phlogopite. Comparing the results from Killoran Creek samples to those published by Lesher et al (1986) indicates that the former samples have some of the characteristics of FIII rhyolites. This suggests that the Killoran Creek area may have good base metal potential.

Carbonate Rocks

Carbonate Rocks of Red Lake and Woman Lake

Carbonate and associated chemical metasedimentary rocks are important stratigraphic marker horizons in the

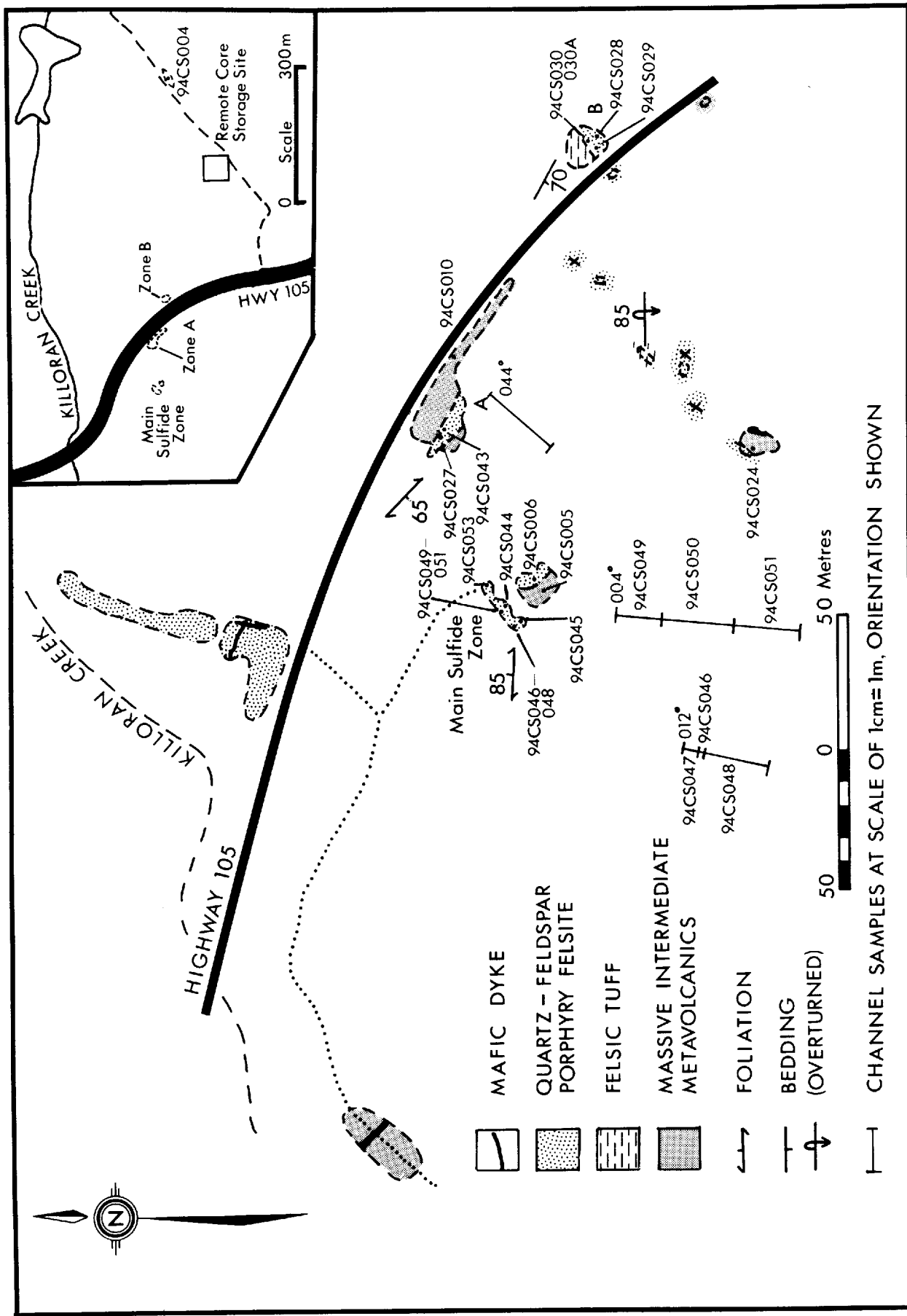


Figure 8. Geology and sample locations of the Killoran Creek sulphide occurrence, Heyson Township.

Table 4. Analytical Results, Killoran Creek Sulphide Occurrence, Heyson Township

Sample No.	94CS-004	94CS-007	94CS-008	94CS-010	94CS-024	94CS-027	94CS-028	94CS-029	94CS-030	94CS-044	94CS-045	94CS-046	Chan A	Chan B	94CS-063
Whole Rock (Values in %)															
SiO ₂	74.14	50.18		52.66		78.34			66.67		39.57				
Al ₂ O ₃	13.51	20.71		15.41		11.61			16.96		20.39				
MnO	0.07	0.01		0.14		0.01			0.06		0.07				
MgO	1.15	1.79		3.20		0.44			0.76		18.27				
CaO	0.89	2.24		5.17		0.31			1.99		1.18				
Na ₂ O	2.53	5.90		4.61		2.43			1.33		1.22				
K ₂ O	2.84	2.91		1.90		3.18			7.89		1.61				
TiO ₂	0.17	1.17		1.40		0.18			0.34		1.18				
P ₂ O ₅	<0.05	0.15		0.38		<0.05			0.08		0.15				
Fe ₂ O ₃	2.49	10.28		12.33		1.96			1.60		8.28				
LOI	1.24	3.90		1.91		1.57			1.66		7.64				
TOTAL	99.08	99.25		99.09		100.06			99.34		99.57				
CO ₂	<0.10	<0.10		0.69		<0.10			<0.10		<0.10				
S	0.03	3.77		0.04		0.59			0.52		0.01				
Sample Codes	1	3	2*	2	2*	1	4*	4	4	3	3	3	1*	1*	1*
Trace Elements (Values in ppm)															
Au (ppb)	173.9	74.68	51	36.14	29	<5	11	12	23.60	136.8	36.07	8	13	4	
Cu	427.7	174.7	<100	120.2	111	55.33	<100	<50	86.31	80.67	121.0	133	363	132	
Zn	2.99	2.27	122	1.04	105	2.57	<50	<50	0.88	1.94	<0.2	86.5	139.3	88	
Be	<5	36.15	<40	23.32	<40	<5	<40	<40	7.83	34.28	20.59	53.5	57	90	
Co	<5	59.43	<40	9.08	<40	<5	<40	<40	13.66	88.08	44.4	53.5	57	90	
Ni	<5	180.1	<40	122.8	<40	<5	<40	<40	40.20	168.7	169.3	53.5	57	90	
V	67	16	54	54	67	67	1325	1624	13	19	10	670	641	426	
Y	44.75	186.6	712.0	712.0	81.27	81.27	529	447	99.51	96.52	5.08	202.5	155	168	
Sr	390	195	280	280	383	383	529	447	127	117	88	202.5	155	168	
Zr	1.34	21.88	569	26.23	333	1.25	1325	1624	5.14	19.96	12.07	670	641	426	
Ba			97		431										
Sc															
W															

NOTES: For all samples Mo < 6, Ag < 20, and As < 100 (values in ppm).
 * indicates analyses (other than Au) by Prospector Package (Martin 1994) other trace elements were done with the whole rock analyses.
 Sample Codes are: 1 - Quartz Feldspar Porphyry 2 - Intermediate Metavolcanic 3 - Altered Rock 4 - Felsite/Rhyolite
 Sample 94CS-007 is from the Main Sulphide Zone.

RED LAKE DISTRICT-1994

Uchi Subprovince. Carbonate rocks form three significant groups of units (called marble belts) in the western Red Lake area, in Todd and Ball townships. The area is underlain by northeast-striking carbonate metasedimentary rocks, felsic and mafic metavolcanic rocks, and mafic to ultramafic intrusive rocks (Riley 1972, 1975a, 1975b, 1978). One of these carbonate bodies was evaluated as a source of lime during the late 1930's (Storey 1986). A small quarry on the shore of Hahn Lake provided limestone for a kiln erected on Hall Bay of Red Lake. Reconnaissance examination and sampling of all three marble belts was carried out in 1994.

Figure 9 shows the overall exposure of the marble belts and the location of the samples analyzed. Analyses by Goudge (1938), Storey (1986) and from this study indicate that the carbonate rocks of the belt 'A' are calcitic and belt 'B' are dolomitic. Two samples analyzed from belt 'C' are dolomitic and much of the belt 'C' rocks seem to be dolomitic, based on field examination. Analytical results are tabulated in Table 5. The present survey, plus previous work on these rocks, indicates considerable variation in the composition of the marble, particularly the silica content. The silica is present as convoluted layers (stromatolites) and discrete rounded masses of sugary-textured quartz. Much of the latter is not visible until a sample is sawed and polished. From the results in Table 5, trace element content, even in samples with visible pyrite, is low.

Table 5. Analytical Results, Carbonate Rocks

Sample No.	94CS-011	94CS-015	94CS-022	94CS-032	94CS-037	94CS-039	94CS-054
Whole Rock							
(Values in %)							
SiO ₂	3.73	3.85	12.22	19.35	12.02	8.88	1.35
Al ₂ O ₃	0.21	0.67	1.20	1.84	3.10	1.04	1.27
MnO	0.48	0.54	0.79	0.39	0.83	0.61	0.74
MgO	0.27	0.30	16.92	0.28	14.25	18.09	0.88
CaO	51.95	51.41	25.59	39.89	24.33	27.07	52.16
Na ₂ O	<0.01	<0.01	<0.02	0.03	<0.01	<0.01	0.01
K ₂ O	<0.02	<0.02	0.03	0.05	<0.02	<0.02	0.03
TiO ₂	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
P ₂ O ₅	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fe ₂ O ₃	0.55	1.00	2.96	1.65	6.11	2.49	0.21
LOI	41.94	41.12	40.36	34.14	37.84	41.92	42.50
TOTAL	99.13	98.90	100.08	97.62	98.48	100.08	99.16
CO ₂	42.40	41.90	40.50	34.30	38.60	42.40	43.50
S	0.01	0.11	<0.01	0.01	0.03	0.02	0.01
Trace Elements							
(Values in ppm)							
Zn		4.91			20.27		8.79
Be		0.35			0.23		0.36
Ni		<5			8.12		6.59
V		<5			9.35		<5
Y		2.64			2.17		4.58
Sr		42.14			29.56		53.92
Sample Locations	Hahn Lake Quarry	Hahn Lake Quarry	Golden Arm	Hall Bay	Trout Bay	Trout Bay	Woman Lake

NOTES: For all samples Co < 5, Cu < 5, Mo < 6, Sc < 1, and W < 35 (values in ppm).

The best exposures of the carbonate rocks are along the shore of Red Lake, Hahn Lake and the other small lakes. Outcrops elsewhere are small and heavily overgrown. The marble belts consist of intercalated units of siliceous limestone or dolomite, calcareous siltstone-chert and siltstone-chert. Magnetite-rich limestone and lean

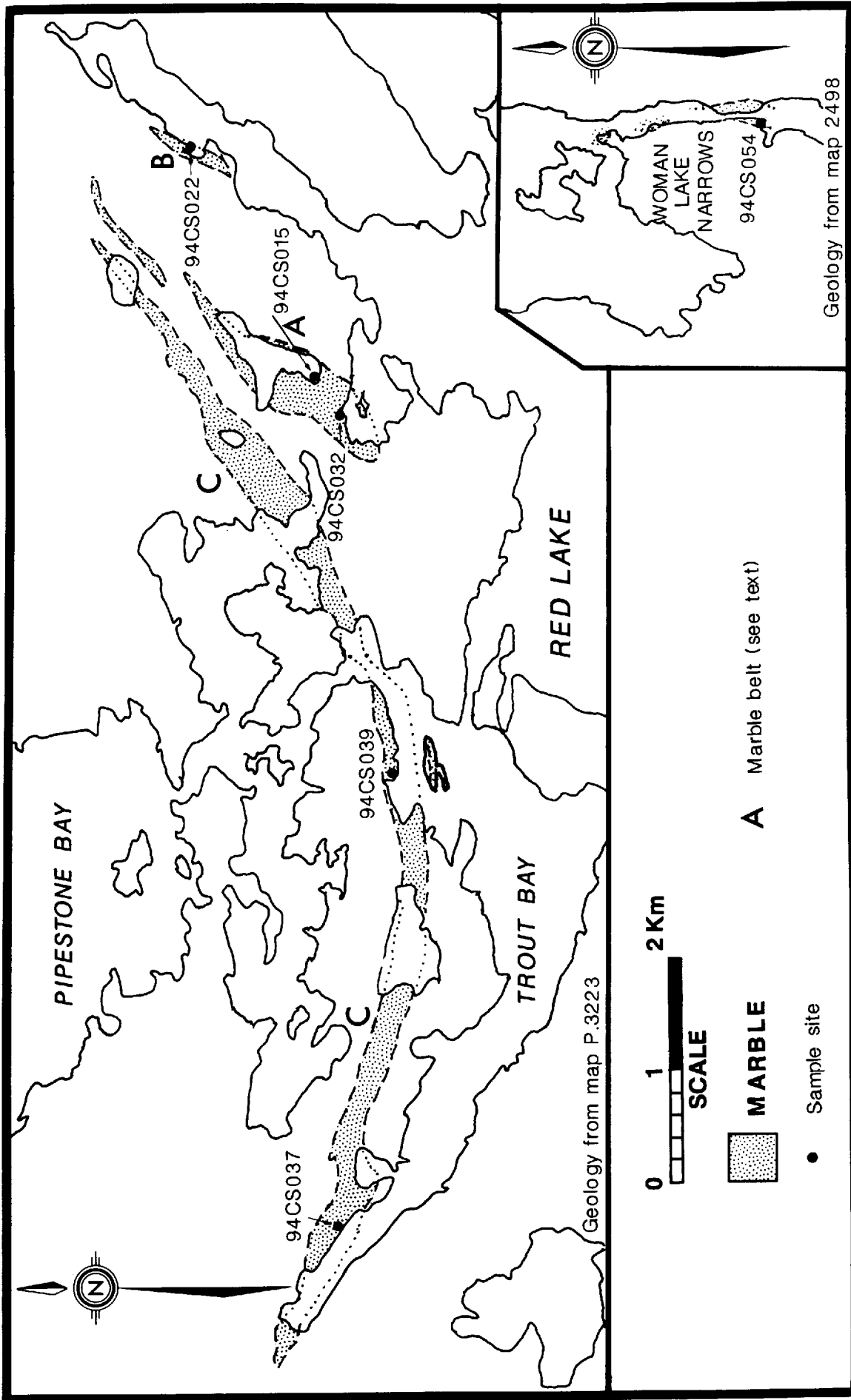


Figure 9. Carbonate rocks of the west end of Red Lake and Woman Lake Narrows.

iron formation are particularly common in belt 'A'. The intercalated siliceous units show layering on a 2 to 10 mm scale. Much of this layering is due to stromatolitic structures (Hoffman et al. 1985) that are still well preserved. The rocks are metamorphosed to green-schist facies. X-ray diffraction of several samples indicate that calcite is the dominant mineral in the rock quarried for lime production and in several marble outcrops on Hall Bay (Storey 1986). A small amount of talc was tentatively identified in one sample from Hall Bay (Storey 1986) and small radiating clusters of calc-silicate minerals are present in marble from the same area. Outcrops in all three belts have a rusty brown weathered surface.

The carbonate rocks exposed in belt 'A' are light grey to buff in colour, with abundant dark grey layers that contain fine-grained, disseminated magnetite. Patches of fine-grained, disseminated pyrite and pyrrhotite and discontinuous, thin (1 - 2 mm) pyrite layers are present in most of the marble examined. The rock for lime production was quarried from one of the more massive units. Many of the units are stromatolitic and contain several percent silica.

Belt 'B' has very limited exposure but does show a well preserved pseudofossil '*Atikokania*' (a depositional feature rather than a true stromatolite) on the shore of Golden Arm of Red Lake. The rocks are buff to light grey in colour. Analyses of the rock published by Goudge (1938), and a sample analyzed in this study are dolomitic. The rock is light grey in colour and contains fine-grained, disseminated pyrite.

Belt 'C' is the largest of the three and has the largest shoreline exposures. Both massive and thinly-bedded units are present. Stromatolitic structures are present in many of the thinly-bedded units. Massive marble units up to 4.5 m thick are exposed in several locations and are particularly well developed on the shore of Trout Bay near Galena Island. Individual beds are up to 10 cm thick. The marble is blue-grey in colour and contains minor, disseminated pyrite. Joint fractures in the massive marble units are well exposed near Galena Island. Here horizontal joints are spaced 0.15 to 1 m apart. Two sets of vertical joints are present: a set oriented 145/80°N; and a less prominent set oriented 060/50°S.

In addition to the sampling on Red Lake, one sample of marble from Woman Lake Narrows of Woman Lake in Dent Township was collected. Mapping by Pryslak (1970) and an unpublished thesis by McAuley (1973) shows the extent of the marble in Woman Lake Narrows. The marble here is also stromatolitic (Hoffman et al. 1985). The marble sampled is dark grey to black in colour and shows structures on a polished surface that may be broken stromatolites. Whole rock analysis (see Table 5) indicates that this marble is calcitic. An analysis of a more siliceous sample by McAuley (1973) also indicates the marble to be calcitic. The major element values are similar to the calcitic marble from the Hahn Lake quarry. Trace element analysis indicates low trace element values similar to those found by McAuley (1973) and similar to those found in the Red Lake marbles. McAuley (1973) identified wollastonite, tremolite and actinolite in thin section of siliceous material from the Woman Lake marble.

The marbles have great significance as stratigraphic markers and paleoenvironment indicators. Their economic importance is dependent on locating marble units that are suitable for building stone, are pure enough for use as lime or contain significant amounts of other industrial minerals (e.g. talc, wollastonite).

DIAMOND-DRILL CORE STORAGE PROGRAM

The remote diamond-drill core storage compound is located 6 km south of Red Lake on Highway 105. This compound is operated as a self-serve facility administered by the Red Lake Resident Geologist's office. Several mining company geologists examined drill core at the site during the summer of 1994. Also during 1994, Rio Algom Exploration Co. Ltd. delivered drill core from diamond drilling on their Fly Lake property in Bowerman Township. The drill core from diamond drilling by CANMET (Canada Centre for Mineral and Energy Technology) to evaluate rock conditions for the Township of Red Lake at the Howey and Hasaga mine sites in Red Lake is stored at the Red Lake Resident Geologist's office.

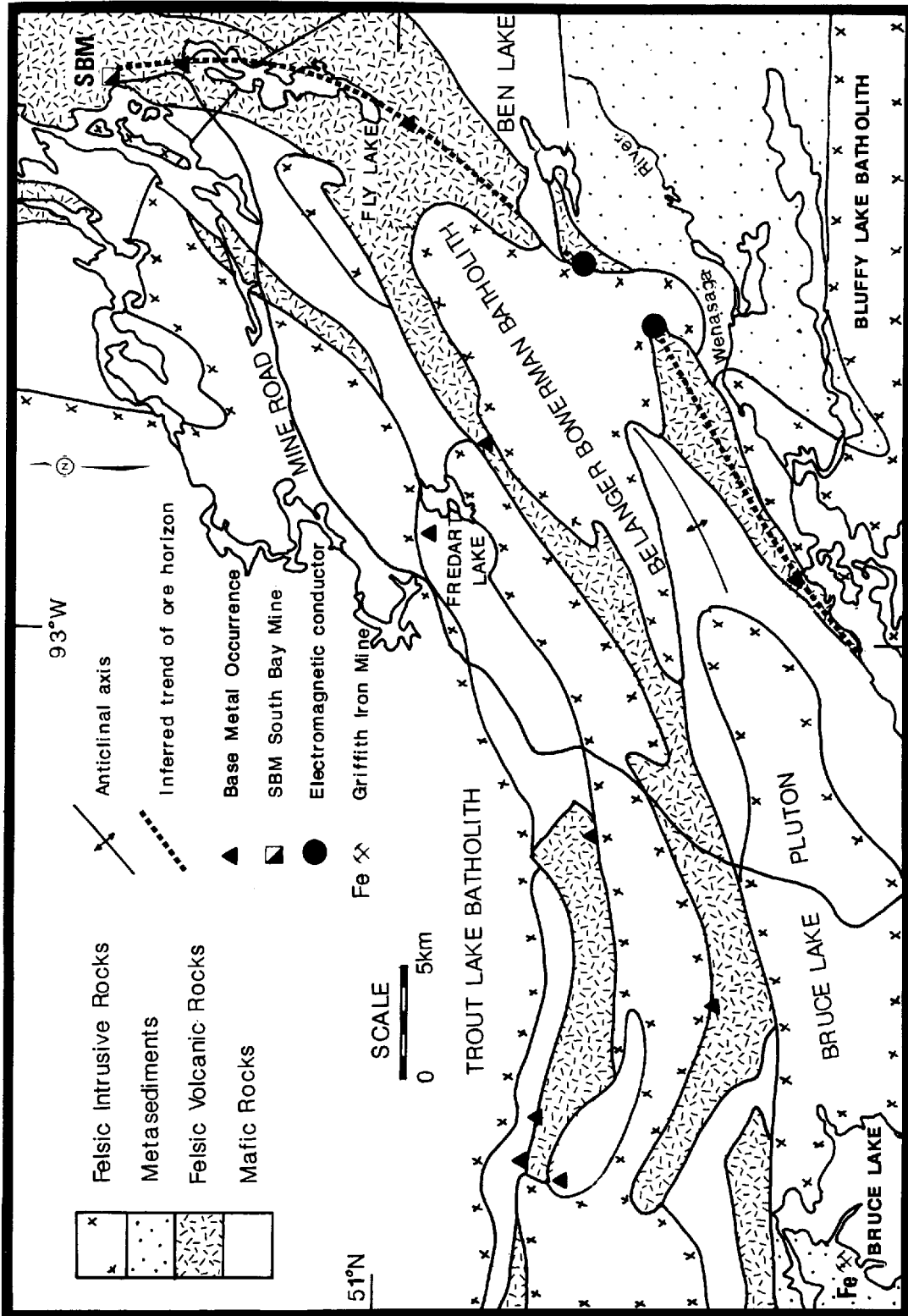


Figure 10. Geology and base metal occurrences of the Bruce Lake to South Bay Mine area.

Table 6. Summary of drill core stored at the Red Lake Resident Geologist's District Remote Drill Core Compound

Asarco Exploration Co. of Canada Ltd.	444.0 m
Canadian Industrial Minerals Corp.	2 029.2 m
*CANMET Howey and Hasaga Mine Hazards Drilling	711.7 m
Noramco Explorations Inc.	31 268.6 m
Noranda Exploration Company Ltd.	1 638.2 m
Pure Gold Resources Inc.	1 762.4 m
*Rio Algom Exploration Co. Ltd.	731.0 m
Teck Exploration Ltd.	7 255.5 m
United Reef Petroleum Limited	8 154.0 m
Western Pacific Energy Corp.	1 936.2 m
TOTAL	55 930.8 m

* acquired in 1994

The Kenora Drill core library houses an additional 14 592.9 m of diamond-drill core from the Red Lake district.

RECOMMENDATIONS FOR EXPLORATION

Gold

Except for intermittent diamond drilling by prospectors, the Heath prospect was last examined in detail in 1944-46. Since then, significant advances in bulk-extraction gold mining methods have been realized. Consequently, the Heath Prospect and the extensive felsic rocks of Todd and Ball Townships should be re-evaluated for their potential for large tonnage gold mineralization.

Base Metals

The ore bodies of the South Bay Mine are associated with a black graphitic argillite and chert horizon hosted by the felsic metavolcanic rocks of the Confederation assemblage. Exploration diamond drilling by various companies has delineated the argillite-chert horizon and accompanying base metal mineralization southward from the mine through Fly Lake. The felsic stratigraphy (Figure 10) is disrupted by the Belanger Bowerman Batholith before re-emerging in the area north of the Wenasaga River. Several strong isolated, electromagnetic conductors southwest of Ben Lake, identified in an airborne electromagnetic survey (OGS 1991), present favourable diamond drill targets for base metal mineralization. The felsic stratigraphy continues westward and eventually links with the Red Lake greenstone belt. Several base metal occurrences lie along the southern horizon of Confederation assemblage felsic rocks. Exploration efforts should target those occurrences with the intent of discovering volcanogenic massive sulphide mineralization akin to the South Bay Mine orebodies.

Table 7. Maps and reports pertaining to the Red Lake Resident Geologist's District issued by the Ontario Geological Survey, 1994

Open File Reports

OFR 5881	Geology of the Casummit Lake Area, District of Kenora (Patricia Portion); by G.P. Beakhouse, 70p. Accompanied by map P.3245.
OFR 5892	Report of Activities 1993, Resident Geologists; edited by C.L. Baker, B.O. Dressler, J.K. Mason and J.W. Newsome, 383p.
OFR 5904	Geology of the Dixie Lake Area, District of Kenora (Patricia Portion); by T.L. Muir, 53p. Accompanied by maps P.3299, P.3300 and P.3301.

Table 7. Continued

Miscellaneous Papers

- MP 163 Summary of Field Work and Other Activities, 1994; edited by C.L. Baker, B.O. Dressler, H.A.F. de Souza, J.A. Fyon, C.A. Kaszycki, D.G. Laderoute, G. Merlino, J.W. Newsome, L. Owsiacki, J.M. Richardson, P.C. Thurston and N. Wood. 276p.

Preliminary Maps

- Map P.3245 Precambrian geology, Casummit Lake Area, District of Kenora (Patricia Portion); by G.P. Beakhouse, M.C. Mainville and M.E. Wilson, scale 1:15 840.
- Map P.3276 Precambrian geology, Apps Lake Area; by D. Stone and J. Crawford, scale 1:50 000.
- Map P.3277 Precambrian geology, Bigshell Lake Area; by D. Stone and J. Crawford, scale 1:50 000.
- Map P.3278 Precambrian geology, Henfrey Lake Area; by D. Stone and J. Crawford, scale 1:50 000.
- Map P.3279 Precambrian geology, Hewitt Lake Area; by D. Stone, J. Crawford and M. Lange, scale 1:50 000.
- Map P.3280 Precambrian geology, Little Trout Lake Area; by D. Stone and J. Crawford, scale 1:50 000.
- Map P.3281 Precambrian geology, Madden Lake Area; by D. Stone and J. Crawford, scale 1:50 000.
- Map P.3282 Precambrian geology, Mamakwash Lake Area; by D. Stone and J. Crawford, scale 1:50 000.
- Map P.3283 Precambrian geology, Margot Lake Area; by D. Stone, J. Crawford and M. Lange, scale 1:50 000.
- Map P.3284 Precambrian geology, Murdock Lake Area; by D. Stone and J. Crawford, scale 1:50 000.
- Map P.3285 Precambrian geology, Namiwan Lake Area; by D. Stone and J. Crawford, scale 1:50 000.
- Map P.3286 Precambrian geology, Nechigona Lake Area; by D. Stone and J. Crawford, scale 1:50 000.
- Map P.3287 Precambrian geology, Old Shoes Lake Area; by D. Stone and J. Crawford, scale 1:50 000.
- Map P.3288 Precambrian geology, Ollen Lake Area; by D. Stone, J. Crawford and M. Lange, scale 1:50 000.
- Map P.3289 Precambrian geology, One Pine Lake Area; by D. Stone and J. Crawford, scale 1:50 000.
- Map P.3290 Precambrian geology, Pikangikum Lake Area; by D. Stone and J. Crawford, scale 1:50 000.
- Map P.3291 Precambrian geology, Pringle Lake Area; by D. Stone and J. Crawford, scale 1:50 000.
- Map P.3292 Precambrian geology, Roderick Lake Area; by D. Stone and J. Crawford, scale 1:50 000.
- Map P.3293 Precambrian geology, Sabourin Lake Area; by D. Stone and J. Crawford, scale 1:50 000.
- Map P.3294 Precambrian geology, Sampson Lake Area; by D. Stone, J. Crawford and M. Lange, scale 1:50 000.
- Map P.3295 Precambrian geology, Shabumeni Lake Area; by D. Stone and J. Crawford, scale 1:50 000.
- Map P.3296 Precambrian geology, Spoonbill Lake Area; by D. Stone and J. Crawford, scale 1:50 000.
- Map P.3297 Precambrian geology, Stout Lake Area; by D. Stone and J. Crawford, scale 1:50 000.
- Map P.3299 Precambrian geology, Dixie Lake Area (West), District of Kenora (Patricia Portion); by T.L. Muir, scale 1:20 000.
- Map P.3300 Precambrian geology, Dixie Lake Area (Central), District of Kenora (Patricia Portion); by T.L. Muir, scale 1:20 000.
- Map P.3301 Precambrian geology, Dixie Lake Area (East), District of Kenora (Patricia Portion); by T.L. Muir, scale 1:20 000.

Table 7. Continued

Geological Data Inventory Folios

GDIF 599	Brownstone Lake Area, Red Lake Mining Division, NTS Reference: 52 N/09; by Staff of the Red Lake Resident Geologist District, 28p. Accompanied by 2 maps.
GDIF 600	Little Shabumeni Lake Area, Red Lake Mining Division, NTS Reference: 52 N/07; by Staff of the Red Lake Resident Geologist District, 240p. Accompanied by 2 maps.
GDIF 601	Casummit Lake Area, Red Lake Mining Division, NTS Reference: 52 N/08; by Staff of the Red Lake Resident Geologist District, 96p. Accompanied by 3 maps.
GDIF 602	Keigat Lake Area, Red Lake Mining Division, NTS Reference: 52 N/08; by Staff of the Red Lake Resident Geologist District, 34p. Accompanied by 2 maps.
GDIF 603	Shabu Lake Area, Red Lake Mining Division, NTS Reference: 52 N/07; by Staff of the Red Lake Resident Geologist District, 41p. Accompanied by 2 maps.
GDIF 604	Shabumeni Lake Area, Red Lake Mining Division, NTS Reference: 52 N/07; by Staff of the Red Lake Resident Geologist District, 72p. Accompanied by 3 maps.
GDIF 605	Satterly Lake Area, Red Lake Mining Division, NTS Reference: 52 N/08; by Staff of the Red Lake Resident Geologist District, 65p. Accompanied by 4 maps. Geological Data Inventory Folios (Cont.)
GDIF 606	Seagrave Lake Area, Red Lake Mining Division, NTS Reference: 52 N/08; by Staff of the Red Lake Resident Geologist District, 26p. Accompanied by 2 maps.
GDIF 607	Narrow Lake Area, Red Lake Mining Division, NTS Reference: 52 N/02; by Staff of the Red Lake Resident Geologist District, 63p. Accompanied by 3 maps.
GDIF 608	Okanse Lake Area, Red Lake Mining Division, NTS Reference: 52 N/02; by Staff of the Red Lake Resident Geologist District, 71p. Accompanied by 4 maps.
GDIF 609	Little Bear Lake and Knott Township Area, Red Lake Mining Division, NTS Reference: 52 N/02; by Staff of the Red Lake Resident Geologist District, 60p. Accompanied by 3 maps.
GDIF 610	Uchi Lake and Earngey Township Area, Red Lake Mining Division, NTS Reference: 52 N/02; by Staff of the Red Lake Resident Geologist District, 118p. Accompanied by 4 maps.

RESEARCH BY OTHER AGENCIES

T. Aston, (CANMET) Canada Centre for Mineral and Energy Technology, Natural Resources Canada did geomechanical investigations of crown pillars on the Howey and Hasaga mines, Heyson Township.

R. Penzack, Queen's University, Ontario, continued examining patterns of hydrothermal alteration associated with pre-ore fault structures at the Campbell Mine, Balmer Township.

R. Stevenson, University of Quebec, P.Q., sampled lithologies in the Red Lake district for Sm/Nd studies.

C. Tarnocai continued a mineralogical study of alteration in the Campbell Mine, Balmer Township as a Ph.D. research topic at the University of Ottawa.

E. Van Huyssteen, Energy, Mines and Resources, did preliminary mineralogical studies on past-producing mine tailings in the district.

G. Zhang, University of Toronto, Ontario, did post-doctoral structural studies on the Campbell Mine, Balmer Township.

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RED LAKE DISTRICT-1994

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Storey, C.C. 1986. Building and ornamental stone inventory in the District of Kenora and Rainy River; Ontario Geological Survey, Mineral Deposit Circular 27, 105p

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SCHREIBER-HEMLO RESIDENT GEOLOGIST'S DISTRICT - 1994

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INTRODUCTION

The Schreiber-Hemlo District covers an area from the Nipigon River east to White River, and from the United States-Canada border north to Upper Roslyn Lake and Kagiano Lake. The district includes the communities of Rosspport, Schreiber, Terrace Bay, Marathon, Heron Bay, Manitouwadge, as well as the Pic Heron, Pic Mobert, Pays Plat and Lake Helen First Nations. The communities of Nipigon and White River are immediately adjacent to the district boundaries.

MINING ACTIVITY

There are five producing mines in the Schreiber-Hemlo District. The three gold mines at Hemlo are: the Golden Giant Mine (Hemlo Gold Mines Inc.), the Williams Mine and the David Bell Mine (both Teck Corporation/ Homestake Canada Inc.). The Geco Division (Noranda Mining and Exploration Inc.) and Winston Lake Division (Metall Mining Corporation) mines are zinc-copper-silver producers.

Geco Division (Noranda Mining and Exploration Inc.)

Production from the Geco Division mine, Manitouwadge, from January 1, 1994 to December 1, 1994 involved milling of 880 483 tons (short) at 2.15% Cu, 3.17% Zn and 1.51 ounces Ag per ton (H. Lockwood, Geco Division, personal communication, 1995).

The mineral inventory as of January 1, 1995 is estimated to be 1 054 100 tons (short) at 2.0% Cu, 2.6% Zn and 1.3 ounces Ag per ton (H. Lockwood, Geco Division, personal communication, 1995). The Geco Division mine is forecast to suspend mining operations at the end of November 1995, after almost four decades of continuous production. Estimated production for 1995 is 895 000 tons (short).

Winston Lake Division (Metall Mining Corporation)

Production from the Winston Lake Division mine from January 1, 1994 to December 31, 1994, involved milling 358 346 t at a head grade of 1.04% Cu, 14.65% Zn, 29.675 g/t Ag and 1.647 g/t Au (G. Doiron, Winston Lake Division, personal communication, 1995).

Reserve estimates as of January 1, 1995, which include all categories of ore with a 20% dilution at 0% grade, are estimated to be 733 306 t at a grade of 0.89% Cu, 12.05% Zn, 26.82 g/t Ag and 1.17 g/t Au (G. Doiron, Winston Lake Division, personal communication, 1995).

David Bell Mine (Teck-Corona Operating Corporation)

Production from the David Bell Mine [Teck Corporation (50%) / Homestake Canada Inc. (50%)] from January 1, 1994, to December 31, 1994 consisted of 192 217 recovered ounces of gold (204 251 feed ounces) from 464 590 t milled, at a

feed grade of 0.44 ounce Au per tonne (P. Desautels, David Bell Mine, personal communication, 1995).

Mineable and diluted ore reserve estimates as of December 31, 1994 were 4 956 219 t at 0.349 ounce Au per tonne, representing 1 731 131 ounces of gold (P. Desautels, David Bell Mine, personal communication, 1995).

Golden Giant Mine (Hemlo Gold Mines Inc.)

Production from the Golden Giant Mine from January 1, 1994 to December 31, 1994 was 446 850 bullion ounces Au from 1 107 348 t milled at a grade of 13.079 g/t Au (R. Kusins, Golden Giant Mine, personal communication, 1995).

Total ore reserves as of December 31, 1994 were 10 582 000 t at a grade of 11.1 g/t Au (R. Kusins, Golden Giant Mine, personal communication, 1995). This figure includes tonnages from the Golden Giant Deposit No. 1 of 9 504 463 t at a grade of 11.38 g/t Au and 1 077 176 t at a grade of 8.74 g/t Au from the Quarter Claim.

Williams Mine (Williams Operating Corporation)

Production from the Williams Mine [Teck Corporation (50%) / Homestake Canada Inc. (50%)] from January 1, 1994 to December 31, 1994 was 445 320 ounces Au from 2 302 571 t milled at a grade of 0.203 ounce Au per tonne (J. Gray, Williams Mine, personal communication, 1995).

Total proven and probable diluted ore reserves for the Williams Mine as of December 31, 1994 are estimated at 30 890 000 t at a grade of 0.184 ounce Au per tonne, representing 5 669 000 ounces Au (J. Gray, Williams Mine, personal communication, 1995).

ADVANCED EXPLORATION ACTIVITY AND DEVELOPMENT

Pick Lake Deposit (Metall Mining Corporation)

Metall Mining Corporation began drifting from the 615 m level of their Winston Lake Division mine in August 1993 in order to assess the Pick Lake Upper Zone Deposit. As of December 31, 1994, 2146 m of lateral drifting had been completed, with 1741 m of lateral drifting being done in 1994. At present 462 m remain to be completed in the program.

Metall Mining Corporation is currently conducting underground diamond drilling from the 615 m Pick Level drift in order to refine presently outlined potential reserves of 1 147 442 t (20% dilution at 0% grade included) at 1.24% Cu, 20.05% Zn, 56.11 g/t Ag and 0.33 g/t Au. The drill results will be used to determine whether the Pick Lake Lower Zone is economically feasible to mine (G. Doiron, Winston Lake Division, personal communication, 1995).

EXPLORATION ACTIVITY

Exploration activity increased in 1994, with 63 active exploration programs in the Schreiber-Hemlo District (see Figure 4). Although major mining companies and individual prospectors still accounted for the majority of the programs, several properties were optioned to junior mining companies. There appears to be a guarded, optimistic outlook for 1995 that the exploration industry is on the upswing. The Ontario Prospectors Assistance Program (OPAP) funded 13 individuals for prospecting programs in the district while the Ontario Mineral Incentive Program (OMIP) provided one grant of \$100 000 to Gregor Goldfields Corp.

TABLE 1. EXPLORATION PROGRAMS IN THE SCHREIBER-HEMLO DISTRICT 1994

ABBREVIATIONS			
AEM	Airborne Electromagnetic Survey	HLEM	Horizontal Loop Electromagnetic Survey
AM	Airborne Magnetic Survey	IP	Induced Polarization Survey
ARA	Airborne Radiometric Survey	RES	Resistivity Survey
DDH	Diamond Drill Hole(s)	SP	Self Potential Survey
GEM	Ground Electromagnetic Survey	Str	Stripping
GC	Geochemical Survey	Tr	Trenching
GL	Geological Survey	UG	Underground Development
GM	Ground Magnetic Survey	VLEM	Vertical Loop Electromagnetic Survey
GRA	Ground Radiometric Survey	VLF-EM	Very Low Frequency Electromagnetic Survey

Company / Individual (Property Name)	Township / Area (Commodity)	Exploration Activity
1. Beaven, E.* (Page Lake property)	Lorna Lake, O'Neil Tp. (Au, Cu, Zn)	Prospecting, sampling
2. Brinklow, L. (Lampson Road property)	Black River (Cu, Zn)	Prospecting, Tr, sampling
3. Brinklow, W. (Trout Pond/Triangle property)	Kagiano River (Cu, Zn)	Prospecting, sampling
4. Carroll, T., MacDougall, D. (White Lake property)	White Lake (South) (Au)	Prospecting, Str, Tr, sampling
5. Christianson, D.* (North Shores property)	Priske Tp. (Au)	Prospecting, sampling
6. Courtney, J., Daniels, G. (Worthington Bay property)	Priske Tp. (Au)	Prospecting, sampling, Tr, Str
7. Daniels, G. (Gale property)	Priske Tp. (Au)	Prospecting, Tr, sampling, Str
8. Doiron, D. (Kabamichigama Lake property)	Kabamichigama Lake (amy)	Str, Tr
9. Falconbridge Limited (Nipigon Bay property)	Miller Lake, Vert Island (Cu, Ni, PGE)	AEM, AM, open house
10. Ferguson, J. & A. (Shack Lake property)	Pic Tp. (feldspar)	Str, Tr, sampling, marketing
11. Fournier, E. (Wabasta Lake property)	Yesno Tp. (Cu, Pb, Zn)	Prospecting, sampling, Tr
12. Fowler, B., Shuman, M. (Steel River property)	Tuuri Tp. (Au, Cu, Zn)	Prospecting, sampling
13. Fowler, B., Shuman, M., Reukl, R.* (Gus Lake Property)	Mussy Lake (Au)	Prospecting, sampling
14. Gionet, G.* (Faries Lake property)	Cecil Tp. (Cu, Zn)	Prospecting, VLF-EM, sampling, Str, Tr
15. Gliddon, D.*, Middaugh, R.* (Santoy Lake property)	Syine Tp. (Au, Cu, Zn)	Prospecting, sampling
16. Gregor Goldfields Corp.** (Wire Lake property)	Lorna Lake (Au)	DDH, GL, Str

17. Hamel, J.R.* (Beaver Creek property)	Syine Tp. (Au)	Prospecting, DDH
18. Hemlo Gold Mines Inc. (Fowler / Armand Lake property)	Wabikoba Lake, White Lake (North) (Au)	Linecutting, Str, GL, sampling, GC
19. Hemlo Gold Mines Inc. (Golden Sceptre property)	Bomby Tp. (Au)	DDH
20. Hemlo Gold Mines Inc. (Golden Giant Mine)	Bomby Tp. (Au)	DDH
21. Hemlo Gold Mines Inc. (Gowan property)	Lorna Lake (Au)	GC, GL, HLEM, GM
22. Hemlo Gold Mines Inc. (Hemlo West / Northern Eagle property)	Pic, Lecours tps. (Au)	DDH, Str, IP, GM, linecutting, GC, Tr
23. Hemlo Gold Mines Inc. (Joa Option)	Rous Lake area, Cotte Tp. (Au)	Linecutting, IP, GL, GM, GC
24. Hemlo Gold Mines Inc. (North Limb property)	Wabikoba Lake, White Lake (North) (Au)	Linecutting, Str, GL, sampling, GC
25. Hemlo Gold Mines Inc. (Petraunt Lake property)	Wabikoba Lake, White Lake (North) (Au)	Linecutting, Str, GL, sampling, GC
26. Hemlo Gold Mines Inc. (Pic project)	Pic Tp. (Au)	Prospecting, reconnaissance GL, sampling
27. Hemlo Gold Mines Inc. (Smoke Lake property)	Seeley Lake, Lorna Lake (Au)	Linecutting, GC, GL
28. Hemlo Gold Mines Inc. (Valley project)	Wabikoba Lake (Au)	Reconnaissance GL, linecutting, IP, GM, GC
29. Homestake Canada Inc. (Enterprise property)	Wabikoba Lake (Au)	Tr, Str, GC
30. Homestake Canada Inc. (Hemlo West property)	Bomby, Lecours tps. (Au)	Re-sampling, re-assaying
31. Komarechka, R (Killala Lake Complex)	Islington Lake, Killala Lake (Ind. Min.)	Reconnaissance, sampling
32. Metall Mining Corporation (Cleaver Lake property)	Pays Plat Lake (Cu, Zn)	DDH
33. Metall Mining Corporation (Ciglen property)	Pays Plat Lake (Cu, Zn)	DDH
34. Metall Mining Corporation (Gestic property)	Pays Plat Lake (Cu, Zn)	DDH
35. Metall Mining Corporation (Pick Lake deposit)	Pays Plat Lake (Cu, Zn)	UG, DDH
36. Metall Mining Corporation (Winston Lake Mine)	Pays Plat Lake (Cu, Zn)	UG, DDH
37. Metall Mining Corporation (Zenith property)	Pays Plat Lake (Cu, Zn)	DDH
38. Michano, D.* (Spider Lake property)	Tuuri Tp. (Au, Cu, Zn)	Prospecting, sampling
39. Mikkonen, R. (Johnston-McKenna property)	Priske Tp. (Au)	Prospecting, sampling
40. Nabigon, P.* (Eastern Townships recon)	Shabotik, Johns, Common, Hambleton tps. (Au, Cu, Zn)	Prospecting, sampling

41. Noranda Mining and Exploration Inc. (Faries/Gionet property)	Cecil Tp. (Cu,Zn)	Prospecting
42. Noranda Mining and Exploration Inc. (Geco Mine)	Gemmell Tp. (Cu, Zn)	DDH, down hole EM
43. Noranda Mining and Exploration Inc. (Lampson Road property)	Black River (Cu, Zn)	DDH
44. Noranda Mining and Exploration Inc. (Hucamp property)	Gemmell Tp. (Cu, Zn)	DDH, linecutting
45. Noranda Mining and Exploration Inc. (Straight Lake property)	Nickle, Herbert tps. (Cu, Zn)	Linecutting, GM, deep EM
46. Noranda Mining and Exploration Inc. (Jim Lake property)	Loken Lake (Cu, Zn)	Prospecting, linecutting, Str, GC, GM, HLEM, deep EM
47. Noranda Mining and Exploration Inc. (East One Otter Lake property)	Herbert Tp. (Cu, Zn)	Prospecting, linecutting, HLEM
48. Noranda Mining and Exploration Inc. (Fishnet Lake property)	Syine Tp., Santoy Lake (Cu, Zn)	Linecutting, GM, HLEM, GC, prospecting
49. Noranda Mining and Exploration Inc. (Rhumly Lake property)	Lower Aguasabon Lake (Cu, Zn)	Linecutting, GM, GC, prospecting
50. Oracle Minerals Inc. (Carroll property)	White Lake (North) (Au)	GL, linecutting, sampling
51. Pitkanen, R.* (Kabamichigama Lake property)	Kabamichigama Lake (Au)	Prospecting, Str, sampling
52. Placer Dome Canada Ltd. (White River property)	Brothers, Laberge tps. (Au)	GL, linecutting, GC, prospecting
53. Secobel Exploration Inc. (Shack Lake property)	McCoy, O'Neill, Pic tps. (stone)	Prospecting, DDH
54. Shuman, M., Daniels, G., Fowler, B., Kakeeway, D. (Spruce Bay property)	White Lake (North) (Cu, Zn)	Linecutting, VLF-EM, GM, HLEM
55. Stenlund, V. (Heron Bay Gold Mine)	Pic Tp. (Au)	Bulk sampling
56. Teck-Corona Operating Corporation (David Bell Mine)	Bomby Tp. (Au)	DDH, UG
57. Thibault, D.*, Miron, B. (Barbara Lake property)	Barbara Lake (Cu, Au)	Prospecting, Str, Tr, sampling
58. Turner, A. (Pinegrove property)	Black River (Au, Cu, Zn)	Prospecting, DDH
59. Turner, A. (Swill Lake property)	Leslie Tp. (Cu, Zn)	Prospecting
60. Vos, C. (Quoits Lake property)	Kabamichigama Lake (amethyst)	Prospecting
61. Wahl, R., Kakeeway, D. (Amwri Lake property)	Wabikoba Lake (Au)	Prospecting, sampling
62. Wahl, R., Kakeeway, D., Beaven, E. (Schreiber property)	Priske Tp. (Au)	Prospecting, Str, sampling
63. Williams Operating Corporation (Williams Mine)	Bomby Tp. (Au)	UG, DDH

Key: *successful applicant, 1994, Ontario Prospectors Assistance Program (OPAP)
**successful applicant, 1994, Ontario Mineral Incentive Program (OMIP)

As shown in Figures 1 and 2, exploration for gold accounted for the majority of programs (~51%) while copper-zinc-silver exploration was second (~37%). Industrial mineral and copper-nickel-platinum-group element exploration accounted for the remainder of the activity.

Gold Exploration

Gold exploration activity in the Schreiber-Hemlo District was led by the three Hemlo mines, who actively explored the Hemlo deposit. Exploration staff at the Williams Mine conducted a total of 12 820 m of diamond drilling, including 9440 m on the B (Main) Zone and 3380 m on the C Zone (J. Gray, Williams Mine, personal communication, 1995). Exploration at the Golden Giant Mine involved deep diamond drilling on the main zone of the Golden Giant orebody, as well as surface diamond drilling on the Golden Sceptre (South) zone. Further drilling is planned for 1995. Diamond drilling was carried out from the 5th level of the David Bell Mine. Diamond drilling on the 7th level is planned for 1995 (P. Desautels, David Bell Mine, personal communication, 1995).

The North Limb of the Hemlo belt experienced considerable staking and exploration activity in 1994. Prospectors B. Fowler, M. Shuman and R. Reukl continued to stake and option claims in the North Limb area to several junior companies. Exploration programs are planned for 1995. Hemlo Gold Mines Inc. was the most active company in the area with 13 exploration programs including those in the Hemlo West and North Limb areas. A new gold occurrence in the White Lake area was discovered in the late fall of 1993 by prospectors D. Carroll and D. MacDougall (*see* Property Examinations section, this report). Placer Dome Canada Ltd. continued exploration on their White River Prospect in which they are in joint venture with Lac Minerals Ltd.. Homestake Canada Inc. also explored on their Hemlo West and Enterprise properties.

Gold exploration in the Pic River-Page Lake area included work by Gregor Goldfields Corp. who reported several gold-mineralized zones, including the South Lake, Lucky Seven, Candlestick and North Hill zones, which occur along a 2.5 km section of the Wire Lake shear zone (Prospectus, Gregor Goldfields Corp., 1994). Diamond drill assays of 0.03 ounce Au per ton across 167 ft. (50.6 m) and 0.15 ounce Au per ton across 6 feet (1.8 m) have been reported from the 241 claim property (Marathon Mercury, p.1, May 31, 1994). Reconnaissance exploration programs were carried out by Hemlo Gold Mines Inc. and prospectors such as E. Beaven.

The Schreiber-Terrace Bay area saw limited gold exploration in 1994. Several prospectors were active, including R. Hamel in the Beaver Creek area near Jackfish Lake. In the Schreiber-Worthington Bay area, D. Christianson, J. Courtney and G. Daniels conducted reconnaissance prospecting and sampling. R. Wahl, E. Beaven and D. Kakeway carried out prospecting, soil and rock sampling in the Schreiber area.

Base Metal Exploration

Exploration for base metals in the Schreiber-Hemlo District included several programs by the producing mines, namely Geco Division (Noranda Mining and Exploration Inc.) and the Winston Lake Division (Metall Mining Corporation). Geco Division drilled a 7405-foot (2244 m) diamond drill hole on the mine property to test the continuity of Mine Series rocks of the Manitouwadge synform. The target was a down-plunge, mineralized zone and alteration package capable of hosting a Geco-sized (>25 Mt) deposit. Garnet-biotite-cordierite-anthophyllite-altered rocks were intersected, but economic mineralization was absent. A down-hole electromagnetic survey failed to pick up off-hole conductors. Diamond drilling by Noranda Mining and Exploration Inc. is ongoing on the Hucamp property. A 2000 m drill hole will test for down-plunge, altered and mineralized zones. Target intersection is anticipated in March, 1995.

Surface exploration by Noranda Exploration and Mining Inc. in 1994 led to the discovery of several showings, including the Jim Lake occurrence (*see* Property Examinations section, this report) as well as the discovery of garnet- and orthoamphibole-bearing, altered rocks in the Straight Lake area.

Geco Division drilled the Lampson Road property (*see* Property Examinations section, this report). Cherty exhalative rocks and iron formation were intersected. Minor, non-economic base metal values were encountered. Noranda Exploration and Mining Inc. also conducted base metals exploration in the Fishnet-Rhumly lakes area. Follow-up work is planned for 1995.

Metall Mining Corporation conducted diamond drilling on surface targets within a 2 km radius of the Winston Lake mill, with the purpose of discovering additional ore. A total of 39 holes, totalling 4642 m, tested six targets including the Winston Lake deposit and the Ciglen, Zenmac, and Gestic occurrences.

Several prospectors were active in 1994. G. Gionet used the Beep Mat geophysical instrument to discover a new copper occurrence in Cecil Township. Initial assays of up to 2% Cu have been returned from grab samples. The Beep Mat also helped enhance the Jim Lake zinc-copper discovery made by Noranda.

Falconbridge Limited has applied for an Exploration Licence of Occupation (ELO) for the Nipigon Bay area. Falconbridge conducted airborne electromagnetic and magnetic surveys, and held an open house in Nipigon in June, 1994. Falconbridge Limited has been issued a work permit and intends to diamond-drill in 1995 for a Noril'sk type Ni-Cu deposit (see Recommendations For Exploration section, this report).

Industrial Mineral Exploration

Industrial minerals activity consisted of several programs involved in various semi-precious minerals, including spectrolite (feldspar) and amethyst. Jon and Audrey Ferguson explored and operated the Shack Lake spectrolite property near Marathon. A "Pick-Your-Own" operation, tours, sampling and marketing opportunities were available in 1994. R. Komarechka investigated the dimension stone potential of the Killala Lake alkalic complex. Several prospectors explored for amethyst in the Nipigon - Kabamichigama Lake area.

Exploration Activity by Commodity

Schreiber-Hemlo District, 1987-1994

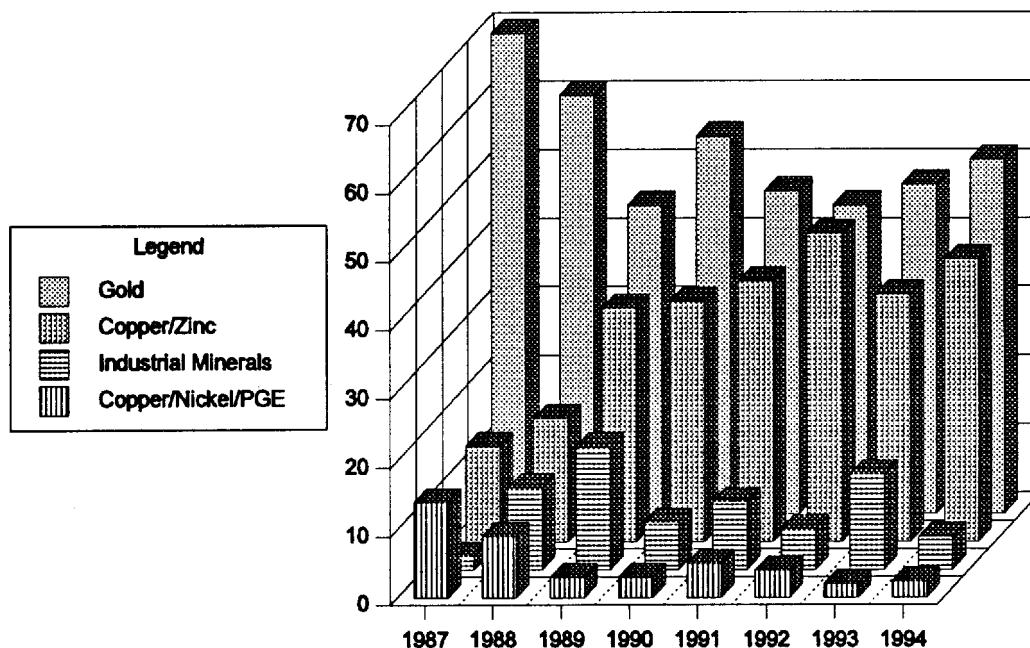


Figure 1. Exploration activity (%) by commodity, Schreiber-Hemlo District, 1987-1994

Schreiber-Hemlo District, 1994

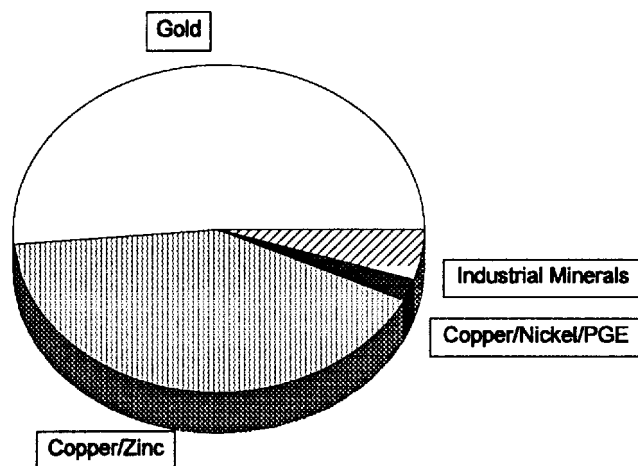


Figure 2. Exploration activity (%) by commodity, Schreiber-Hemlo District, 1994

RESIDENT GEOLOGIST STAFF AND ACTIVITIES

During 1994, the Schreiber-Hemlo program dealt with over 1700 inquiries from the mining sector, other government agencies and the general public. This figure includes 618 visitors and 904 inquiries in the Thunder Bay office and 107 visitors and 90 inquiries in the Marathon field office. The Resident's program operated from the Mines and Minerals Division office in Thunder Bay. The field office was maintained at the office of the Northern Development Officer (NDO), Ministry of Northern Development and Mines, in Marathon from May through October, 1994. This office was manned on Tuesday afternoons from 1:00 to 5:00 P.M. Maintenance of the remote drill core storage site in Marathon involved the recovery and reboxing of over 3000 m of donated core in 1994. Service was also provided to clients in the Thunder Bay Drill Core Library.

Staff of the Schreiber-Hemlo program conducted over 60 property visits to 44 sites in 1994 (Table 2, Figure 3). Twelve field trips were delivered or attended. Prospector information sessions were presented in Manitouwadge, Marathon and Thunder Bay. A Basic Prospecting course was given in Terrace Bay. Nine poster displays were assembled and manned at Mines and Minerals symposia in Thunder Bay and Toronto, and at various open houses and conferences. Three technical presentations were delivered and five presentations were given to school groups. Support and field assistance were given to Geological Survey of Canada geoscientists and university groups. A technical presentation for the Hemlo-MITEC Workshop was presented in December, 1994.

Work continued on an Open File Report which will summarize approximately 200 property visits and mineral

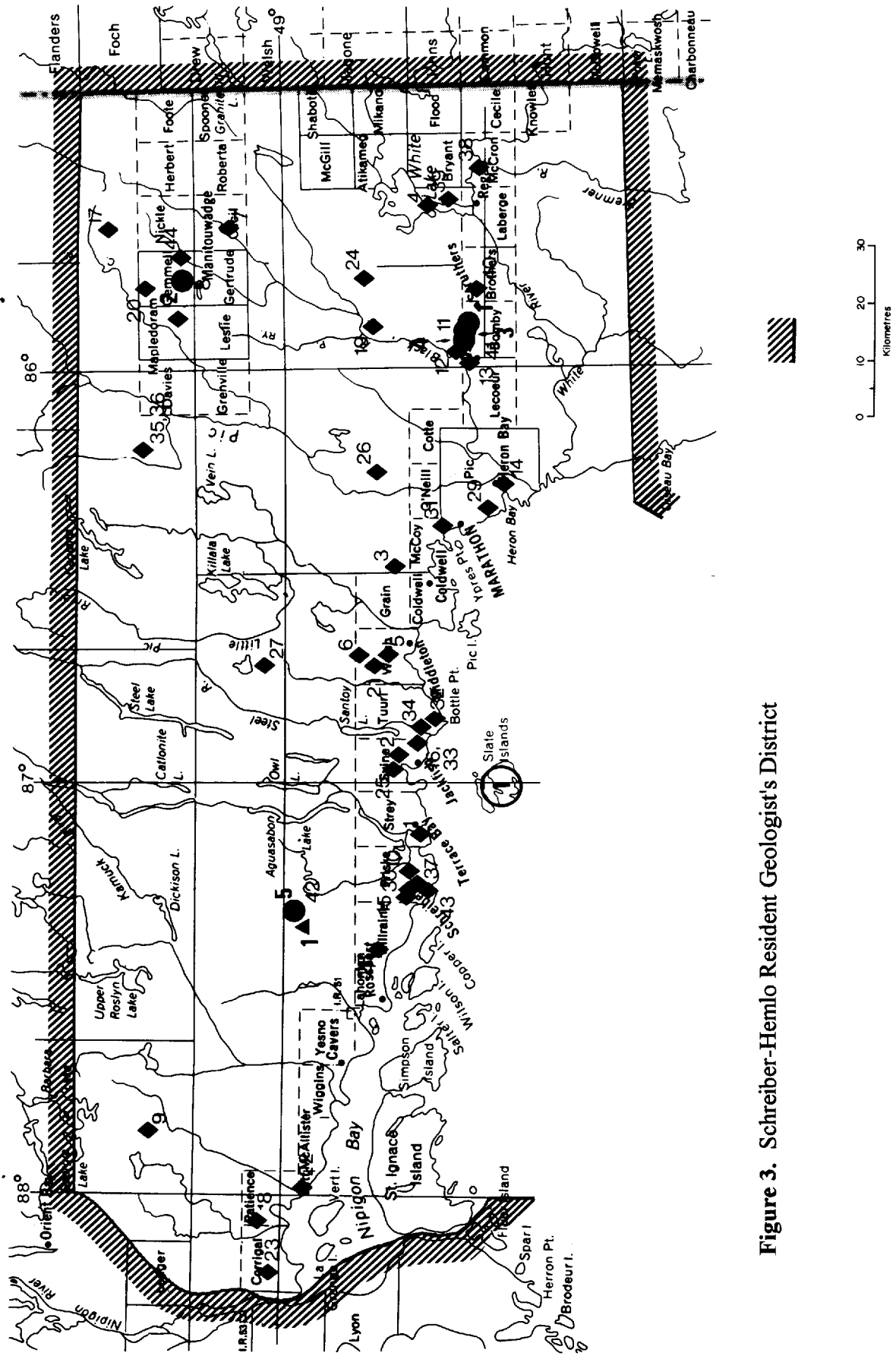


Figure 3. Schreiber-Hemlo Resident Geologist's District

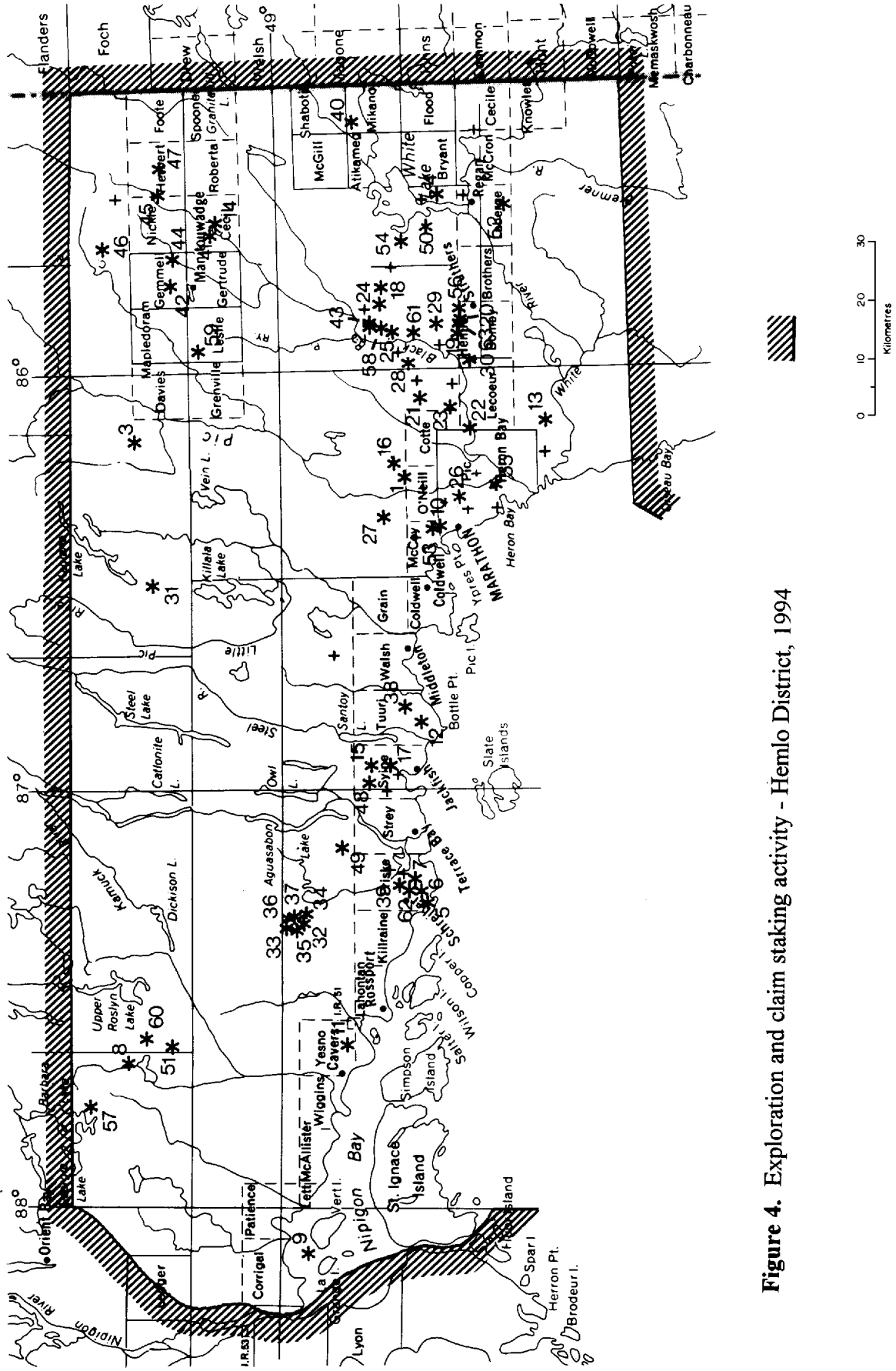


Figure 4. Exploration and claim staking activity - Hemlo District, 1994

occurrences in the Nipigon-Marathon area for completion in April, 1995. D. McKay is digitizing and drafting AutoCAD maps for this report.

M.C. Smyk became Chairman of the Institute on Lake Superior Geology (ILSG) and began organizing the 41st ILSG, which will be held in Marathon in May, 1995. A field guide for the Schreiber greenstone assemblage was begun by M.C. Smyk in 1994 for use at the ILSG (Smyk and Schnieders, in preparation). M.C. Smyk also became part of the organizing committee for the International Geological Correlation Program (IGCP) conference, which will be held in Duluth, Minnesota, in August, 1995. A field trip highlighting intrusive rocks of the Midcontinent rift, including those of the Trans-Superior Tectonic Zone, is being organized. B.R. Schnieders was nominated and serves on the executive of the Thunder Bay Branch of the CIM (Canadian Institute of Mining, Metallurgy and Petroleum). B.R. Schnieders will also be a field trip leader for the 1995 ILSG.

Table 2. Property Examinations 1994 (keyed to Figure 3)

1. Aguasabon Gorge	16. Jackfish Pillows ¹	31. Shack Lake Spectrolite ¹
2. Coach House Xenoliths	17. Jim Lake Occurrence ³	32. Simard-Swetz Occurrence
3. Coldwell Complex ¹	18. Kama Bay Area	33. Steel River Komatiites ¹
4. Crab Rocks Occurrences	19. Lampson Road Occurrence ³	34. Steel River Turbidites ¹
5. Dead Horse Creek Diatremes ¹	20. Manitouwadge Synform Recon ²	35. Triangle Occurrence
6. Dead Horse Road Recon ¹	21. McKellar Lake (Michano)	36. Trout Pond Occurrence
7. Faries Lake Iron Formation ¹	22. Nipigon Bay Recon	37. Wahl (Schreiber) Property
8. Geco Division Mine	23. Niskanen Amethyst Occurrence	38. West White River Recon
9. Glacier Creek Occurrence	24. North Limb, Hemlo Belt ¹	39. White Lake (Carroll) Occurrence ³
10. Gold Range Prospect	25. Noslo Xenoliths	40. White River Prospect
11. Golden Giant Mine ¹	26. Page Lake Recon ³	41. Williams Mine ¹
12. Golden Sceptre Property ¹	27. Prairie Lake Carbonatite ¹	42. Winston Lake Mine ¹
13. Hemlo Highway Section ¹	28. Rainbow Falls Provincial Park	43. Worthington Bay Property
14. Heron Bay Gold Mine ¹	29. Rolls Resources Property	44. Wowun Lake Iron Formation ²
15. Hodder Property	30. Schreiber Iron Formation	

¹Visited during the course of a field trip conducted in 1994

²Visited in conjunction with the Geological Survey of Canada

³Described in "Property Examinations" section, this report

PROPERTY EXAMINATIONS

Carroll-MacDougall (White Lake) Gold Occurrence

Prospectors Tom Carroll and Dan MacDougall discovered auriferous quartz veins in October, 1993 on their property east of White Lake, approximately 20 km east-northeast of Hemlo. The occurrence is accessible by boat from Highway 17 (White Lake landing). Proceed 2 km north to the first bay east of the White Lake Narrows, 500 m southeast of Crab Rocks. A trail extends southeast for approximately 1 km to the showing.

The occurrence lies within a southeasterly trending package of supracrustal rocks of the Hemlo greenstone belt, just north of the eastern end of the Cedar Lake granodiorite pluton. The greenstone belt immediately north and south of the occurrence was mapped by Milne (1968) and Siragusa (1984), respectively. The showing consists of a 4 m by 10 m, stripped and trenched area. Several narrow quartz veins striking 330/80NE are hosted by highly foliated, mafic, biotite-amphibole schists. Garnet and epidote are abundant in foliation-parallel zones. Surface exposures consist of highly foliated metasedimentary and mafic metavolcanic rocks, possibly pillowed flows. Biotite-rich zones have a gossanous appearance, although no appreciable sulphides were observed. Grab samples of the mafic schist assayed less than 0.01 ounce Au per ton. The main, mineralized quartz vein varies up to 4 cm in width. The vein displays a crack-seal texture, developed in white to glassy quartz and biotite-rich seams. Coarse, visible gold and very minor pyrite were observed in the vein. A second, 4 cm wide vein, grades into a biotite-quartz-feldspar pegmatite. Selected assays are shown in Table 3. Approximately 15 m to the northeast, the mafic schists are in contact with a quartz-rich, felsic intrusion. Locally, the intrusion is highly foliated and hosts abundant quartz stringers and narrow (2 to 3 cm) quartz veins and minor pyrite. Elsewhere, the intrusion is massive, unfoliated and lacks quartz stringers.

Several base metal and gold occurrences have been noted in the White Lake area, including the Spruce Bay, Carroll, McKay-Fowler, Shuman-Daniels, Kakeeway, Graphite, and Crab Rocks occurrences (McKay 1994). Siragusa (1984) also noted several, anomalously auriferous gossans. Previous work filed in the assessment files indicates potential geochemical and electromagnetic targets in this area.

Table 3. Selected assay results, grab and chip samples, White Lake gold occurrence.

Sample Number	Au (oz./ton)	Description
94 BTC-01	1.10	2 cm gray, glassy quartz vein, no visible gold noted (Main Vein)
94 BTC-02	0.02	amphibole-biotite schist; no visible sulphides
94 BCM-01	22.8	2 cm quartz vein; no visible gold noted (Main Vein)
94BCM-04	0.04	biotite-quartz-feldspar pegmatite
94 BCM-05A	0.02	1.5 m chip sample across two narrow veins/mafic volcanics
94 BCM-07	0.18	biotite-rich quartz vein (Main Vein)

(n.b. all samples returned <2 g/t Ag)

Resident Geologist's Files, Schreiber-Hemlo District, Thunder Bay

Jim Lake Zinc-Copper Occurrence

The Jim Lake zinc-copper occurrences are located north of Nickle Township, approximately 20 km northeast of Manitowadge. Access to the property is gained by travelling 22 km on the Camp 70 road and then proceeding 5 km west on the Fox Creek road. A trail follows an old skidder road for approximately 1.5 km north to the showings.

The Jim Lake West occurrence was discovered during prospecting and reconnaissance mapping in 1994 by Steve Stares and Paul DeGagne of Noranda Exploration Company Limited. Follow-up prospecting using a Beep Mat resulted in the discovery of a second, mineralized zone located approximately 100 m to the east (Jim Lake East). An airborne geophysical survey flown by Noranda in 1989, as well as soil geochemical surveys conducted by the Geological Survey of Canada (Kettles 1993) helped to target this area for reconnaissance exploration.

The Jim Lake occurrence lies within a section of the north limb of the Manitowadge greenstone belt. Geological mapping by the Ontario Geological Survey (Williams and Breaks 1990) and the Geological Survey of Canada (Zaleski and Peterson 1993), as well as geophysical interpretation indicate that the belt is folded in this area. Zinc and copper sulphides occur at the Jim Lake East and West showings within a quartz-biotite schist. The biotite schist displays a breccia texture with rounded quartz fragments up to 2 cm in a matrix of biotite, garnet, pyrite, pyrrhotite, sphalerite and chalcopyrite. Sphalerite occurs as disseminated grains and as veinlets; chalcopyrite occurs in veinlets.

Further to the west, the quartz-biotite schist is in contact with a laminated rock consisting of quartzo-feldspathic layers alternating with orthoamphibole- and biotite-rich layers. In places, the felsic layers are brecciated and display an augen texture. Large garnet porphyroblasts up to 2 cm in size are abundant. In several outcrops, magnetite is a common constituent within the mafic layers. The foliation and contact relationships indicate a strike of 090° to 100° with a dip of 20° to 50° to the south. The host rocks display tight to isoclinal folding. Fold hinges trend 140/30SW. Sampling of the

mineralized zone yielded base metal values of up to 4787 ppm Zn and 1379 ppm Cu. Selected grab samples by Noranda geologists assayed up to 7% Zn, 0.5 % Cu and 0.25 ounce Ag per ton (P. DeGagne, Noranda Mining and Exploration Inc., personal communication, 1994). Lithogeochemical sampling indicated minor sodium depletion and magnesium enrichment relative to similar, unaltered counterparts in the area.

Metamorphic mineral assemblages, sulphide and oxide mineralogy and gross lithologic characteristics suggest that the protolith to the quartz-biotite schist may have been a banded iron formation, similar to those which have a close spatial association with volcanogenic massive sulphide deposits in the Manitouwadge camp. The presence of orthoamphibole, in addition to garnet and biotite, is characteristic of metamorphosed hydrothermal alteration assemblages which comprise the altered footwall rocks to local base metal deposits.

The discovery of these base metal occurrences expands the prospective target areas for base metal exploration in the Manitouwadge camp. It also stresses the importance of recognizing metamorphosed, hydrothermally altered rocks and the usefulness of the Beep Mat in conjunction with prospecting.

Diamond drilling and further work is planned for 1995.

Lampson Road Zinc-Copper Occurrence

This occurrence, situated on Lampson Road, is located approximately 1.4 km east of Highway 614, 26 km south of Manitouwadge. It was discovered in 1991 by prospectors Bill and Lonnie Brinklow. The occurrence was described by McKay (1994) and Schnieders et al. (1992). The property was subsequently optioned to Noranda Inc. as part of a larger property that extended over the northernmost portion of the Hemlo greenstone belt. Renewed trenching and stripping in 1994 led to the discovery of higher-grade, zinc- and copper-mineralized rocks, prompting its detailed mapping, re-optioning to Noranda Mining and Exploration Inc. and diamond drilling in 1994.

The occurrence lies on the northern edge of a package of predominantly mafic metavolcanic rocks, where it is in contact with granitoid and gneissic rocks of the Black-Pic batholith. Metavolcanic and metasedimentary rocks are typically intruded by, and intercalated with felsic intrusive rocks within this contact zone. Bedrock is largely covered by overburden; outcrops are most readily apparent along cut roads. Banded chert-magnetite iron formation is intercalated with wacke, felsic tuff and a conspicuous, chert fragment-bearing breccia, tentatively interpreted as a debris flow. A massive amphibolite, locally varied-textured, may have a gabbroic protolith. All metasedimentary units display minor folds and intense foliation. Fold axes are randomly oriented, perhaps as a result of syn-depositional slumping and/or multiple fold events. There is evidence of refolded folds. Disregarding local variances due to folding, the units strike between 080° and 090°.

Veinlets of sphalerite, chalcopyrite and pyrite fill fractures in metasedimentary host rocks and occupy dilational hinge zones in folded units. Sulphides have apparently been remobilized from the banded iron formation into adjacent rocks during amphibolite-facies metamorphism and associated ductile deformation. Grab samples containing greater than 30% sphalerite have been noted. The discovery of significant sulphides below an original, surface showing reinforces the importance of trenching and stripping. The sulphide mineralization is strongly controlled by minor structures. The iron formation, the presumed source of the sulphides, has also been folded. It is therefore necessary to identify and assess the relative importance of structures when deciding where to sample, trench or drill. This discovery has also renewed interest in this part of the Hemlo belt, where iron formation-hosted, zinc-copper mineralization (e.g. Fairservice occurrence; Schnieders et al. 1991) and remobilized sulphides (e.g. Theresa Lake occurrence; Schnieders et al. 1992) have already been described. McKay (1994) has described a number of zinc- and copper-enriched iron formations in the Pinegrove and Summers lakes area. The gold potential of such rocks, especially sulphidized and altered, oxide-facies iron formations, is also being investigated. Properties in the immediate area have recently been optioned to or acquired by Noranda Mining and Exploration Inc., Hemlo Gold Mines Inc., Gregor Goldfields Corp., Oracle Minerals Inc., Greater Lenora Resources Corp. and Winslow Gold Corporation.

RECOMMENDATIONS FOR EXPLORATION

Page Lake Reconnaissance

The Page Lake area lies within a north-trending portion of the Schreiber-Hemlo greenstone belt that is truncated by the Proterozoic Coldwell alkalic complex to the southwest. It is located approximately 16 km northeast of Marathon. The area was first investigated by Thomson (1931). Regional-scale mapping by Milne (1967) roughly delineated a north-trending assemblage of mafic to felsic metavolcanic and related metasedimentary rocks and a U-shaped serpentinite intrusion north of Goodchild Lake.

Reconnaissance along the powerline that extends west from the north end of Page Lake to the Pic River was undertaken in 1994 in order to ground-truth previous mapping, add detailed geological observations and conduct prospecting.

The eastern end of the section is underlain by massive, light grey-green, aphyric andesite, which locally hosts fissile, carbonatized, rusty zones, and biotite lamprophyre and felsic dykes. Spinifex-like textures are preserved in intercalated, polygonally jointed flows of magnesium-rich tholeiitic basalt.

Magnetite-chert banded iron formation apparently occupies the contact between mafic flows and felsic fragmental rocks. Grab samples of gossanous iron formation returned between 0.01 and 0.06 ounce Au per ton and up to 217 ppm Zn.

The iron formation is bounded to the west by a monolithic, aphyric rhyolite breccia. This breccia is clast-supported; lapilli-size clasts are angular and, in areas of incipient brecciation, can be fit back together. The matrix to the clasts is pale green and sericitic. Green mica-bearing, sericite schists are locally developed and rocks may be pervasively carbonatized. Coarse, felsic pyroclastic rocks persist to the west, gradually becoming more matrix-supported and heterolithic. Well-rounded clasts range from 2 to 70 cm in more poorly sorted units. The poor sorting, clast variety and rounding suggests that these rocks may be re-sedimented, felsic pyroclastic units, perhaps debris flows. Slaty turbidites are intercalated with the pyroclastic rocks. A sulphide-barren, tourmaline-bearing, quartz-carbonate vein in fragmental rocks returned 0.01 ounce Au per ton.

In light of these recent observations and previous exploration elsewhere in the area, it is suggested that the volcanic-sedimentary sequence be re-evaluated for its volcanogenic massive sulphide and gold potential. Gregor Goldfields Corp. is currently involved in a diamond drilling program southeast of Page Lake. Gold values had earlier been returned from altered, quartz vein-bearing, interflow sedimentary units. Drilling has delineated a deformation zone 2 km long, from which values of 0.05 ounce Au per ton over 120 feet and 0.21 ounce Au per ton over 8.75 feet have been returned (*The Northern Miner*, June 20, 1994, p.16).

Prairie River Area

This area comprises a number of base metal occurrences that lie over a distance of approximately 10 km from east of Santoy Lake to the vicinity of McKellar Lake (Schnieders and Smyk 1994). This portion of the Schreiber-Hemlo greenstone belt consists predominantly of amphibolite-facies, intermediate to felsic metavolcanic rocks-- mainly andesite, rhyolite and associated pyroclastic rocks (Walker 1967). In the vicinity of many of these base metal occurrences, the host rocks have been altered and deformed to produce distinctive, sericite-, chlorite- and garnet-bearing schists.

The Marlhill occurrence consists of two separate, subparallel, copper-rich and zinc-rich zones, respectively, within an area approximately 90 m wide and 600 m long. Mineralization is manifested as disseminated to stringer pyrite, chalcopyrite and sphalerite in quartz-sericite schist with quartz stringers. Similarly mineralized rocks comprise the Prairie West occurrence. At Goldbar Lake, the host rocks are sericite-chlorite-biotite \pm carbonate \pm garnet schists.

A broad, east-trending zone of soda depletion ($\text{Na}_2\text{O} < 2\%$) envelopes these aforementioned occurrences and extends east to the MacKellar Bay occurrence and west toward Santoy Lake. Hydrothermally altered rocks, ranging in composition from basalt to rhyolite, show depletion of total sodium, as well as in the relative amount of sodium to potassium. Sodium-depleted samples from the Prairie River area mimic altered rocks from the Winston Lake Mine. This distinctive geochemistry, together with mineralization style and host lithologies, suggests that this area may represent part of an

alteration zone(s) related to volcanogenic massive sulphide (VMS) deposition.

Garnetiferous pyroclastic breccias have been identified in the Spider Lake area to the west. Silicified, carbonatized, green mica-rich alteration zones have recently been noted (D. Michano Jr., Prospector, personal communication, 1994). Calc-alkalic, felsic metavolcanic rocks occur in the McKellar Harbour area to the southeast. Soil samples have returned in excess of 2000 ppm Zn near Prairie River. These far-ranging discoveries expand the prospective target area for base metal deposits around Prairie River. Gold analyses should accompany all base metal assays.

Keweenawan Mineral Potential

The ongoing exploration of the Nipigon Bay area by Falconbridge Limited has renewed interest in the copper-nickel-platinum group element (PGE) potential of Mesoproterozoic rocks related to Keweenawan rifting. The basis of their working model is a comparison of local geology with that of the Noril'sk camp in Russia. The comparative parameters and similarities between the two areas has most recently been summarized by Lightfoot and Keays (1994) (Table 4).

Table 4. The requirements of the Noril'sk model and Keweenawan characteristics

<u>Requirement Parameter</u>	<u>Noril'sk</u>	<u>Keweenawan</u>
Structure	Major, mantle-penetrating faults associated with a triple junction in a region of attenuated crust	Faults both parallel to rift basin axis, as well as transurrent faults
Sulphur Source	Local source of sulphur, such as evaporitic rocks within continental margin sedimentary rocks	Sulphur may exist within Animikie and Sibley group sedimentary rocks
Scale	Thick sequence of continental flood basalts or evidence for the existence of an eroded lava plateau	Keweenawan lava and clastic sedimentary sequences approach 20 km thickness
Comagmatism	Presence of picritic and tholeiitic basalts with comagmatic intrusions	Many of the Logan diabase sills and Nipigon Plate picritic intrusions appear to be comagmatic with parts of the Osler and North Shore volcanic groups
Ni, Cu and PGE Depletion	Abnormal depletion of lavas in Ni, Cu and PGE	Osler lavas have elevated MgO/Ni, which suggests some abnormal Ni depletion
Contamination	Evidence for contamination of lavas by continental crust (e.g. elevated SiO ₂ , La/Sm, Th/Y, etc.)	The most Ni-depleted Osler Group lavas are also the most contaminated by continental crust
Plume Chemistry	Evidence for an early chemical contribution from the deep asthenospheric mantle	Plume chemical contributions are recognized at the base of the Osler and Mamainse Point volcanic groups
Mantle Lithosphere	Evidence for contributions of large volumes of magma from the continental mantle lithosphere (typically low-Ti lavas)	Lavas with similar geochemistry have been recognized in the Osler and Mamainse Point groups
Differentiated Intrusions	Presence of picritic intrusions	Picritic intrusions and picritic lavas have been recognized
Open System Intrusions	Geochemical evidence for repeated influxes of magma through a sill in the form of changing incompatible element ratios and isotope ratios through the sill, or changes in the Ni, Cu and PGE ratios	Hypothesis remains to be tested
Sulphides	Presence of basal concentrations of magmatic sulphides and disseminated to blebby sulphides within the intrusion	Sulphide deposits occur in Duluth Complex, Coldwell alkalic complex and Crystal Lake gabbro

Schreiber Area

The vast majority of the over 20 gold occurrences in the Schreiber area are hosted by discrete structures, usually composite quartz \pm carbonate veins. Vein orientations are generally subparallel to fault and joint sets in host rocks; *en echelon* and conjugate sets are common. Veins are commonly localized along contacts and discontinuities. Host rocks show little evidence of ductile deformation.

There is a strong spatial association between gold occurrences and felsic intrusive rocks (e.g. quartz- and quartz-feldspar porphyries, syenite, trondhjemite) as well as lamprophyre dikes. Marmont (1984) investigated the occurrence of polymetallic, auriferous veins and copper-molybdenum-bearing veins in and around the contact zone of the Terrace Bay granodiorite batholith. A number of volcanic and intrusive igneous rocks sampled by Carter (1988) near Schreiber have alkalic, shoshonitic affinities. These are geochemically classified (LeMaitre 1989) as latites, mugearites and biotite lamprophyre (kersantite), similar to those of the "Timiskaming"-type successions of the Shebandowan greenstone belt (Fyon et al. 1991; Lavigne and Scott (this volume). Hornblende-phyric, syenitic rocks, spatially associated with many gold occurrences in both areas, bear similarities to syenites that host gold deposits in the Matatchewan and Kirkland Lake camps.

It is possible that veins may occur in large arrays, or as brecciated, stockwork zones with abundant microfracturing. Such zones and intervening, altered host rocks may represent larger-tonnage, lower-grade targets. The two most important exploration criteria appear to be: (1) evidence of hydrothermal fracturing and alteration (sericite-chlorite-silica-pyrite), and (2) rocks attributable to felsic magmatism. The discovery of new gold-bearing zones on the North Shores Mine property (2 million tonnes grading 2.2 g/t Au; Schnieders et al. 1993) demonstrates the importance of re-evaluating known occurrences and applying new exploration models. One such exploration model and program for the Schreiber area has been suggested in Patterson et al. (1987).

Steel River-Jackfish Lake Area

Recent examinations in the Steel River area have led to comparisons with the geological setting of the Lightning Zone located north of Kirkland Lake (W. Waychison, Santa Fe Canadian Mining Limited, personal communication, 1994, 1995). The Lightning Zone gold deposit (Cooper 1994) is hosted by hydrothermally altered, high-iron tholeiitic basalt occurring within a volcanic-dominated sequence adjacent to the Destor-Porcupine Fault Zone. Gold mineralization is principally associated with a stratabound pyrite vein network developed within strongly albitized, variolitic flows. Komatiitic flows in the immediate footwall are locally altered to "green carbonate". Also present in the Destor-Porcupine complex is a greywacke-argillite sequence which hosts quartz-sericite-carbonate schists. The greenschist-facies basalt flows sometimes display a complete flow top-pillowed-massive flow base sequence. They are locally variolitic and in places the varioles comprise over 90% of the rock. Footwall komatiites and tholeiitic flows display pillows, flow breccia, hyaloclastite and spinifex texture. Talc-chlorite-(serpentine) and fuchsite/sericite-quartz alteration assemblages are present. All footwall ultramafic rocks are ankeritized. Magnesium-tholeiitic basalt flows make up a minor constituent of the host package. Aphanitic, quartz- and quartz-feldspar-porphyrific dikes cut all stratigraphic units. The Lightning Zone is openly to locally tightly folded with evidence of multiple deformation events (Cooper 1994).

Variolitic basalt flows and basaltic komatiites in the Steel River-Jackfish Lake area have been identified by Schnieders (1987) and Smyk and Schnieders (in preparation). Varioles content can range to greater than 75%. Magnesium-tholeiitic basalt and basaltic komatiite flows display pillows, pillow/ flow breccia, hyaloclastite and spinifex. Mafic rocks may display talc-chlorite-(serpentine) alteration and abundant ankerite. Green carbonate and carbonate-bearing, chlorite schists were noted near Black Fox Lake (Schnieders 1987) and in the Spider Lake area in 1994 (D. Michano Jr., Prospector, personal communication, 1994). Hydrothermally altered, pillowed, variolitic flows have been observed

at the Kingdom occurrence (Schnieders 1987). The mafic volcanic assemblage is intercalated with a greywacke/argillite sequence. Multiple deformation events and folding have been identified by Schnieders (1987) and the Jackfish-Middleton shear zone was described by Walker (1967) and Williams (1989).

Gold exploration in the Steel River-Jackfish Lake area has historically focussed on quartz veins (e.g. Bottle Point, Empress, Siville-Ferrier occurrences) and on sulphide facies iron formations (e.g. Fire Mountain, Simard-Swetz, Kingdom, and Little Steel occurrences). Historical data within the files of the Schreiber-Hemlo Resident Geologist reported gold values of up to 2 ounces Au per ton from the Fire Mountain occurrence. Unfortunately, this occurrence has not been rediscovered. Anomalous to low gold values have been obtained from several of the iron formation occurrences. The Black Fox sulphide facies iron formation displays carbonaceous, pyritic schists with refolded folds (Schnieders 1987), in contact with a felsic, possibly intrusive, rock. Further prospecting and exploration is warranted in this area.

Green carbonate alteration in mafic metavolcanic rocks at Black Fox Lake and near Spider Lake have returned low gold values (~ 0.03 ounce Au per ton; Resident Geologist's Files, Schreiber-Hemlo District, Thunder Bay). Air-photo studies would help identify major and minor lineaments and structures. Contacts between mafic flows and intrusive rocks, as well as sedimentary contacts should be explored. Humus and soil geochemical surveys may prove to be useful exploration tools. Lithochemical sampling for sodium, potassium, carbon dioxide, gold and sulphur enrichment is warranted.

Additional Recommendations

Geological mapping and investigations by Stott et al. (1994) in the Dayohessarah Lake area has led to recommendations for gold exploration, concentrating on quartz veins, felsic porphyry sills and associated porphyry bodies. The Strickland granodiorite pluton is suggested as an exploration target. Stott et al. (1994) also recommended the Dotted Lake Pluton as a potential gold exploration target. The authors further recommend several dioritic to granodioritic plutons and stocks in the Schreiber-Hemlo District, including the Terrace Bay batholith, Ellis Lake, Veronica Lake, Runnalls Lake, Budall Lake, Musher Lake and White Lake stocks, and the Dotted Lake, Heron Bay and Cedar Lake plutons. The margins and peripheries of these intrusions should be thoroughly prospected and explored, focussing on small or separate apophyses related to these intrusions. Exploration around the Floatingheart Batholith in the Mishibishu area near Wawa led to the discovery of the Eagle River gold deposit. This crack-seal vein-hosted deposit in a granodiorite to diorite displays similarities to the Sapawe-Atiko deposit in the Atikokan area (Schnieders and Dutka 1985).

Airborne radiometric surveys are useful exploration tools for targeting potential gold mineralization areas. The gamma ray spectrometric (radiometric) survey conducted by the Geological Survey of Canada (Hetu and Ford 1992) in the Hemlo - Marathon area displays numerous potassium anomalies, including one in the Golden Sceptre (Hemlo) area. Other potential targets have been brought to the attention of the authors including a potassium anomaly approximately 5 km east of Santoy lake in the Spider Lake area (G. Shevchenko, Placer Dome Canada Ltd., personal communication, 1994). Reconnaissance exploration (Resident Geologist's Files, Schreiber-Hemlo District, Thunder Bay) indicated the presence of a blue quartz eye-bearing, porphyritic rock in this locality. This airborne radiometric target, as well as the margins and contact zones of this porphyritic unit, should be investigated.

Given the recent discovery of placer diamonds in the Wawa area, as well as the presence of numerous diamond indicator minerals (Morris et al. 1994), the Trans-Superior Tectonic Zone is once again recommended as a diamond target (cf. Schnieders et al. 1993). During a 1994 field trip to Michigan, M.C. Smyk discovered cobbles of syenite in a gravel pit excavated in coarse, glaciofluvial sediments of the Sagola moraine. Several hundred kimberlite pebbles, cobbles and boulders had already been discovered in this pit (Carlson and Floodstrand 1994). The syenite cobbles bear remarkable similarities to the syenites of the Coldwell alkaline complex, which may be their source. While the complex provenance of these glacial materials has yet to be fully unravelled, this spatial coincidence adds additional food for thought when considering the diamond potential of the north shore of Lake Superior.

OGS ACTIVITIES AND RESEARCH BY OTHERS

B. Dressler and J. Scott conducted research in conjunction with V.L. Sharpton and B. Schuraytz of the Lunar and Planetary Institute, Houston, Texas, on the Slate Islands meteorite impact structure in Lake Superior (Dressler et al. 1994). They provided additional evidence for an impact origin for the structure, namely the occurrence of suevite, Bunte breccia and impact-derived melt. Further work is planned for 1995.

Resident's office staff provided assistance to Greg Stott's mapping crew in the Dayohessarah Lake greenstone belt, northeast of White River (Stott et al. 1994). This 1:20 000 mapping project was prompted largely by recommendations of the Resident Geologist's program, spurred on by a recent flurry of gold exploration in the belt. Field trips to the Dayohessarah Lake area were exchanged with trips through portions of the neighbouring Hemlo and Manitouwadge greenstone belts. Remarkable similarities in lithologies, structural deformation and styles of metamorphism exist between these belts. Extrapolation of the bifurcated southern end of the Dayohessarah belt suggests a highly disrupted but logical connection with the eastern end of the Hemlo belt. Stott et al. (1994) have tentatively related auriferous quartz veins (e.g. Sugar Zone) and associated porphyry bodies with the Strickland pluton, which bears a strong petrographic resemblance to the Dotted Lake pluton on the north limb of the Hemlo belt.

The OGS will be involved in a multi-year, collaborative research project with the Mining Industry Technology Council of Canada (MITEC). MITEC plans to initiate a three-year study of the Hemlo gold deposit in order to establish the parameters necessary to discover additional deposits of similar character. The OGS contribution comprises regional-scale, synoptic studies of geochemistry, geophysics, structure, plutonism and metamorphism in the Hemlo greenstone belt, incorporating both bedrock and surficial data.

Dr. David Good (Post-Doctorate Research Associate, McMaster University, Hamilton) is sampling gabbroic rocks of the Coldwell alkalic complex for rhenium-osmium and samarium-neodymium isotopic study. Isotopic and trace element signatures will provide information about local alkalic magmatism by characterizing crustal/mantle signatures of these intrusive rocks.

E. Zaleski of the Geological Survey of Canada continued a bedrock geological study of the Manitouwadge greenstone belt that was initiated in 1991. Detailed mapping and litho-geochemistry has led to the publication of a 1:25 000 scale map of the belt (Zaleski and Peterson 1993), as well as the publication of aeromagnetic maps at the same scale.

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SIoux LOOKOUT RESIDENT GEOLOGIST'S DISTRICT - 1994

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INTRODUCTION

The volume of exploration undertaken in the Sioux Lookout area increased in 1994. Prospectors and mining exploration companies conducted 31 exploration programs in the district during the year. The level of interest in the North Caribou Lake and Horseshoe Lake greenstone belts increased during the year. The exploration and development work done on the Musselwhite gold property by Placer Dome Canada Ltd. attracted other companies to the area. Prospectors and junior exploration companies conducted diamond drilling in the Sandybeach Lake area and in King Bay and other areas on Sturgeon Lake. Prospectors discovered and explored an interesting base metal showing with gold values near Sandybeach Lake south of Sioux Lookout.

MINING ACTIVITY

Golden Patricia Mine

Ownership of the Golden Patricia Mine changed from Lac Minerals Ltd. to Barrick Gold Corp. during the year. The operation was put up for sale by its owners in the fall. Barrick Gold Corp. decided to retain ownership and to invest in exploration to lengthen the operating life of the mine late in the year.

The mine is located 70 km southwest of Pickle Lake, immediately to the north of Muskegsagagen Lake. The ore body is a 0.3 m thick quartz vein, which is traceable for several kilometers. The mine is accessed by two declines located about 1 km apart. A production shaft was sunk in 1992 and is in use at present. A shrinkage stoping method is used to mine the quartz vein. Stope widths are between 1.0 m and 1.5 m.

The mine is accessed by air in summer and winter using a private strip, and by a temporary road in winter. At present, the mine employs approximately 176 workers on a rotating basis. The mill uses conventional grinding, gravity separation and cyanidation followed by zinc precipitation to recover gold. During 1994, the mill processed approximately 385 tonnes per day with an average grade of 17.23 g/t Au. During the year, 141 851 tonnes of ore were milled (J. Brisco, Barrick Gold Corp., written and verbal communication, 1995).

Dona Lake Mine

The Dona Lake Mine was acquired from Placer Dome Canada Ltd. by Ross Finley Ltd. in the summer of 1993. The mine recovered gold from highly deformed, pyrrhotite-replaced, oxide-facies iron formation. As of January 1 of 1994, the estimated reserves were 148 000 t at a grade of 7.78 g/t Au. Ross Finley Ltd. drove a ramp from the 445 m level to 505 m to access the lower part of the Main Zone. A drilling program was conducted to test the Main Zone below the 505 m level. No additional ore was outlined and mining ceased on August 30, 1994. A small staff remained on the site to wind-down the operation. Recently, the mill was sold to Madsen Gold Corp. and will be shipped to their mine in Baird Township, 10 km southwest of Red Lake.

Figure 1a. Sioux Lookout Resident Geologist's District, Producing Mines and Exploration Activity, 1994

EXPLANATION

- * Exploration Program (Keyed to Table 1)
- Producing Mines, 1994
 - 1. American Barrick Resources Corporation, Golden Patricia Mines..... Au, Ag
 - 2. Dona Lake Gold Mine Ltd., Dona Lake Mine..... Au, Ag
- Advanced Exploration Projects
 - 1. Placer Dome Canada Ltd./TVX Gold Inc., Musselwhite Project
- ◐ Mills
 - 1. Locke Rich Minerals Ltd.
 - 2. Matabi Mines Ltd.
- Producing Quarries
 - 1. C.N.R. Watcomb Quarry

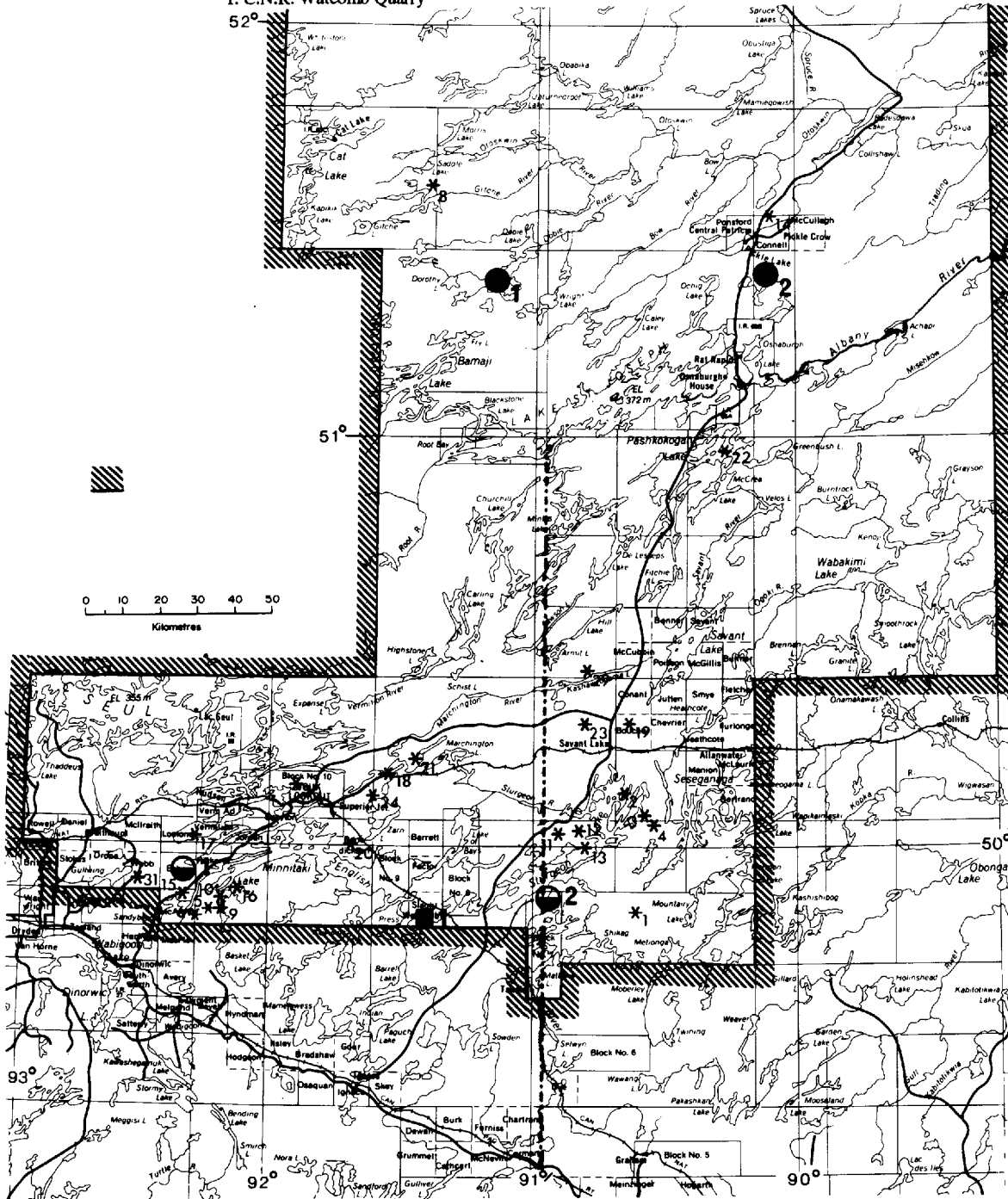
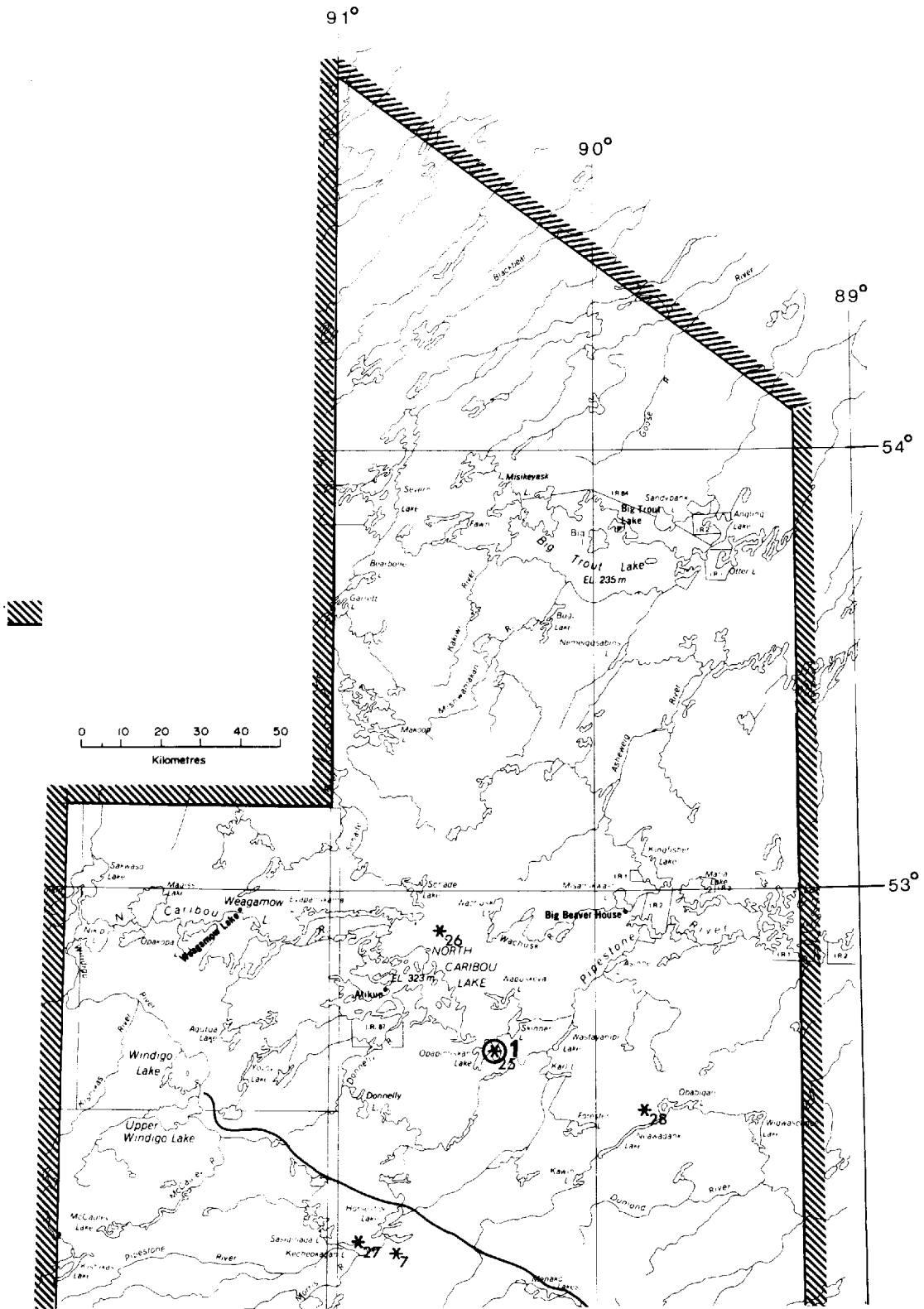


Figure 1b. Sioux Lookout Resident Geologist District, Producing Mines and Exploration Activity



ADVANCED EXPLORATION

Musselwhite Property, Opapimiskan Lake

The Musselwhite Project is a joint venture of Placer Dome Canada Ltd.(68%) and TVX Gold Inc.(32%). Placer Dome Canada Ltd. is the project manager and has completed the second year of an advanced exploration program for gold in folded iron formation. This program included geophysical surveys, grid-cutting and extensive surface and underground diamond drilling. A bulk sample was collected from the underground workings. This phase of the program should be completed in the period from the end of February to the middle of March 1995. Work required to support a production decision will be done by the end of 1995.

EXPLORATION ACTIVITY

There were 31 exploration programs carried out in the Sioux Lookout district in 1994 (Figures 1a and 1b, Table 1). This is an increase of 7 programs over the 1993 figure and an apparent 29 percent increase in the number of exploration programs. The number of exploration agencies active in the district (prospectors and companies) remained at 15. In 1993, there were 9 prospectors or groups, 1 junior exploration company and 5 major exploration companies active in the district. The 1994 figures were 10 prospectors or groups, 2 junior exploration companies and 3 major exploration companies. The decrease in exploration activity experienced over the past several years has apparently bottomed out and the level of exploration activity is beginning to increase.

The advanced exploration on the Musselwhite project at Opapamiskan Lake (discussed above) has sparked a renewed interest in the North Caribou Lake greenstone belt. There has been much staking activity in the belt during the year and most of the prospective ground is now held. This has not yet translated into many exploration programs. However, more are expected for 1995.

The majority of the exploration programs in 1994 occurred in the Sioux Lookout portion of the Wabigoon Subprovince. Many programs, especially those by Noranda Exploration Company Ltd. and Placer Dome Canada Ltd. were preliminary to future work and have not yet yielded significant results. The noteworthy programs for 1994 were those conducted by: Champion Bear Resources Ltd. in the Keikiwabik Lake area and McAree Tp.; by JRJ Explorations Ltd. (Stan and Sherridon Johnson and William Read) in the Fourbay Lake Area; by A. Best at Couture Lake; and by prospectors A. Glatz and A. Kozowy at Keikewabik Lake. These programs are discussed briefly below. The senior writer discusses the discoveries of JRJ Explorations and of Glatz and Kozowy in the Property Examinations section.

Champion Bear Resources Ltd. conducted exploration programs on 2 separate gold occurrences at its Swimit Lake gold property during the year. A 26-hole diamond drilling program tested the depth extension and the lateral continuity of the "Shaft (Schmidt) quartz vein". The vein was cut by 10 holes above the 50 m level along a strike length of 75 m. Assays of the vein ranged from 0.01 ounce Au per ton over 60 cm (1.8 feet) to 2.40 ounces Au per ton over 60 cm (1.8 feet).

Champion Bear Resources Ltd. also tested the "Rivers gold-silver prospect" which is located 2 km to the west of the Shaft quartz vein. In the spring of the year, the company diamond drilled 4 holes all of which encountered "a wide zone of altered felsic rocks that is highly anomalous in gold and silver mineralization." (S. Sears, Sears, Barry and Associates, written communication, 1994) The zone is open in all directions and geological and geophysical data suggest a strike length greater than 600 m. Averaged assays of the zone range from 0.031 ounce Au per ton over 5.12 m (15.6 feet) to 0.067 ounce Au per ton over 9.12 m (27.8 feet). The higher grade intersections range from 0.112 ounce Au per ton over 1.08 m (3.27 feet) to 0.598 ounce Au per ton over 0.54 m (1.64 feet). As a result of this drilling in the spring of 1994, the company acquired additional claim to secure its land position. In December, the company started a 3000 m diamond drilling program to further evaluate the Rivers gold-silver prospect. Five holes were completed at the time of writing. (S. Sears, Sears, Barry and Associates, personal and written communications, 1994)

Table 1. Exploration Activity during 1994

ABBREVIATIONS				
AEM	Airborne Electromagnetic Survey	HLEM	Horizontal Loop Electromagnetic Survey	
Au	Gold	IP	Induced Polarization Survey	
BM	Base Metals	LC	Line Cutting	
DDH	Diamond Drill Hole(s)	Pros.	Prospecting	
GEM	Ground Electromagnetic Survey	Str.	Stripping	
GC	Geochemical Survey	Tr.	Trenching	
GL	Geological Survey	UG	Underground Exploration	
GM	Ground Magnetic Survey	VLEM	Vertical Loop Electromagnetic Survey	
GRA	Ground Radiometric Survey	VLF-EM	Very Low Frequency Electromagnetic Survey	

No. on Figures 1a and 1b	Company or Individual	Township/Area	Activity	Commodity
1	A. Benderite	Dunne Lake	Str., Tr., Pros.	Au
2	A. Best	Beckington Lake	1 DDH	Au
3	A. Best	Squaw Lake	Str., Tr., DDH	Au
4	A. Best	Squaw Lake	Str., Tr., DDH	Au
5	Champion Bear Resources Ltd.	Keikewabik Lake	26 DDH	Au
6	Champion Bear Resources Ltd.	McAree Tp.	9 DDH	Au
7	J. Dignard	Wapimisk Creek	GEM, 1 DDH	Au
8	Geofine Exploration Consultants Ltd.	McVicar Lake	LC, HLEM, GM, GL, GC	Au, BM
9	A. Glatz	Keikewabik Lake	Pros., LC, GEM, Str., Tr.	Au, BM
10	A. Glatz	Kabik Lake and Pickerel Tp.	Pros., GEM	Au, BM
11	W. Hollingsworth	Four Bay Lake	Pros., Str., Tr.	BM
12	JRJ Explorations Ltd.	Four Bay Lake	Pros., Str., Tr.	Au
13	C. Kuryliw	Four Bay Lake	2 DDH	Au
14	Metal Mining Corp.	Tarp Lake	LC, IP	Au
15	Noranda Exploration Co. Ltd.	Echo Tp.	LC, GM, HLEM, GL	BM
16	Noranda Exploration Co. Ltd.	Kabik Lake and Pickerel Tp.	LC, GM, HLEM, GL	BM
17	Noranda Exploration Co. Ltd.	Vermilion Tp.	LC, GM, HLEM, GL	BM
18	Noranda Exploration Co. Ltd.	Sharron Lake	1 DDH, LC, GM, HLEM, GL	BM
19	Noranda Exploration Co. Ltd.	Boucher and Connant Tps.	LC, GM, HLEM, GL	BM
20	Noranda Exploration Co. Ltd.	Smock Lake	1 DDH, LC, GM, HLEM, GL	BM
21	Noranda Exploration Co. Ltd.	Badshot Lake	LC, GM, HLEM, GL	BM

No. on Figures 1a and 1b	Company or Individual	Township/Area	Activity	Commodity
22	Noranda Exploration Co. Ltd.	Pashkokogan Lake	LC, GM, HLEM, GL	BM
23	Noranda Exploration Co. Ltd.	Evans Lake	LC	BM
24	Placer Dome Canada Ltd.	Sharron Lake	AEM, LC, GL, GC	Au
25	Placer Dome Canada Ltd.	Skinner and Zeemel Lakes	UG, LC, GM, DDH	Au
26	Placer Dome Canada Ltd.	Erichson Lake	AEM, GL, Pros.	Au
27	Placer Dome Canada Ltd.	Kecheokagan Lake, Wapamisk Creek and East of Wapamisk Creek	AEM, GL, Pros.	Au
28	Placer Dome Canada Ltd.	Neawagank Lake	GL, Re-logging DDH core	Au
29	R. Ramsay	Armit Lake	Pros., Tr.	Au
30	W. Thompson	Drayton Tp.	Pros.	Au
31	M. Woitowicz	Webb Tp.	Pros.	BM

JRJ Explorations Ltd. carried out a search for a gold occurrence northwest of King Bay on Sturgeon Lake. Their efforts resulted in the discovery of a narrow, north-trending quartz vein. This white quartz vein contains visible gold along with pyrite, chalcopyrite and sphalerite. G. Armstrong of Fort Frances has taken an option on the property and diamond drilling is planned for 1995. (C. Kuryliw, geologist, personal communication, 1994)

A. Glatz and A. Kozowy of Dryden discovered a new gold-base metal occurrence to the northeast of Swimit Lake in the Keikewabik Lake area. The prospectors named the occurrence the Keikewabik Lake Prospect. In 1994, the prospectors stripped and trenched the mineralization, established a small grid and conducted a limited amount of ground geophysical surveys. Assays up to 0.15 ounce Au per ton and 7% Zn over 1.0 m have been reported from the mineralized area, which has a known strike length of about 100 m and mineralized widths of up to 5 m. At the time of writing, the prospectors were looking for a party to option the property on which the occurrence is situated. (A. Glatz, prospector, personal communication, 1994)

A. Best of Savant Lake drilled a short diamond drill hole to test a quartz vein to the west of Couture Lake in the Beckington Lake area. The drill hole intersected the vein, which assayed 0.963 ounce Au per ton over 46 cm (1.5 feet) (A. Best, prospector, personal communication, 1994/5). Further drilling of this gold-bearing vein will be done in 1995.

LAND USE PLANNING ACTIVITY

During the year, the Resident Geologist was asked to review and comment on Requests for Withdrawal of Mining Rights for 2 Old Growth Forest Stands, 20 Permanent Sample Plots and a large scale expansion of the Wabikimi Provincial Park Boundary.

The protection of 2 old growth forest stands within the Patricia Mining Division was proposed by the Ministry of Natural Resources. One of the proposed sites was Eagle Island on Lac Seul. The other site consists of 28 hectares on the north side of Willow Lake, about 14 km southeast of the Mattabi mine site. Both of these sites are underlain by migmatitic granitoid gneiss, and have never been staked. There is no road access to either site. The mineral potential of both sites was rated as low. No objection was raised to the withdrawal of these sites.

Table 2 Summary of claims recorded and assessment-work credit

Year	Claim Units Recorded	Claim Units Cancelled	Claim Units Active	Physical Work* \$	Geotechnical Surveys \$	Total \$
1991**	1 967	3 842	11 502	306 896	60 129	449 360
1992	655	1 417	11 743	1 557 864	355 342	1 963 404
1993	1 779	2 379	11 143	977 463***	410 666	1 124 070
1994	3 078	2 354	11 867	2 537 864	182 181	2 744 757

* includes diamond drilling
 ** Revised totals from June 1, 1991 to year end 1991.
 *** Corrected from amount shown in 1993 annual report.

The Ministry of Natural Resources requested the withdrawal of 20 Permanent Sample Plots (PSP) in the southern part of the district. Each Permanent Sample Plot is about 10 hectares in sizes. The PSPs are part of the Ontario Forest Growth and Yield Program. This program is a long term study which collects forest data on trees vegetation, soils and wildlife habitat within the PSPs over time. The purpose of the program is to improve the knowledge of our forests and silvicultural practices. The Ministry of Natural Resources has published a guide to enable forest workers to recognize a PSP and tells why the sites should not be disturbed. The Resident Geologist evaluated the mineral potential of all 20 proposed PSPs. All but 3 are underlain by granitoid rocks deemed to have low mineral potential. The remaining 3 sites are underlain by mafic volcanic rocks and there are no mineral showings close by. The 3 sites have had little or no past exploration. No objection was raised to the withdrawal of the 20 proposed PSP sites.

Wabikimi Provincial Park is presently 155 000 hectares in size and is located almost midway between the Savant Lake greenstone belt and Caribou-Linklater Lakes greenstone belt. The present park area was proposed in 1983, withdrawn from staking in 1984 and regulated in 1993. In the summer of 1992, a committee of local and regional stakeholders was struck by the Ministry of Natural Resources to study and make recommendations for possible park expansion. During 1994, the committee put forth several "Park Concepts" for public and government review. The size of these park concepts ranged from 574 500 ha to 1 027 840 ha. The smallest of the park concepts proposed would yield a park underlain primarily by granitoid gneiss, where the mineral potential, though unknown, is likely low to moderate. The 1 027 840 ha park concept would incorporate significant greenstone areas with moderate to high mineral potential. Most of these greenstone areas are within the Thunder Bay Resident Geologist's District. A response to the proposed park concepts was drafted by D. Laderoute, Section Chief, with input from the Thunder Bay, Geraldton-Beardmore and Sioux Lookout Resident Geologist's offices and given to the Ministry of Natural Resources.

The Resident Geologist, from time to time, becomes involved with other land use issues, such as reviewing land severance documents pertaining to patented lands, reviewing cottage lot development proposals, providing information to the Sioux Lookout Waste Management System Plan, and working with exploration interests and Aboriginal groups concerning mineral exploration in traditional land use areas.

RESIDENT GEOLOGIST STAFF AND ACTIVITIES

The full time staff of the Sioux Lookout Resident Geologist's office during 1994 included: D. Janes, Resident Geologist, G. Seim, Staff Geologist, and M. Roy, Administrative Assistant.

J. Brinkman returned for a second season as a field assistant. In the fall, P. Parsons was hired as a winter assistant. He worked as a CAD technician preparing digital Geological Data Inventory Folio Maps and other geological drawings, as required.

The Resident Geologist continued to work on an Open File Report documenting the gold occurrences of the Sturgeon Lake area. In the winter, he presented a 10-week Discover Prospecting course, assisted in part by Mining Recorder R. Majcher and the Staff Geologist. During the field season, the Resident Geologist completed the mineral occurrence examinations necessary for the Open File Report mentioned above. He also made investigations into the

gold potential of the Savant Lake area. The zinc-gold discovery made at Keikewabik lake prompted several visits to the area. The Resident Geologist spent considerable time dealing with land use issues such as: withdrawals for Ministry of Natural Resources forest growth study sites, abandoned mine sites, and municipal withdrawals. He also spent considerable time advising exploration parties regarding working near First Nation communities.

The Staff Geologist's major project for the year was a lithochemical sampling program conducted southwest of Sioux Lookout. This project involved considerable research on past mapping and exploration activity in the study area and 3 weeks of actual field work and considerable follow up work preparing samples for chemical analysis and documenting the project. He assisted E. Nabigon, lecturer to Aboriginal peoples, with a prospecting course to the Lac Seul First Nation and with a presentation to the Northern Chief Tribal Councils Conference on resource development. He also made a presentation to the Windigo Interim Planning Board on mineral exploration activities. The Staff Geologist spent 2 weeks during the summer as Acting Resident Geologist for the Kenora District. The Staff Geologist also spent considerable time reviewing and responding to the Wabikimi Provincial Park Boundary Expansion Committee's proposals.

Interaction with the school system took the form of a class and field trip on geology for the grade 5 class at the Hudson Public School and a one day career forum at the Queen Elizabeth District Secondary School.

The Administrative Assistant, in addition to her normal duties, completed a listing of the assessment files indicating: the local file number, the Toronto file number, the work report number, the name of the company or individual who submitted the file, the type of work reported, the year the work was done, and, if applicable, the drill hole numbers of the submitted logs. This listing assists the staff in locating assessment files where only limited information such as the area and drill hole number is known by a client. The administrative assistant also worked at updating the published GDIF's for the district. At year end, 39 GDIF's were updated except for the exploration data maps which show geophysical anomalies and drill hole locations. P. Parsons, the winter assistant worked at completing digital drill hole and mineral occurrence location maps to go with the updated GDIFs.

The Resident Geologist and staff also prepared 2 option booklets, 2 poster displays, a talk for the Northwest Geoscience Symposium, and the 1993 annual Report of Activities. Assistance was also given to an OGS field party working out of Sioux Lookout. Two field trips were organized by the office: one for prospector course participants during Mining Week and the other, in conjunction with J. Devaney of the OGS, highlighting the summer work of his project.

The office received 460 visitors during the year and 1000 phone requests for information.

PROPERTY EXAMINATIONS

Keikewabik Lake Prospect

In 1994, prospectors Alex Kozowy and Alex Glatz of the Dryden area formed a partnership to explore an unmapped block bounded to the north by Minnitaki Lake and to the south by the Trans-Canada Highway (Highway 17). The western side of the area is taken as Highway 72, which connects Sioux Lookout to Highway 17 at the village of Dinorwic. In the last 10 to 15 years, logging activity has opened up the area by providing good to passable roads and trails off both highways.

In the western portion of the block, the only significant exploration targets known prior to 1993 are:

- the Minnitaki Iron Range, south of Redpine Bay of Minnitaki Lake;
- the Rivers Option gold showing, to the southeast of Pickerel Arm; and
- the Swimit Lake gold property, northwest of Swimit Lake.

The Minnitaki Iron Range Ltd. acquired, in 1961, an oxide-quartz iron formation property which extended for 20 km along the south shore of Minnitaki Lake. The 159 claim group was examined by a magnetic survey and by drilling

on 4 selected claims north of Little Goose Lake. The work was done from 1962 to 1965. While the grade of magnetite ore was interesting, the deposit was not large enough for economic extraction (Sioux Lookout Assessment Files 52F16/NE)

The Rivers Option in McAree Township has been examined by several groups over a 60 year period. The first recorded exploration on the property was done around 1900 by the Wallbridge Interest (Hurst, 1932). While the Wallbridge interests appear to have examined and worked on the Schmidt property, they apparently staked and examined the Rivers Option site.

The next work recorded on the property was done by John C. Rodgers in 1950 (Sioux Lookout Assessment Files 52F16/SW). Mr. Rodgers examined the property and sampled the "Porphyry Ridge" showing, a graphic description of the Rivers Option site. Mr. Rodgers reported assays ranging from 0.28 to 11.70 ounces Au per ton over widths ranging from 0.5 to 8.2 feet. Coordinates were not given with the geological description of the property.

Teck Corporation drilled the showing and surrounding area in 1960. Teck drilled 2724.7 ft. in 7 holes along the 022° trend of the base line. Most assays returned nil to 0.02 ounce Au per ton. Four intersections assayed greater than 0.4 ounce Au per ton over 1.5 to 4.3 feet.

In 1980, Nova-Co Exploration conducted a geochemical sampling program using rock and humus samples. The surveys covered the previously drilled and trenched area. The highest gold value was 0.08 ounces Au per ton over an unstated width (Sioux Lookout Assessment Files 52F/16SW).

In 1987, Camine Resources Inc. carried out a program of mechanical stripping, mapping, airborne geophysical surveys, geochemical sampling and trenching on several groups of claims in McAree and McFee townships.

Champion Bear Resources Ltd. acquired the Rivers prospect from Camine Resources in February of 1994 (Sioux Lookout Assessment File 52F16/SW).

The Swimit Lake gold property was discovered on claims HW636 and HW635 around 1898 and named the Schmidt-Wallbridge property. An inclined shaft 29 feet deep was sunk and spectacular gold assays reported. The property was later referred to as the Wasik claims.

The next reported work on the property was done by Central Manitoba Mines Ltd. in 1932 and involved trenching and x-ray drilling.

In 1950, Central Manitoba Mines Ltd. did diamond drilling totalling 1007 feet on the property and carried out a sampling program. The best intersections returned 0.34 ounce Au per ton over 1.6 feet and 1.12 ounce Au per ton over 0.4 foot. A report by geologist R. McCombe in 1952 described the geology and the work done on the property.

Norontex Exploration Ltd. examined the property in 1984 and carried out a program of surface geochemical sampling for precious metals, centred mainly around the older trenches and pits.

The property was acquired and examined by Champion Bear Resources Ltd. during the 1992 and 1993 field seasons. Stripping, trenching and drilling programs were done on the property. (Sioux Lookout Assessment Files 52F16/SE)

During the summer of 1994, prospector Alex Kozowy discovered a gossan at the north tip of Swimit Lake. Preliminary sampling and grab samples indicated zinc and gold anomalies over a wide area; the area was subsequently staked. The gossan covers an area approximately 80 m by 40 m and forms a low hill elevated above the surrounding countryside. The property is identified as the Keikewabik Lake prospect to avoid confusion with the Champion Bear Resources Ltd. Swimit Lake property. The new showing is located 2 km to the east of the Swimit Lake property and is located on a forestry access road in reasonable repair.

This is a new prospect and is located in the Southern Volcanic belt of the Sioux Lookout supracrustal rocks. The only recorded geological reference to the area is by Hurst (1933) who commented on the occurrence of plagioclase glomeroporphyritic gabbro, (leopard rock), at the north end of Keikewabik Lake.

Mr. Kozowy invited the author and Mr. C. Blackburn, Kenora Resident Geologist, to visit and examine the property in June 1994.

The property can be accessed by a forestry road off Hwy 72 at the south end of Sandybeach Lake. The distance to the property is 41 km by this route. Alternatively, the prospect can be reached from Hwy 17 by taking the Basket Lake road north to the west side of Keikewabik Lake and then to the north tip of Swimit Lake (Figure 2).

The outcrops occur over approximately 10 percent of the gossan area. On the first visit, on June 24 of 1994, it was possible to trace beds for short distances across and along strike. Unfortunately, bulldozer and backhoe stripping have since obscured most of the better outcrop areas. Washing of the outcrop will be required before the geology can be properly mapped. A baseline, approximately parallel to strike, was cut at a bearing of 300° and picketed at 50 m intervals. A traverse at 060° bearing was done from the southwest edge of the outcrop area to Baseline 200 west. From Southwest to Northeast, the succession of outcrops found is:

- 1 Sheared, light green to rusty metasedimentary rock with red oxide in shears;
- 2 Vesicular, fine- to medium-grained wacke, with quartz filled vesicles;
- 3 Fine-grained to cherty metasedimentary rock with red quartz veins;
- 4 Similar to 2, however, the quartz eyes may be detrital;
- 5 Sheared to foliated, fine-to medium-grained felsic fragmental;
- 6 Sheared to foliated wacke and fragmental intermediate beds;
- 7 Narrow beds of sheared, silicified, fine-grained wacke with rusty layering;
- 8 Black, fine-grained, pyritic metasedimentary rock with almandine garnets;
- 9 Probable intermediate clasts in fine grained felsic matrix with small almandine garnets; and
- 10 Massive unit of fine-grained, light green to grey rock which is pale to rusty brown on the weathered surface. This may be a dacite to rhyodacite intrusive similar to that found in drill core at the Swimit Lake property, 2 km to the west.

Table 3 Selected sample analyses, Keikewabik Lake Prospect

Reference Figure 3	Zinc %	Silver oz./ton	Gold oz./ton	Lead %	Sample Number*
a	3.26	2.00	0.15	1.65	9432
b	1.14	0.51	0.03	0.77	9366
c	0.26	0.19	0.01	0.07	not known
d	0.72	0.36	0.007	0.26	9426
e	0.71	0.28	0.008	0.34	9420
f	0.04	0.12	0.006	0.03	9365

* Analytical results supplied by A. Glatz and A. Kozowy

Prospectors Glatz and Kozowy have sampled a number of the different lithologies and have identified zones which are enriched in zinc, lead, silver and gold. The best assays have contained up to 5% Zn, 1% Pb, 2 ounces Ag per ton

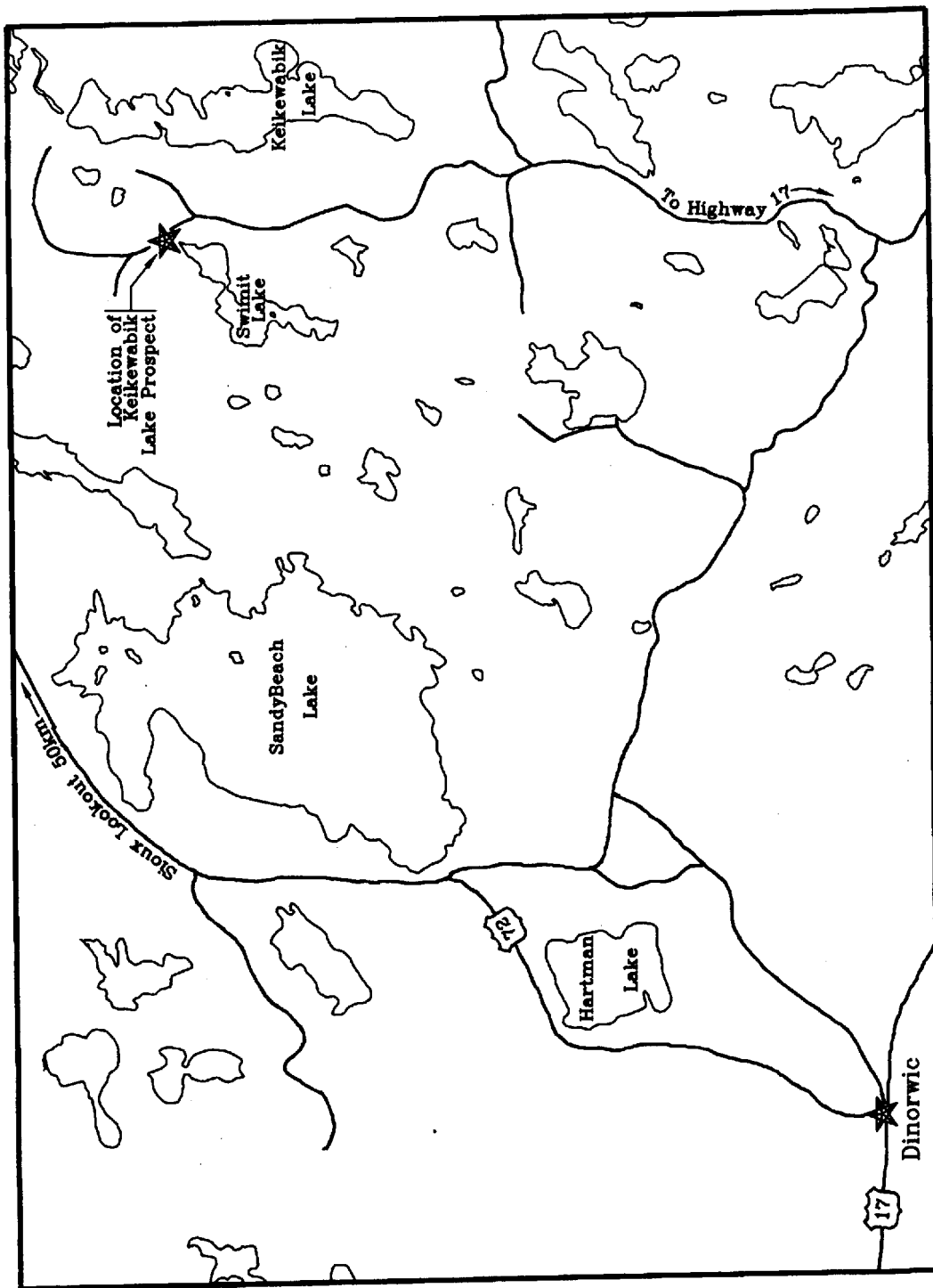


Figure 2 Location Map for the Keikewabik Lake Prospect

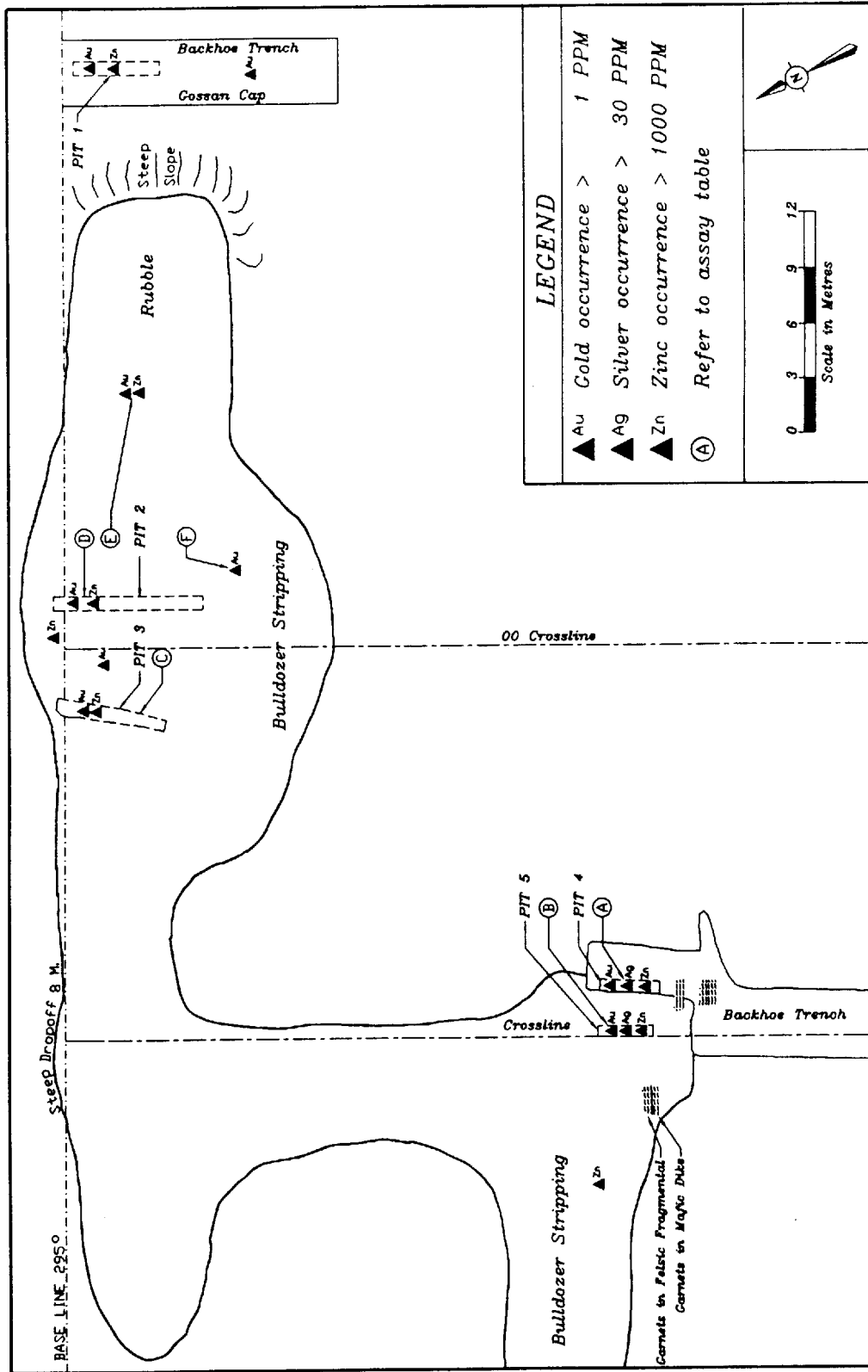


Figure 3 Sample Location Map for the Keikewabik Lake Prospect

and 0.15 ounce Au per ton. Table 3 was compiled from a number of assays done for the owners of the property. The table suggests the trend of metal values in the mineralized zones of the gossan.

Considerably more work is required to outline the location and tenor of metals in the gossan zone. Washing the outcrop in the spring and systematic sampling is recommended.

Berry Lake Sulphide Showings

During 1994, William Hollingsworth, a prospector from Savant Lake, conducted stripping and trenching on three sulphide showings in the Fourbay Lake area. The showings are located off of the Berry Lake Road about 20.5 km southwest of the village of Savant Lake (Figure 4). Access to the showings is by Highway 599 to the Berry Lake Road. The condition of the Berry Lake Road is such that all terrain vehicle travel or foot travel is recommended. Skidder trails lead from the Berry Lake Road to the showings.

Mr. Hollingsworth has 2 claims covering the showings.

Robinson and MacLean (1992) mapped the area of the Berry Lake sulphide showings; their nomenclature is used in the following. The Berry Lake showings are situated near the contact between the older Fourbay cycle and the Six Mile cycle. The Fourbay cycle starts with a succession of pillowed and massive mafic metavolcanic flows 1500 m thick. These flows are capped by up to 400 m of intermediate to felsic pyroclastics. A semi-continuous, sulphide-facies iron formation extends along the top of the pyroclastic unit. This iron formation is evident both in outcrop and in airborne geophysical data. The intermediate to felsic pyroclastic unit is intruded by an irregularly-shaped diorite body north of the Berry Lake showings. The lower part of the Six Mile cycle is a 5000 m to 6000 m thick unit of pillowed and massive mafic flows.

The Berry Lake sulphide showings occur along the semi-continuous sulphide-facies iron formation horizon found near the top of the Fourbay cycle. The three showings exhibit a rather uniform rock succession. From north to south, this succession is;

- a contact zone with the intrusive diorite, characterized by xenoliths of recrystallized mafic metavolcanic;
- greater than 4 m of intermediate to felsic pyroclastics, which are typically very fine-grained ash tuffs, but locally coarsen to lapilli ash tuff. Disseminated and stringer pyrite and pyrrhotite are found in this interval. Sulphide concentrations are usually less than 3%;
- a 1 m to 2 m thick bed of siliceous argillaceous tuff mixed with graphitic argillaceous tuff. This unit contains 5% to 15% sulphides. Pyrite typically occurs with the graphitic material and pyrrhotite is typically found with the more siliceous material. Mr. Hollingsworth reported that he had observed sphalerite in this unit. The writer observed traces of chalcopyrite with the pyrrhotite. Shearing is evident within this unit;
- a 1 m to 1.5 m thick unit of chloritic rock. This rock is very fine-grained, weathers a light greenish-grey, is greenish-grey on the fresh surface and is much softer than the surrounding intermediate to felsic metavolcanics. It is otherwise featureless. This rock may be a product of alteration;
- greater than 2 m of intermediate to felsic metavolcanic rock. This rock is very fine-grained and siliceous. It is somewhat fractured, but is otherwise featureless; and
- < 10 m to the north are the mafic metavolcanics of the Six Mile cycle.

A second mineralized area is found to the south of the east end of showing # 2. Here, an altered granitoid is mineralized with parallel stringers of pyrrhotite and traces of chalcopyrite. The zone of mineralization appears to be 1 m to 2 m wide and strikes at a high angle towards the argillaceous horizon. The granitoid may be a dike intruded along a north-northeast trending fault, which is shown by Robinson and MacLean (1992) as extending through the intermediate to felsic metavolcanics at that location.

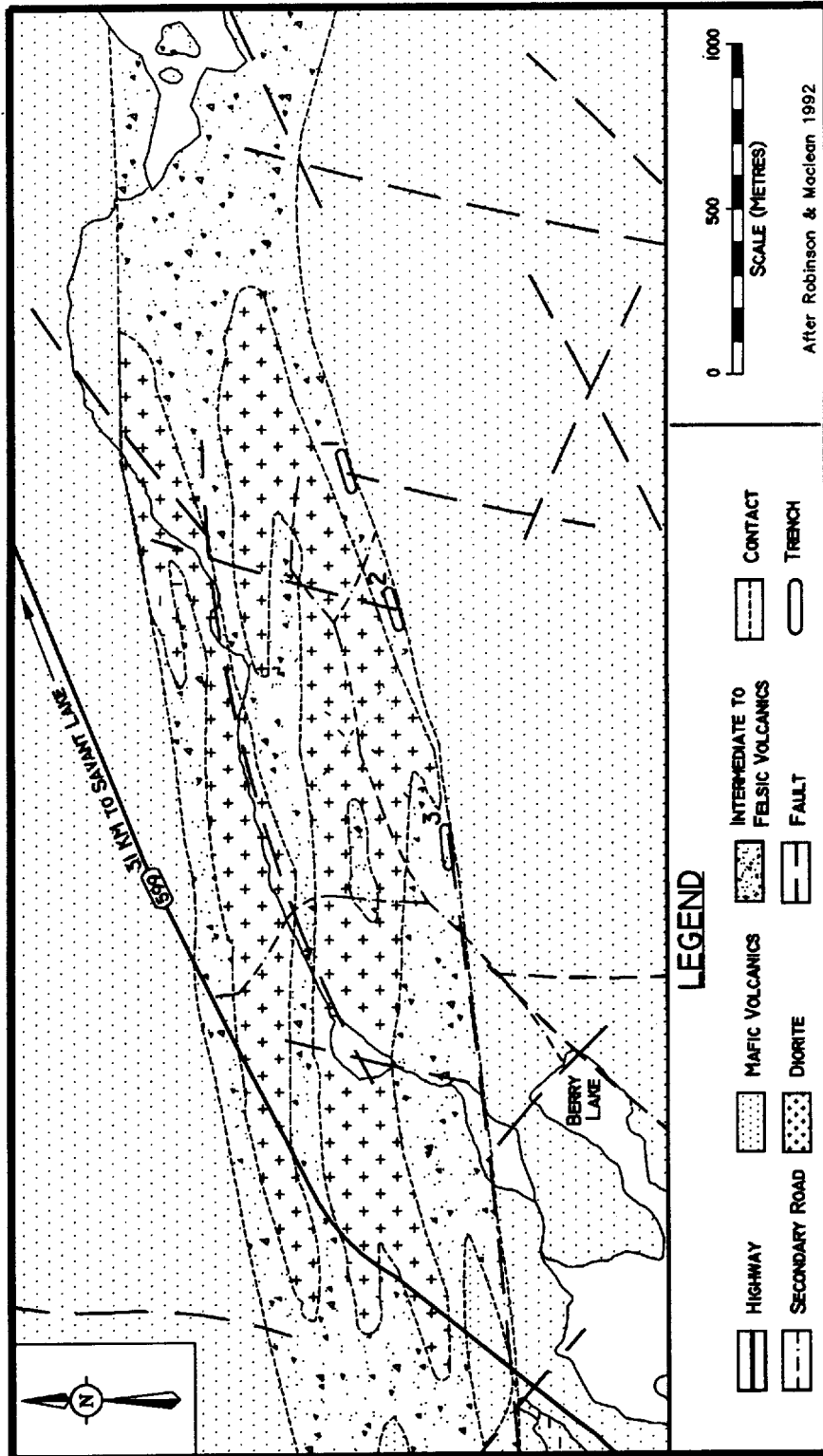


Figure 4 Location and General Geology Map for the Berry Lake Showings

Samples were taken of the mineralized rocks and of the intermediate to felsic metavolcanic rocks. Some were submitted for Cu, Zn, Pb, Ag, and Au assay, while the less mineralized samples were submitted for whole rock and trace element geochemistry. Partial results are given in Table 4. The results indicate that the sulphide showings are anomalous in Cu and Zn.

Robinson and MacLean (1992) had whole rock and trace element analyses completed on 10 samples from the Fourbay intermediate to felsic pyroclastic unit. All but one of the samples plotted in the calc-alkaline dacite and andesite field on the cation plot (Jensen, 1976). The other sample plotted in the tholeiitic dacite field. The samples also yielded low Hashimoto Alteration Index numbers, with one sample yielding an Alteration Index of 15. That sample was reported to be enriched in CaO. The sample was taken from an outcrop 3 km east of Berry Lake showing # 1. Mr. Hollingsworth also had some whole rock analysis done on samples from the Berry Lake showings. The Staff Geologist calculated the Hashimoto Alteration Index for Mr. Hollingsworth's whole rock data. The numbers generated were less than 25. Robinson and MacLean (1992) stated that a very low alteration index, less than 25, may also be indicative of sodium enrichment associated with both VMS and lode gold deposits. Thus, the low alteration index numbers generated from analyses of rocks from the upper part of the Fourbay cycle suggests that the rocks maybe hydrothermally-altered. A qualitative assessment of the data suggests the hydrothermal alteration may be an enrichment in CaO rather than Na₂O. The whole rock and trace element analysis of samples submitted by the Staff Geologist was not complete at the time of writing.

Table 4 Assay Results for the Berry Lake Sulphide Showings

Sample No.	Description	Au oz./t	Ag oz./t	Cu ppm	Zn ppm	Pb ppm
GWS-94-94	Berry Lake Showing # 3 intermediate to felsic volcanic 3 m south of argillite horizon	N.A.	N.A.	121	99.56	N.A.
GWS-94-95	Berry Lake Showing # 3 Chlorite-rich rock on south side of argillite horizon	N.A.	N.A.	100.6	100.3	N.A.
GWS-94-96	Berry Lake Showing # 3 Felsic volcanic on north side of argillite horizon	N.A.	N.A.	153.2	154.4	N.A.
GWS-94-97	Berry Lake Showing # 3 Felsic volcanic to north of argillite horizon	N.A.	N.A.	80.46	117.9	N.A.
GWS-94-98	Berry Lake Showing # 3 Graphitic argillite with 5% pyrite	N.D.	N.D.	264.9	207.6	44
GWS-94-99	Berry Lake Showing # 1 Graphitic argillite with minor pyrite (<1%)	N.D.	N.D.	122.1	246.8	<10
GWS-94-100	Berry Lake Showing # 1 Felsic volcanic 1 - 3% Py	N.A.	N.A.	50.95	99.74	N.A.
GWS-94-101	Berry Lake Showing # 1 Felsic lapilli tuff with 1 - 3% stringers and diss. Py	N.A.	N.A.	25.58	77.98	N.A.
GWS-94-102	Berry Lake Showing # 2 Felsic volcanic with 3 - 5% Po and 1% Py	Tr.	N.D.	603.9	919.1	<10
GWS-94-103	Berry Lake Showing # 2 Felsic Volcanic with 5 - 10% Po and Tr. Cp, Py	Tr.	N.D.	941.0	473.2	<10
GWS-94-104	Berry Lake Showing # 2 Felsic volcanic with Tr. Po	N.A.	N.A.	135.1	206.2	N.A.
GWS-94-105	Berry Lake Showing # 2 Altered granitoid with 5 - 10% Po and Tr. Cp	Tr.	N.D.	469.6	331.1	<10
Abbreviations:	N.A. - Not assayed for N.D. - Not Detected Tr. - Trace					

The Berry Lake sulphide showings are anomalous in Cu and Zn. The rock comprising the intermediate to felsic pyroclastic unit of the Fourbay cycle may be hydrothermally-altered as suggested by the low Hashimoto Alteration Index numbers. These two factors suggest that further study and prospecting along the upper contact of the Fourbay cycle may be warranted.

Sherridon-1 Showing

For the past several years, prospectors S. Johnson of Dryden and his partner W. Read of Sioux Lookout have concentrated part of their time prospecting properties on Sturgeon Lake. During the summer of 1994, they were working on showings in the vicinity of King Bay of Sturgeon Lake. A considerable amount of work has been done on this area since 1981, when the discovery of the Armstrong-Best gold deposit prompted intense exploration of King Bay and surrounding areas of Sturgeon Lake.

Mr. Johnson and Mr. Read were trying to locate a showing near the west end of King Bay of Sturgeon Lake. The property had been worked prior to 1930, but had not been properly located in existing records of that time. During attempts to locate the older property, a quartz vein containing fine grained, visible gold was found. The property is called the Sherridon-1 showing. This vein has not been previously worked and has different characteristics than other quartz vein showings nearby.

The vein is located approximately 1.5 km due west of the MacRead deposit near the west end of King Bay of Sturgeon Lake (Fig. 5). The area can be accessed from Hwy. 599 by taking the Six Mile Lake road, approximately 1.5 km south of the bridge over the Sturgeon River. Five kilometers south on the Six Mile Lake road, a cut trail traverses east for 2 km, before turning south to a cleared area surrounding the trenched vein system. In 1994, the trail was clear-cut and usable by a vehicle with good clearance. Figure 5 shows the access to the showing and the location of nearby gold properties in the area.

Figure 6 shows the geology of the vein. The country rock is a sheared pillow basalt with a strike of 080° to 095° and a dip of 80° to 85° to the south. Quartz porphyry sills and dikes have intruded the basalt, striking 120° to 130° and dipping steeply south. A quartz vein approximately 30 feet long intrudes the sheared pillow basalt close to the north contact of the quartz porphyry sill. The quartz vein is white to greyish white and locally contains minor amounts of fine-grained disseminated pyrite. In several areas, very fine flecks of gold are visible under a 10 power magnifying glass. At the north end of the quartz vein, a north striking fault cuts the outcrop, translating several veinlets of quartz porphyry to the north. This suggests right lateral movement. An additional feature is a wedge shaped block of pillow basalt to the west of the fault. The pillow fragments in this wedged block appear to have been rotated, probably by fault movement.

Because of a lack of time, it was only possible to sample hand specimens of the quartz vein. A panel sample or set of channel samples would be required to properly represent the disseminated fine flecks of gold found in this vein. This gold occurrence is interesting in that it contrasts with the other gold occurrences in the King Bay area. Nearly all of these other occurrences strike east and tend to have blue to black quartz associated with gold. In addition, sulphide content is much higher, usually from 5% to 15%, in the east striking gold occurrences. An exception may be the Copper Lake deposit at the east end of King Bay. Note that the MacRead and Armstrong-Best showings, which are within 2 to 3 km of the Sherridon-1 occurrence, are both terminated to the west by northwest striking shear zones.

Rainbow Lake Occurrence

Maps of the North Arm of Sturgeon Lake show a series of trenches located between Rainbow Lake and Loch Gordon Lake, two small lakes 14 km to the east of the village of Savant Lake. The Canadian National Railway main line traverses past the north tip of Loch Gordon. Older maps have indicated sulphide occurrences on the west shore of this lake. No data was available in the assessment files in the Sioux Lookout office or in other sources examined. The present holder of three patented claims that cover the showings requested that the site be examined. (Figure 7)

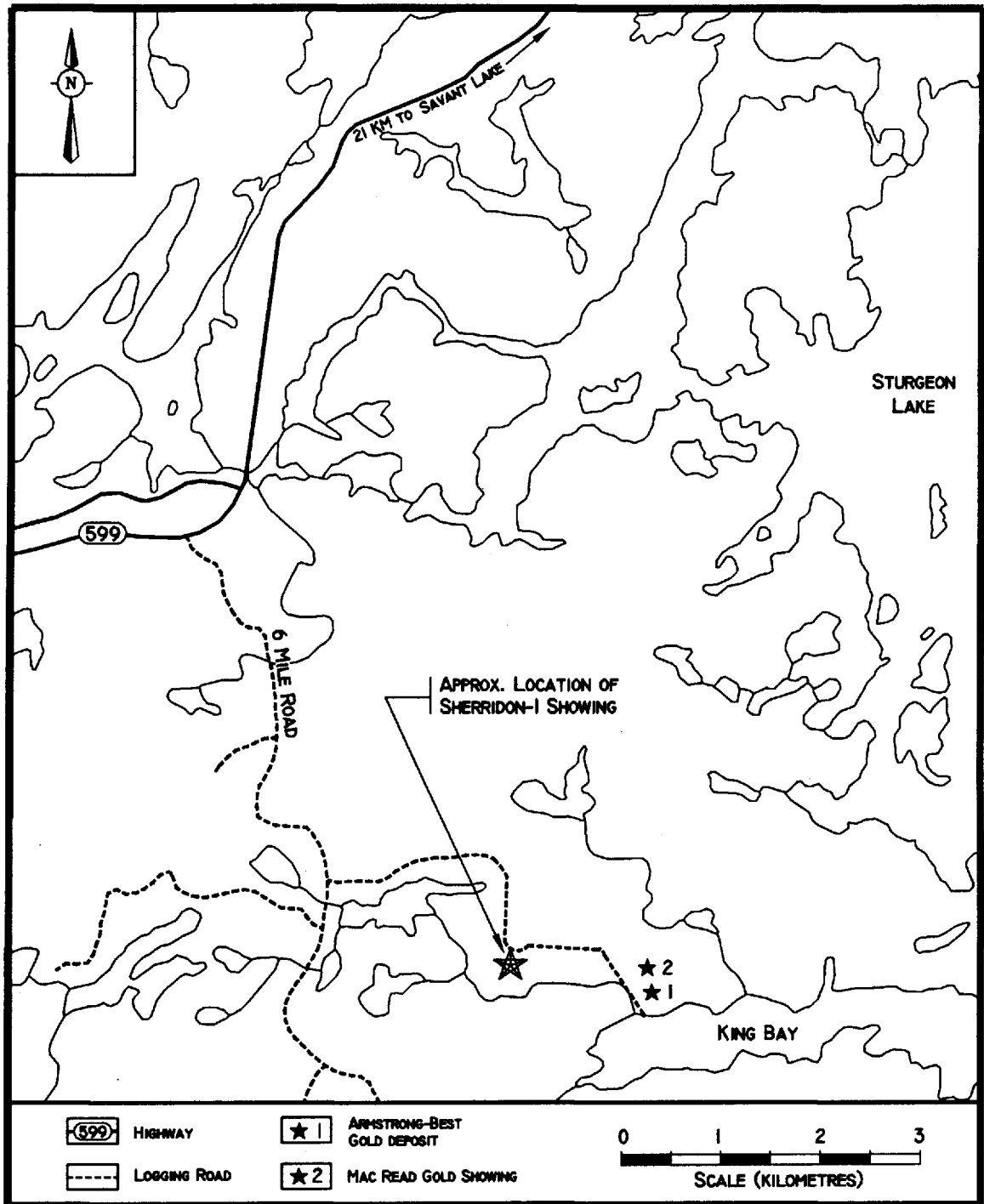


Figure 5 Location Map for the Sherridon-1 Showing

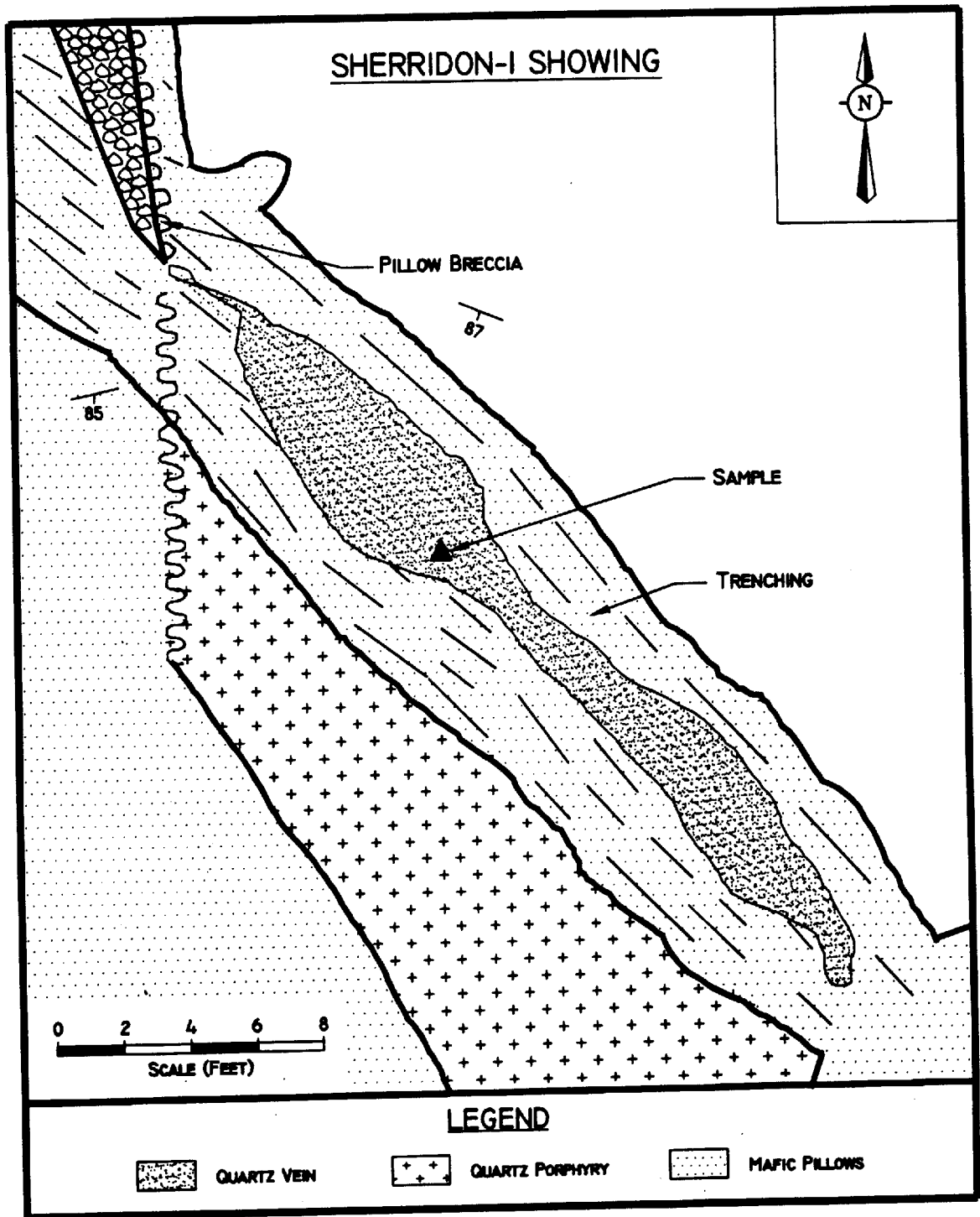


Figure 6 Geology of the Sherridon-1 Showing

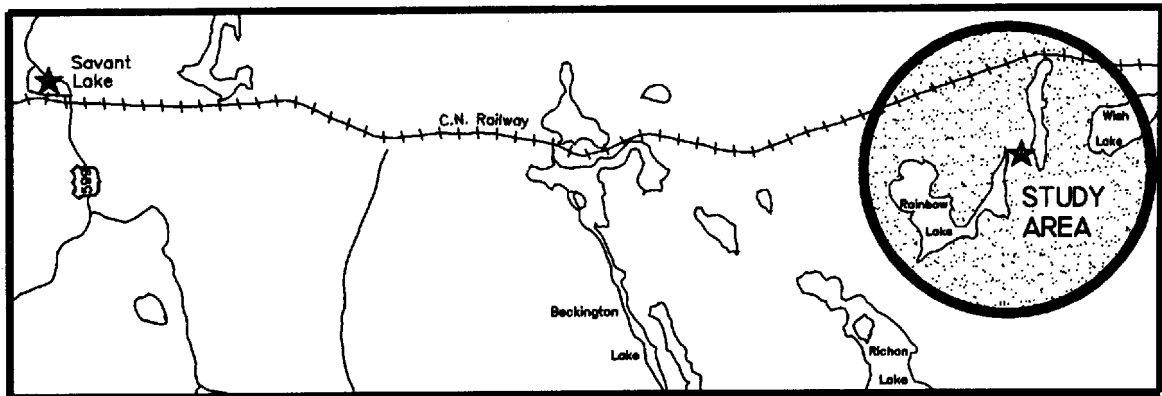


Figure 7 Location of the Rainbow Lake Occurrence

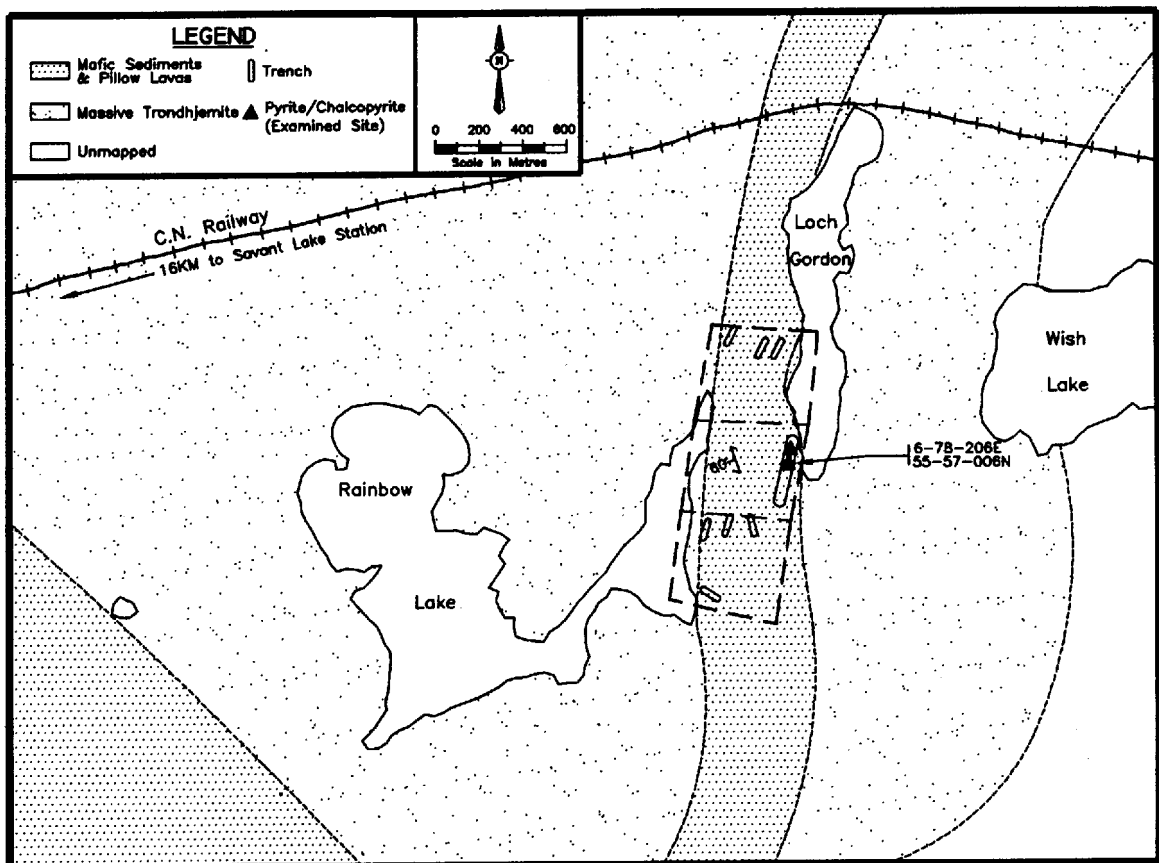


Figure 8 Geology of the Rainbow Lake Occurrence

The trenches are located in a 500 m wide band of mafic metavolcanic flows and wackes that trends north from Richan Lake. An intrusion of trondhjemite to granodiorite separates the narrow band of mafic metavolcanic flows and wackes from the major belt to the west (Figure 8).

Loch Gordon is accessible from the rail line if a track car is available. If not, a light aircraft can land on Rainbow Lake, on the west side of the rock ridge between the lakes.

The pits are found in several locations between the rail line and the south end of Loch Gordon. There are 5 pits containing mineralized rock, located near the southwest shore of Loch Gordon. The trenches are at least forty years old and have not been disturbed recently.

The rock ridge between the lakes stands 5 m to 10 m above the lake level. This is due to a resistant series of narrow ridges of mafic wacke and basalt which strike from 340° to 030°. These ridges have a sloping face on the east side and a near vertical face on the west side due to glacial erosion caused by ice movement from northeast to southwest. Narrow dikes and sills of leuco-granodiorite intrude the mafic rocks near the contacts with the enclosing granitoid rocks.

An examination of these ridges showed that mafic wacke and basalts were present. At the most northerly of the trenches, pyrite and minor chalcopyrite mineralization were localized along the edges of either an elongate pillow or lava tube. Minor calcite and sulphide rust was observed with the pyrite and chalcopyrite mineralization.

The most northerly of the pits and trenches on Loch Gordon is identified as no. 1 and was located by a Magellan satellite positioning system at UTM coordinates 678206 E 5567006 N.

Trench no. 2 was deeper and had pillows or lava tubes in the pit. The sulphide mineralization present was 1% to 2% pyrite with minor silica replacement near the pillow selvages. Trench no.'s 3, 4 and 5 were smaller, had less alteration and less than 1% sulphides.

A rapid scan technique was used in the laboratory to search for interesting levels of economic mineralization. None of the collected samples were sufficiently elevated in tenor to be of interest.

Lithogeochemical Sampling of Intermediate to Felsic Metavolcanic Rocks West-southwest of Sioux Lookout.

Introduction

During the summer of 1994, the Staff Geologist undertook the sampling of intermediate to felsic volcanic rocks west-southwest of Sioux Lookout (Figure 9). The purpose was to provide a database of geochemical information which may guide future work in the area. The sampling concentrated on the Northern Volcanic Belt, the Patara metasedimentary rocks, and an unnamed felsic pyroclastic pile located stratigraphically below the Abram metasedimentary rocks as defined by Blackburn, et al. (1991). Some intermediate to felsic metavolcanic rock from the Central Volcanic Belt was examined in conjunction with J. Devaney of the Precambrian Section of the OGS.

Rationale

The area to the west-southwest of Sioux Lookout contains a large succession of intermediate to felsic pyroclastics which Page (1984) describes as being interbedded with and possibly underlying the Patara metasedimentary rocks. Page (1984) reported 17 whole-rock analyses from the intermediate to felsic pyroclastics. To better assess the base metal potential of the intermediate to felsic pyroclastic succession, not only is more whole-rock data needed, trace-element data (including base metals) is needed as well. Work by Leshner et al. (1986) indicates that it may be possible to differentiate between barren and volcanogenic massive sulphide (VMS)-bearing intermediate to felsic metavolcanic successions in the Superior province on the basis of their rare earth element (REE) pattern and by the relative abundances of Titanium, Yttrium and Zirconium. Often only the latter three elements are used to determine

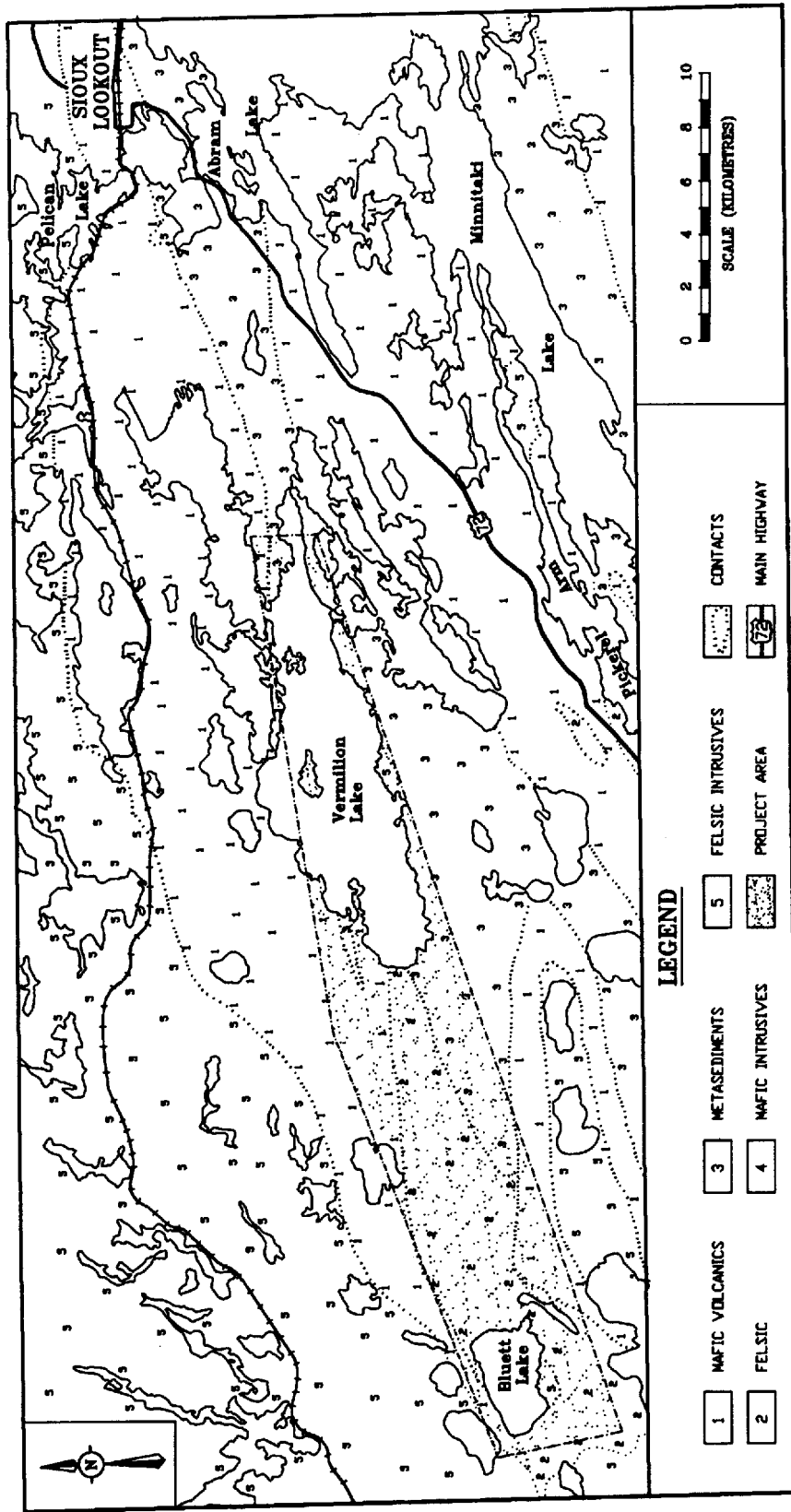


Figure 9 Location and General Geology Map for the Lithochemical Sampling Project West-southwest of Sioux Lookout

if intermediate to felsic metavolcanic successions have the potential to host base metal deposits, because obtaining REE data is expensive. Whole rock data and metal content data is also used to quantify hydrothermal alteration. This can aid in focusing exploration for VMS deposits on particular areas. To this end, the samples collected during this program were submitted to the Ontario Geoservices Centre's (OGC) Geoscience Laboratory in Sudbury for whole-rock and trace-element analysis. Selected samples may later be submitted for REE analysis.

Methodology

The Staff Geologist conducted traverses between Bluett Lake and the east end of Vermilion Lake. The traverses were along passable and overgrown logging roads, a power line and lake shore. The Staff Geologist collected 85 representative rock samples in the area. Global Positioning System (GPS) readings in UTM co-ordinates were recorded at most sample sites. Where a GPS reading was not possible, the position was recorded as accurately as possible on a map and UTM co-ordinates were determined at a later date. Efforts were made to minimize the weathered surface on the samples, and lichen and moss were scrubbed away using a steel brush. Most samples were later cut using a diamond saw. Reference slabs were kept for future examination.

Discussion

No analytical results were available at the time of writing. As a result, the data and a discussion of the geochemistry of the study area will be made in a future report.

Harding (1950) mapped the area to the west of Vermilion Lake. He indicated that a large unit of conglomerate extends east from Vermilion Lake to Bluett Lake and south of Gullwing Lake. Johnston (1972) mapped to the east of Harding's map area and interpreted rocks in the Vermilion - Abram Lakes area, which were similar to Harding's conglomerate, as belonging to the Patara metasedimentary rocks. Page (1984) reinterpreted Harding's (1950) conglomerate and parts of Johnston's (1972) sediments on Vermilion Lake as being intermediate and felsic pyroclastic rocks. Pettijohn (1935) had recognized a unit of "younger volcanics and agglomerates" between the Patara meta-sedimentary rocks and the Abram metasedimentary rocks on Vermilion Lake. The Staff Geologist found the geological interpretations of Page (1984) and of Pettijohn (1935) to be accurately representative of the geology. The intermediate to felsic pyroclastics mapped by Page (1984) extend east of the Lateral Lake map area to at least the east shore of Vermilion Lake. As a result, the sampling area was extended on Vermilion Lake to assess the potential of the intermediate to felsic pyroclastics.

The analytical results for the samples taken during this program may help assess the base metal potential of the area between Bluett Lake and Vermilion Lake. Furthermore, there are several untested geophysical anomalies indicated on OGS airborne surveys of the study area that could be located and examined. Small amounts of base metal sulphides have been found in the recognized pyroclastics and recent work to the west of Bluett Lake by prospectors found new showings. Unexplained airborne geophysical anomalies exist in the Northern Volcanics and around Hooch Lake, east of the Lateral Lake Stock. Small units of intermediate to felsic volcanics may occur in these areas.

RECOMMENDATIONS FOR EXPLORATION

Recent work by prospectors in the area west and south of Sioux Lookout has met with some success. Last year's report contained a description of newly discovered sulphide occurrences in Stokes and Drope Tps. This report contains a description of the newly discovered Keikewabik Lake Prospect. These new discoveries are in part testament to the skill of the prospectors who discovered them. The new discoveries are also testament to the potential of the less explored areas in which they occur. There are many areas within the Sioux Lookout District that have seen little or no past exploration and, at best, reconnaissance scale geological mapping. Such areas are recommended for grassroots prospecting and exploration.

The area south of Minnitaki Lake is one such area. This area has the bonus of reasonable access and it is covered by OGS airborne geophysical surveys. A series of gold occurrences, including the Thunder Lake (Kenora District),

the Alto-Gardener (Kenora District), the Rivers and the Schmidt-Wallbridge occurrences, is associated with the Wabigoon Fault system that extends northeast into the area south of Minnitaki Lake. This suggests a potential for gold mineralization. The discovery of the Keikewabik Lake Prospect, and the results of past diamond drilling done by Breakwater Resources Ltd. near Twin Bay of Minnitaki Lake both suggest a potential in this area for base metal mineralization.

ONTARIO GEOLOGICAL SURVEY ACTIVITIES AND RESEARCH BY OTHERS

In 1994, the Ontario Geological Survey, Precambrian Geoscience Section, began a 2 year study of a 1000 km² area located generally to the south and west of Sioux Lookout. Dressler (1994) states that the objectives of the study are "to update the geological data base, to test the existing tectonic interpretations of the area and to provide a proper evaluation of the area's mineral potential." The study is being headed by J. Devany of the OGS.

PUBLICATIONS

Table 5 Publications received during 1994

Title	Author	Type of Publication/Year
Report of Activities 1993, Resident Geologists;	Baker, C. L., Dressler, B. O. Mason, J. K. and Newsome, J. W. (editors).	Ontario Geological Survey, Open File Report 5892, 383p. 1994
Compilation Map, English River Subprovince,	Breaks, F. W., Bond W. D. and Westerman, C. J.	Ontario Geological Survey, Preliminary Map P.3091, scale 1:253 440. 1993.
Surficial Geology, Wabigoon Lake, Ontario;	Cowan, W. R. and Sharpe, D. R.	Geological Survey of Canada, Map 1774A, scale 1:100 000. 1991
The Geochemical Map of Ontario Pilot Project; Part 1: Report on the 1992 80th Meridian Traverse;	Fortescue, J. A. C. and Dyer, R. D.	Ontario Geological Survey, Open File Report 5907, 307p. 1994
Quaternary Geology and Drift Composition, Lake of the Woods Region, Northwestern Ontario by	G. V. Minning, W. R. Cowan, D. R. Sharpe, and T. A. Warman.	Geological Survey of Canada, Memoir 436, 1994
Industrial Mineral Occurrences and Deposits in Northwestern Ontario;	Hinz, P. and Landry, R. M.	Ontario Geological Survey, Open File Report 5889, 145p. 1994.
Geographic Index to Published Reports and Maps, Mines and Minerals Division, 1891-1993;	Ontario Geological Survey	Ontario Geological Survey, Miscellaneous Paper 178, 316p. 1994.

ACKNOWLEDGEMENTS

P. Parsons did the drafting of Figures 2 through 9 using AutoCAD.

M. Roy compiled the list of Publications received during the year.

D. Laderoute edited this report.

The writers thank the prospectors, mine geologists and mineral exploration personnel for the information included in this report.

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- Turner, C.C. 1972. Archean Sedimentation: alluvial fan and turbidite deposits, Little Vermilion Lake, northwestern Ontario; unpublished M.Sc. thesis, McMaster University, Hamilton Ontario, 211p.
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THUNDER BAY RESIDENT GEOLOGIST'S DISTRICT - 1994

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INTRODUCTION

The boundary of the Thunder Bay Resident Geologist's District is shown on Figure 1. Mineral exploration activity has increased slightly in this area in 1994. Lac des Iles Mines has had its first full year of production and the reopening of Inco Limited's Shebandowan mine is anticipated.

MINING ACTIVITY

Lac des Iles Mine

The Lac des Iles Mines Ltd. palladium mine at Lac des Iles had its first full year of production in 1994. The mill has been operating at 2500 tons/day, producing a concentrate containing platinum, palladium, gold, copper and nickel. The concentrate is shipped to Falconbridge Limited's smelter in Falconbridge for processing. The ore grades 0.18 ounces platinum group metals (PGM)/ton, 0.01 ounce Au/ton, 0.1% copper and 0.1% nickel. It is expected to produce 120,000 ounces palladium, 6,000 ounces platinum, 12,000 ounces gold, 1.5M pounds of copper and 1M pounds of nickel per year (Northern Miner, Jan. 2/95).

Shebandowan Mine

Inco Limited's Shebandowan Mine remains closed and has been maintained on a standby basis. At the time of writing the price of nickel has created anticipation of reopening in 1995.

Amethyst

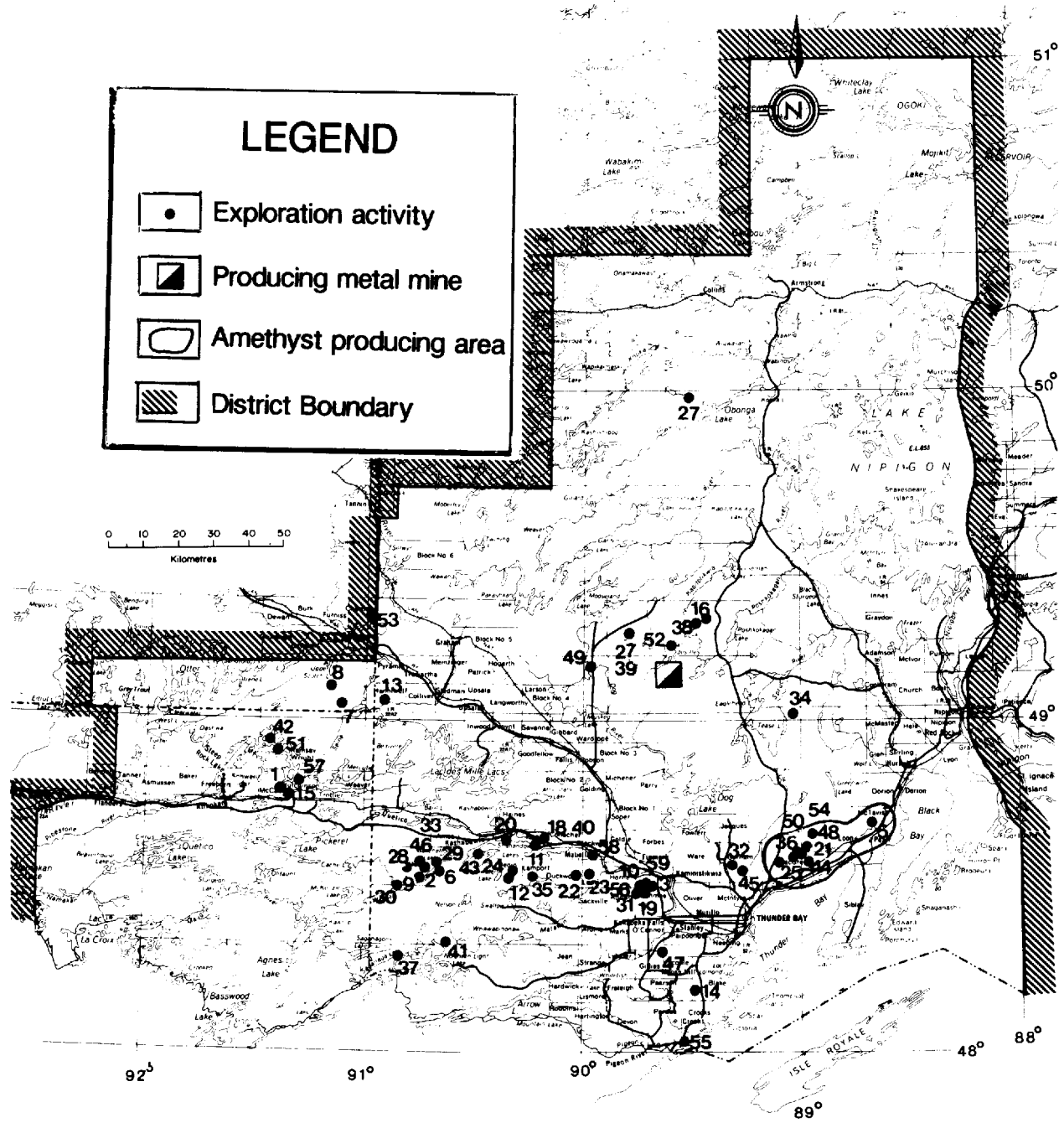
Mining for amethyst continued at various sites near Thunder Bay on a seasonal basis throughout 1994. For a fee, operators allow tourists and rockhounds to pick samples on their own. Major producers are concentrated in the Thunder Bay-Dorion corridor in MacGregor Township and area, and McTavish Township. Some recent staking for amethyst has occurred in the Tartan Lake and Greenwich Lake areas. Amethyst producing areas are shown on Figure 1.

EXPLORATION ACTIVITY

Ontario Prospectors Assistance Program - Ontario Mineral Incentives Program

Twenty-four prospectors received Ontario Prospectors Assistance Program (OPAP) grants in 1994 for a total potential expenditure of \$238,259. There were also six Ontario Mineral Incentives Program (OMIP) grants for a total sum of \$204,285.

Figure 1. Thunder Bay Resident Geologist's District



ABBREVIATIONS

AEM	Airborne Electromagnetic Survey	HLEM	Horizontal Loop Electromagnetic Survey
AM	Airborne Magnetic Survey	IP	Induced Polarization Survey
ARA	Airborne Radiometric Survey	RES	Resistivity Survey
DDH	Diamond Drill Hole(s)	SP	Self Potential Survey
GEM	Ground Electromagnetic Survey	Str	Stripping
GC	Geochemical Survey	Tr	Trenching
GL	Geological Survey	UG	Underground Development
GM	Ground Magnetic Survey	VLEM	Vertical Loop Electromagnetic Survey
GRA	Ground Radiometric Survey	VLF-Em	Very Low Frequency Electromagnetic Survey

Company/Individual (Property Name)	Township/Area (Commodity)	Exploration Activity
1. Allegheny Mines Corp.	Sabawi Lk. G-554 (Au)	GEM, GM, DDH
2. Aho, Ted	Moss Twp. G-676 (Au)	Tr, sampling
3. Asarco Exploration Company of Canada Ltd.	Comnee Twp. G-647 (Au)	Recon. sampling
5. Bak, D.	McTavish Twp. G-675 (amy)	Tr
6. Belisle, Omer	Fountain Lk. G-706 (BM, Au)	Prospecting
7. Bernatchez, R.	Richardson Lk. G-553 (st, BM)	Tr
8. Bernatchez, R.	Lumby Lk. G-553 (BM, st)	GL, prospecting
9. Bumbu, C.	Moss Twp. G-676 (Au)	Prospecting
10. Calvert, D.	Comnee Twp. G-647 (Au)	GM, GEM
11. Calvert, D. & Christianson, D.	Hagey Twp. G-661 (Au)	GM, GEM
12. Calvert, D. & Darwin, B.	Begin Twp. G-643 (Au)	Prospecting
13. Chapman, Lawrence	Hanniwell Twp. G-550 (BM)	DDH
14. Chaschuk, Metro	Blake Twp. G-645	DDH
15. Clark, Garry	Sabawi Lk. G-554 (Au)	Str
16. Cumberland Resources Ltd.	Wabikon Lk. G-773 (BM, Au, st)	GL, prospecting, GM
17. Dabranski, Dan	Begin Twp. G-643 (Au)	Prospecting
18. Detector Resources Ltd.	Hagey Twp. G-661 (Au)	DDH
19. Glamis Gold Ltd.	Comnee Twp. G-664 (Au)	GC
20. Green Ice Resources	Haines Twp. G-662 (Au)	IP
21. Grieve, Mike	Tartan Lk. G-2706 (amy)	Prospecting
22. Hackl, Joe	Duckworth Twp. G-638 (Au)	Prospecting
23. Hackl, J. & Hackl, J.	Laurie Twp. G-669 (Au)	Prospecting
24. Hakala, John	Begin Twp. G-643 (Au)	Prospecting
25. Jones, H. & Jones, D.	MacGregor Twp. G-672 (amy)	Prospecting
27. Kuhner, Knut	Puddy Lk. G-118 (BM, PGM)	DDH
28. Kukkee, Ray & Kukkee, Ken	Moss Twp. G-676 (Au)	Prospecting
29. Kukkee, Ken	Burchell (Span Lk) G-706 (Au)	DDH
30. Kwiatkowski, R. & Kukkee, E.	Tilly Lk. G-562 (Au, Mo)	DDH
31. Kwiatkowski, R. & Kukkee, E.	Comnee Twp. G-647 (Au)	Prospecting
32. Lempiala Sand & Gravel Ltd.	Gorham Twp. G-660 (Aggregate)	Tr
33. Lukosius-Sander, Jurate	Moss Twp. G-676 (Au)	GL, prospecting
34. McAteer, W.	Eaglehead Lk. area G-714 (st)	Prospecting
35. McKellar, R.	Lamport Twp. G-668 (Au)	Tr, sampled
36. M.N.L. Holdings	MacGregor Twp. G-672 (amy, st)	Str
37. Noranda Exploration Company Ltd.	Saganaga Lk. G-555 (Au)	GL
38. Noranda Exploration Company Ltd.	Whistle Lk area, Wabikon Lk area G-773 (BM)	GL, GM, EM, DDH
39. Obonga Precious Metals	Tib Lk. G-2660 (PGM)	DDH
40. Parker, Douglas	Drift Lk. area G-713 (Au)	Prospecting
41. Parker, R.	Titmarsh Lk. G-771 (PGM)	Prospecting
42. Pentland Firth Holdings Ltd.	Sawbill Bay G-558 (Au)	Linecutting, GL
43. Petrunka, D.	Upper Shebandowan G-2713 (BM)	GL, prospecting
44. Pierre Gagne Contracting Ltd.	MacGregor Twp. G-672 (gravel testing)	Tr
45. Pitkanen, R.	Gorham Twp. G-660 (Au)	Prospecting
46. Ranta, Eino	Moss Twp. G-676 (Au)	DDH
47. Redden, J.	O'Connor & Gillies Twp G-678, G-657 (Ag)	Str, sampling
48. Richardson, W.	Tartan Lk. G-2706 (amy, BM)	DDH, prospecting
49. Richmond, W.	Orbit Lk. G-748 (BM, PGM)	Prospecting, sampling, tr
50. Smith, Basil	MacGregor Twp. G-672 (amy)	Str
51. Stewart, Ted & Sande, Dave	Marmion Lk. G-558 (Au)	Prospecting, str, sampling

52. Sutcliffe, R.	Lac des Iles G-739 (PGM)	GM, GEM
53. Sutton, K. & Sutton, Earl	Chartrand Twp G-751 (BM)	Prospecting
54. Thibault, D.	MacGregor Twp. G-672 (amy)	Prospecting
55. Viitala, Reino	Crooks Twp. G-648 (BM)	Prospecting
56. Waibel, Conrad	Horne Twp./Conmee Twp. G-664/G-647 (Au, BM)	Prospecting
57. Wicheruk, Mitch	Tyrell Lk. G-573 (Au)	Tr, sampling
58. Wing, Allan	Blackwell Twp. G-644 (Au)	GL, prospecting
59. Winslow Gold Corp.	Adrian Twp./Conmee Twp. G-640/G-647 (BM)	GL, linecutting

Exploration Activity

The balance of several types of semi-quantitative measures of mineral exploration activity indicates a slight increase in 1994 in comparison to 1993. This is the first increase since 1988. This conclusion is strongly influenced by the occurrence of three larger diamond drill programs carried out by exploration companies, and nine smaller programs carried out by prospectors. In 1993, there were only 6 diamond drilling programs. Most other measures show declines. For example, the total dollar value of assessment work credits declined because of a lag time from when the work was done to when it was recorded. A total of \$2,284,532 of assessment work credits were assessed in 1994, compared to \$3,807,610 in 1993. The lower 1994 figure probably accurately reflects the lack of exploration in 1993. The number of active claim units has declined slightly, 29,191 in 1994 from 29,680 in 1993. The number of properties being explored declined from 63 in 1993 to 57 in 1994. Gold regained its prominence as the favoured target. Thirty-one properties were explored for gold, 12 for base metals, 5 for platinum group metals, 7 for amethyst, and 1 for silver.

Noranda Exploration Company Ltd. optioned Cumberland Resources Ltd.'s property in the Whistle Lake area (Wabikon Lake, claim map sheet #G773). The target is volcanogenic massive sulphide (VMS-type) base metal mineralization. The area is underlain by Archean felsic volcanic rocks, blue-eyed quartz porphyries and massive sulfide lenses. The property covers more than 4451 hectares and contains a 16 km long belt of felsic volcanic rocks. Noranda's option involves approximately 1902 hectares. On the optioned ground, Noranda completed 731.52 m of diamond drilling in four holes, to test four separate geophysical targets over a 3.2 km strike length. All holes intersected stringer and/or massive sulfide mineralization. Hole 94-4 intersected 24 m of massive to semi-massive and stringer-type sulfide mineralization. Copper and zinc mineralization was present in the core, but was not expected to be ore grade. Good VMS-type alteration is associated with all the intersected zones (Canada Stockwatch, Dec. 13/94).

Knut Kuhner and Obonga Precious Metals Inc. have been involved in diamond drilling in the Puddy Lake area, as well as on property controlled by them in the Tib Lake area. At Puddy Lake, the drill targets are PGM and copper-nickel mineralization associated with ultramafic intrusive rock. In the Tib Lake area, the target is PGM in a gabbroic intrusion known as the Tib Lake Gabbro. PGM mineralization at Tib Lake is associated with basal magma pulses of each intrusion sub-phase (Smith & Sutcliffe, 1987).

River Gold Inc., (formerly Central Crude), Storimin Explorations Limited and Tandem Resources Ltd. have agreed to combine their resources and form a new company - Moss Lake Gold Mines - to further explore the low-grade gold deposit situated just north of Snodgrass Lake. This low-grade deposit contains about sixty million t grading 1.1 g/t Au. This zone contains a higher grade core, that Moss Lake Gold intends to explore in 1995.

Exploration activity for gold in the Atikokan area was quite brisk in 1994. Re-evaluation of old properties was undertaken by K.G. Fenwick and others. Search of public records such as old newspaper articles has revealed the location of, or the presence of old and forgotten mineral occurrences. A grab sample by M.J.Lavigne and J.Scott from an old gold occurrence near the intersection of Mills Creek and the Canadian National Railway Ltd. track yielded 0.43 ounce Au per ton. The reader is referred to the property write-up on the Hidden Treasure Mine, in this report.

East of Atikokan, Allegheny Mines Corporation has initiated an exploration program 2.7 km southwest of the past-producing Atiko gold mine, at the Eagle occurrence. Sampling of surface mineralization returned values of 0.26 ounce Au per ton across one metre. (news release, Allegheny Mines Corporation, Dec.8, 1994)

A second target, the Olcott occurrence, located approximately 2.8 km to the west of the Eagle, has also been diamond-drilled. Surface mineralization returned values of 0.12 ounce Au per ton over a strike length of 15 m, across a width of 2.6 m. Grab samples of over 4 ounce Au per ton have also been reported. (news release, Allegheny Mines Corporation, Dec.8, 1994)

Twenty kilometres north of Atikokan, Pentland Firth Holdings Ltd. conducted an exploration program to evaluate the Hammond Reef Mine area, near Sawbill Bay on Marmion Lake. Linecutting and geological mapping were conducted.

RESIDENT GEOLOGIST STAFF & ACTIVITIES

The Thunder Bay Resident Geologist's office was staffed by M.J. Lavigne Jr., Resident Geologist; John Scott, Geologist; Cyndee Komar, Secretary; Karen Furioso, Acting Secretary and Susan Warren, Assessment File Clerk. Although the Thunder Bay Drill Core Library is no longer staffed, staff from the Thunder Bay, Schreiber-Hemlo and Beardmore-Geraldton Resident Geologist's offices provide access to the core library by appointment.

This office handled 1817 enquiries, conducted 47 property visits and 19 field trips, tours or talks. Several properties in the Matawin Gold Belt were examined in detail. In addition, the three, two-day prospectors classes this year were entirely field-based.

PROPERTY EXAMINATIONS

Inco I-Zone - Matawin Gold Belt

In 1986, Inco Ltd. initiated gold exploration programs in Duckworth and Laurie townships. Their property consisted of claim groups acquired from a number of prospectors, as well as their own staked claims. Over the next four years, Inco discovered 22 occurrences of gold. One of these is the I-zone (Figure 2b).

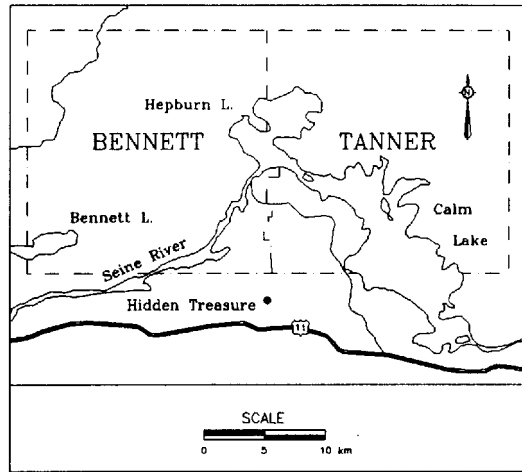
As can be seen in Figure 3, the zone consists of quartz-filled tension gashes that form a "ladder-like" array in a 2 to 4 m wide granodiorite dyke. At the I-Zone, the dyke is hosted by oxide-facies banded iron formation which is devoid of gold mineralization and unaffected by the hydrothermal activity which produced the veins. The vuggy quartz veins range in width from 1 mm to 60 cm, and contain up to 15% iron carbonate. The granodiorite wallrock contains up to 15% pyrite as coarse anhedral crystal aggregates up to 10 cm x 5 cm in size. Pyrite in the quartz veins is euhedral and is associated with 2% to 3% galena. Visible gold was found at 19 locations. Alteration of the granodiorite is zoned adjacent to the veins and consists of iron carbonate and hematite.

Very high gold values were obtained from grab samples. An area 14.6 m x 4.1 m was channel sampled and produced an average value of 3.10 g/t Au. One diamond hole was drilled parallel to the dyke and perpendicular to the veins, producing a 17 m long intersection with an average value of 3.53 g/t Au. Other grab samples ranged up to 116.0 g/t. (Thunder Bay Resident Geologist's files)

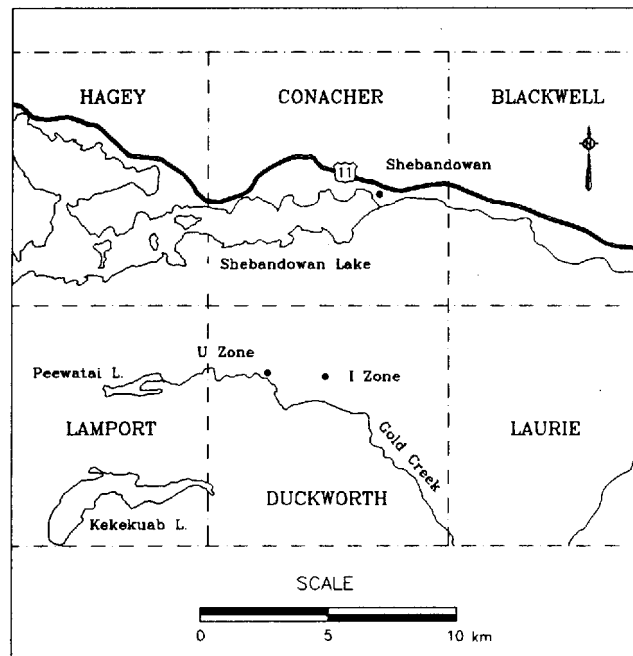
This granodiorite dyke can be traced to the east and west for several kilometres. Whenever this dyke outcrops, it is mineralized with pyrite, hematite and gold. Inco eventually discovered 29 dykes, 20 of which contain gold mineralization. The dykes are confined to an area underlain by "Timiskaming"-type sedimentary rock, which, in conjunction with the superimposed high density of gold occurrences, defines the "Matawin Gold Belt". The number of these dykes increases to the west, where they become wider and are most likely related to the Peewatai Lake stock.

Moose Calf Property

Prospector Joe Hackl discovered an extensive zone of gold-bearing carbonate alteration in Laurie Township, 5.5 km directly south of Mabella. The alteration can be traced over a minimum distance of 3 km, and appears to be spatially related to the contact between "Timiskaming"-type sandstones to the south and Keewatin volcanic rocks to the north. The alteration is confined to the sandstones for a width of approximately 400 m. It is possible that the carbonate alteration is also controlled by east-northeast-striking faults. This area has never been mapped. Ankerite is pervasive, and at some locations fuchsite is present. Fe-dolomite and calcite are also present as coarse crystals associated with north-trending quartz veins and veinlets. One percent pyrite is disseminated throughout the carbonate alteration. Galena is found within some of the quartz veins. To date, ten such mineralized outcrops have been discovered. At most of these locations, the entire exposure is altered and mineralized, covering areas of 100m². There are no obvious structural controls on the distribution of the alteration, and the rocks are undeformed. Grab samples taken by Joe Hackl from these outcrops assayed as high as 3 ppm Au. (Joe Hackl, Prospector, personal communication, 1994) It is not clear if the quartz veins on these outcrops are significant contributors of gold. One zone, #7, is different in that it is more intensely



(a)



(b)

Figure 2 : Location Maps

I ZONE

LEGEND	
	Strike and Dip
	Outcrop
	Contact
	Inferred Contact
	Quartz Vein
	Granodiorite
	B.I.F.

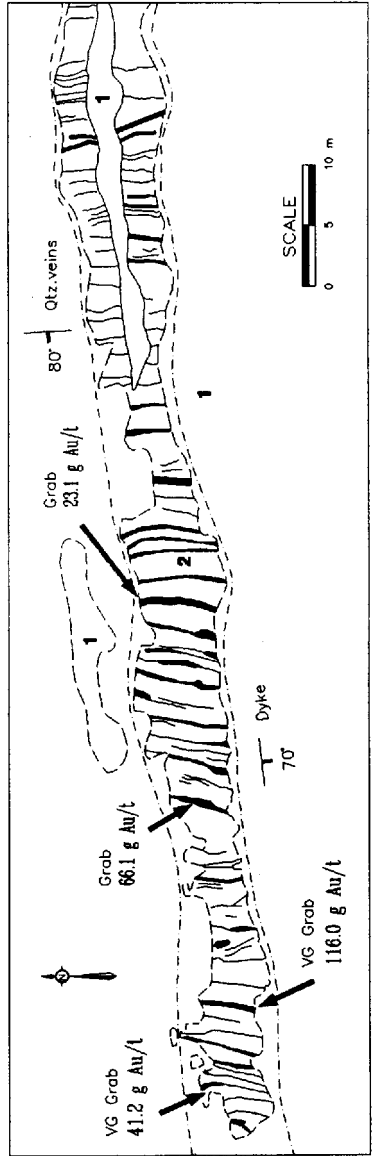


Figure 3 : Geology of the I-Zone, Duckworth Township

mineralized, (containing up to 5% pyrite), has more quartz veins, and is intensely silicified and foliated. Samples taken from this zone by Joe Hackl assayed as high as 16 ppm Au. (Joe Hackl, Prospector, personal communication, 1994) The host rock is poorly exposed and highly altered. It may be conglomerate with jasper clasts.

Exploration activity to date has consisted of prospecting and minor stripping. The mineralized zones are on isolated, low-lying outcrops separated by flat, low-lying areas of thin overburden and swamp. These gold occurrences are interpreted to be part of a continuous hydrothermal system which has a potential for significant gold mineralization.

Obadinaw River Gold Occurrence

During the summer of 1994, Raymond and Kenneth Kukkee discovered gold mineralization in Moss Township. The occurrence is located on claim #TB1202036, 100 m west of its eastern boundary, on the south bank of the Obadinaw River. This occurrence lies approximately 400 m northwest of the western boundary of the Shebandowan greenstone belt, and is underlain by greywacke of the Quetico Subprovince. The mineralization is associated with a medium grained, equigranular feldspathic dyke. At the site of mineralization, the dyke appears to be more than 30m wide. However, on the north side of the river, the dyke is 10 m wide and strikes at 45°. At the site of mineralization the one exposed contact is folded and the apparent thickness of the dyke is attributed to this folding. Two styles of mineralization occur. Within the dyke, a 1 to 3 cm wide pyrite-impregnated shear can be traced for 20 m. Two samples collected by Ray Kukkee assayed 0.488 ounce Au per ton and 0.324 ounce Au per ton respectively. A sample collected by M.J. Lavigne assayed 762 ppb Au. The second style of mineralization consists of slightly bleached greywacke on one side of the dyke. No sulfides were present, however, samples collected by Raymond Kukkee were anomalous with respect to gold. Three samples collected by M.J. Lavigne assayed 167 ppb, 43 ppb and 4 ppb Au respectively. This mineralization appears to be controlled by the flexure in the dyke. To date, work on this property consists of moss-peeling and sampling. It is significant to note that within the greywacke there is only subtle bleaching and no obvious signs of mineralization. Also significant is the fact that this occurrence is underlain by Quetico Subprovince greywacke, a non-traditional target for gold mineralization.

Hidden Treasure (Boss) and Golden Crown Occurrence

INTRODUCTION

Many of the gold occurrences that were discovered at the end of the century were never documented, or only partly documented. We are fortunate, however, that the re-discovery of these occurrences is facilitated by the fact that the prospectors and developers of the time were highly promotional, leaving a trail of clues scattered over a hundred years in a various newspapers. By painstakingly scrutinizing these newspapers, Ken Fenwick of Thunder Bay has re-discovered several such gold occurrence. In this case, a shaft with a gold bearing quartz vein was re-discovered on the Hidden Treasures property.

LOCATION ACCESS

The Hidden Treasure and the Golden Crown occurrences are approximately 41 km west of the Atikokan turnoff on Highway 11 and approximately 3/4 km to the north of the highway. The C.N.R. track trends east, through the property. The occurrences are presently covered by mining claim TB1209243. (10 claim units) Eight of the claim units are in the Kenora Mining Division and two of the claim units are in the Thunder Bay Mining Division (Figure 2a).

EXPLORATION HISTORY

This exploration history was compiled by Ken Fenwick from old newspaper accounts and exploration files.

1. The Hidden Treasure occurrence was situated on mining locations HP 278 and HP279. The mine was worked in 1899, when a shaft was sunk on HP 278 to a depth of 64 feet, with a crosscut 16 feet south at a depth of 54 feet (ODM, 1901, p85).

The Golden Crown Mining Co., southeast of the above occurrence, was situated on mining locations HP226 and HP 227. A shaft of approximately 59 feet deep was sunk (Manitoba Free Press Mining Supplement, no date).

2. The Boss Syndicate took over the two occurrences in 1934. A new 6 foot wide vein just south of the C.N.R. track and 400 feet south of the old Hidden Treasure shaft was discovered. The vein matter consists of highly mineralized fractured quartz with frequent specks of visible gold. A number of assays were obtained, ranging from about \$3 to \$81.90 per ton without any blanks. The vein was traced 900 feet to a second outcropping (Daily Times-Journal, Aug. 17, 1934, p. 12).
3. A new zone, nearly 20 feet wide and traced for more than 400 feet, was uncovered on the Boss, as were several quartz veins (Daily Times-Journal, Oct. 19, 1934, p. 1).
4. Gold was panned freely on the property of the Boss Syndicate (Daily times-Journal, Nov. 12, 1934, p. 10).
5. W.A. Preston, who was the original owner of the Hidden Treasure, made the statement that in sinking the shaft they ran into free gold to such an extent that he believed he had found the Treasure Fortuna (Daily time-Journal, April 23, 1937, p. 18).
6. Trenching completed at the Boss mine suggested that the zone extended northward more than expected. Twenty feet north of the main break, ore was found that yielded values of \$10 to \$23 per ton in terms of gold (with gold at \$34.98 an ounce) (Daily Times-Journal, June 18, 1937, p. 18).
7. The shearing at the Boss mine was observed to strike east across four claims. Hosted in this shearing was a string of quartz lenses. Three shafts were sunk along this break. Good assays of gold were found. Samples taken over a distance of 3/4 mile gave gold values from 75¢ to \$81.90 (Daily Times-Journal, Feb. 11, 1939).
8. In 1936, Animikie Mines carried out reconnaissance work in the area. Their map indicated the location of two shafts (45 and 8 feet deep respectively) and trenching near the intersection of the C.N.R. and Mills Creek.
9. Andowan Mines Limited worked in the area in 1945, but spent most of their time in the eastern Mayflower Mine area. Their map indicates a shaft in the vicinity of the Golden Crown occurrence.
10. Fumerton (1985) stated that the quartz veins at the Hidden Treasure Mine were located near a zone of shearing related to the Little Turtle Fault and near a contact between mafic and intermediate metavolcanics and felsic metavolcanics with numerous intercalated, banded ironstone and siltstone layers.
11. In 1988, Noranda Exploration Company Ltd. did a detailed mapping and humus sampling program over the Hidden Treasure occurrence. This company located two shafts in the area. A grab sample of pyritized mafic volcanic collected by Noranda assayed 12.34 g/t gold. Noranda recommended that further prospecting is warranted.

Geology and Structure

Fumerton (1985) indicates the rock types in the area to be mafic metavolcanics, felsic metavolcanics, metasediments (magnetic ironstone), and quartz veins. The Little Turtle Fault separates the felsic metavolcanics from the mafic metavolcanics. Noranda Exploration Company Ltd. has identified quartz porphyry and quartz vein stockworks hosted by quartz porphyry in the vicinity of two shafts at the Hidden Treasure occurrence.

Geology

The occurrences are underlain by volcanic rocks of the Wabigoon Subprovince, and are located 1.5 km north of the boundary with the Quetico Subprovince. Fumerton (1985) describes most of the rock in the immediate vicinity as chlorite phyllites and schists and shows the Turtle River Fault as a single fault several kilometres to the west, which splay into no less than six faults that blend with the Quetico fault. These six east striking splay faults cover an area that

is 2.5 km from north to south and envelope the occurrence. Based on an offset at Trim Lake, Fumerton(1985) interprets movement along the fault to be sinistral. Observation by the authors on rotated quartz veins and stretch lineations at one location in the chlorite schist, suggest oblique slip plunging at 50 W, and the rotation to be dextral.

This area represents an unusually large volume of rock that has been sheared and chloritized, with minimal carbonate alteration. Fumerton (1985) and the authors recognize tuff-breccias in enclaves of lower strain. It is possible that the schistose and chloritic nature of these rocks reflects a tuffaceous origin. At one location, along the C.N.R. tracks east of Mills Creek, the rocks are sericitic.

Fumerton (1985) did not locate the old workings however, a shaft is plotted on his map near the east shaft of the Hidden Treasure occurrence. Noranda Exploration Company Ltd. located two shafts on the Hidden Treasure property. In 1994 the authors located a third shaft to the east, 20 m south of the C.N.R. tracks east of Mills Creek. This site was located on the basis of a map by Boss Mining Syndicate obtained from the Kenora assessment files.

In 1987, Noranda Exploration Co. Ltd. stripped and channel-sampled the mineralized zones at the two shafts north of the C.N.R. tracks. These shafts are 400 metres apart, and the western shaft is 120 metres north of the C.N.R. tracks. The mineralized zone has been stripped east and west of the shaft for a total distance of 70 metres. The mineralization is hosted by an east striking, quartz-rich felsic unit which has been brecciated and silicified. The felsic rock has a maximum width of 3 m, and attains a width of 50 m to the east, where it is unmineralized. This gives the appearance that the mineralized area is the neck of a boudin. The wall rock is locally altered to an assemblage of carbonate, sericite and pyrite. The highest value from channel sampling, 1.37 g/t Au., came from this altered wallrock. At the eastern shaft, the felsic unit has been exposed over a strike length of 120 m. The largest zone of mineralization is 4 m by 16 m and consists of carbonate-altered felsic rock and containing large quartz veins and quartz flooding. Once again, the mineralized area is localized to where the felsic unit is pinched down to 3 m from 9 m.

Yet to be re-discovered in this area is the 2 m wide quartz vein that the Boss Syndicate discovered in 1934, just south of the railroad tracks and 400 feet south of the western Hidden Treasure shaft.

Mineralization at the newly re-discovered shaft, south of the C.N.R. tracks, and just west of Mills Creek, consists of a 25 cm wide quartz vein striking 60° on the northeast wall of the shaft and 40° on the southwest wall. The host rock is chlorite-sericite schist, which strikes east. A sample collected by M.J.Lavigne and J.Scott, representing the full width of the vein, assayed 0.43 ounce Au per ton. The vein contained pyrite and traces of chalcopyrite. The muck pile adjacent to, and downslope from the shaft contains abundant quartz, and is of such quantity that the shaft must have been in excess of 10 m deep. Several north-south trenches in the overburden occur just west of the shaft.

The Hidden Treasure gold occurrence is similar to the Mayflower gold occurrence 2 km to the south-east, in that more brittle felsic rock surrounded by schist, has been fractured and mineralized. It is the authors' opinion that larger felsic stocks and dykes in this area should be prospected for gold.

RECOMMENDATIONS FOR EXPLORATION

Several new gold discoveries within the Matawin Gold belt have added to the already impressive inventory of gold occurrences that have been discovered in the last ten years. The gold mineralization is hosted by "Timiskaming" type sedimentary, volcanic and intrusive rocks. The known mineralization styles consist of: quartz veining in felsic dykes in the north part of the Gold Creek area to disseminated pyrite in altered felsic volcanic rocks in the south part of the Gold Creek area; and disseminated pyrite in the brecciated outer margin of a felsic stock in Conmee Township. This year, two discoveries in the North Gold Creek area have added to the variety of styles of gold mineralization found in this area. Prospector Joe Hackl has found sulfidized iron formation with values in excess of 0.5 ounce Au per ton and disseminated pyrite in carbonate altered sandstone with values as high as 3000 ppb Au. Prospectors Russell Kwiatkowski and Ed Kukkee discovered an outcrop of "Timiskaming" type conglomerate 400 m long, containing disseminated pyrite in its matrix, yielded values as high as 800 ppb Au. This outcrop is just west of the Tower Syenite stock in Conmee Township.

The number of discoveries made within a five year period in the Matawin Gold Belt therefore suggest that this area has the potential to host significant gold deposits.

With Falconbridge Ltd. undertaking a major exploration program in the Nipigon Bay area, to search for Noril'sk-type copper-nickel-PGM mineralization, the question arises, are there any other areas within the Nipigon Embayment that should be investigated? Until specific tracts of land can be scientifically discounted, all of the Nipigon Embayment and its associated mafic to ultramafic intrusions should be considered to have high potential for Noril'sk type deposits. The reader is referred to Schnieders and Smyk (this volume), where a brief comparison between the Keweenawan geology of the Nipigon area and the Noril'sk region of Siberia is made. Regional geochemical copper-nickel anomalies (OGS-GSC 1978) in the Black Sturgeon area should be investigated. Additional literature is available in the Thunder Bay Resident Geologist's office.

New logging roads south of Rinker Lake, located approximately 100 km north of Thunder Bay on Highway 527 should be investigated for VMS mineralization. A massive sulfide occurrence outcrops on Highway 527 at about 98 km north of Thunder Bay. Although barren of ore-grade copper and zinc, this zone may represent a favourable horizon and should be explored. The new roads trend along the general strike of the local stratigraphy and represents excellent access for prospecting. Pye (1967) indicates favourable geology for VMS-type mineralization and gold. Since the area was mapped, gold occurrences, often associated with iron formation, have been discovered. Grab samples containing up to 0.5 ounce Au per ton have been reported by Canamax Resources Inc (Thunder Bay Assessment Files). A favourable horizon for VMS-type mineralization strikes southwest from McCuaig Lake to south of Jolly Lake. In addition, an irregularly shaped porphyritic granodiorite intrudes the volcanic rocks between Kiddman Lake and McCuaig Lake and its margins should be prospected for gold.

OGS ACTIVITIES AND RESEARCH BY OTHERS

The Precambrian Section continued geological mapping in the Shebandowan area during 1994. Ike Osmani continued mapping the volcanic belt along Highway 11 near Kashabowie. His open file map is available for viewing in the Thunder Bay Resident Geologist's office.

C.E.G. Farrow of the Mineral Deposits and Field Service Section of the OGS continued the evaluation of base metal mineralization of the Shebandowan greenstone belt in the Thunder Bay District.

At Lakehead University, several undergraduate theses have been completed that pertain to regional geological problems. These are:

- 1) Evidence for the contact metamorphism of regionally metamorphosed rocks in a section of the Quetico Subprovince, by Christa Koebernick.
- 2) A Cathodoluminescence study of the Big Beaver House Carbonatite Complex, Kenora, Ontario, by Kenneth Kukkee.
- 3) The magnetic fabrics of the Bad Vermillion Lake Pluton near Mine Centre, Northwestern Ontario, by David King.

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**MINERAL DEPOSITS AND
FIELD SERVICES SECTION**

Kirkland Lake Resident Geologist's District - 1994

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INTRODUCTION

In 1994 there were five underground gold mines, one tailings reclamation project, one underground barite mine, one open pit hematite mine and one green carbonate decorative stone quarry operating in the Kirkland Lake Resident Geologist District.

1994 abounded with good news. Hemlo Gold Mines Inc., Freewest Resources Inc. and Teddy Bear Valley Mines Ltd. reached a production decision to mine the Lightning gold zone. Mining resumed at the Macassa Mine, now owned by American Barrick Resources Corp., following fatal rock bursts in 1993. The mine has also commenced refurbishing its No. 2 shaft to access old workings and boost underground production. Work is progressing well at the American Barrick's Holt-McDermott Mine to access the South Zone discovered in 1992. Gold reserves have been further increased at the mine and the grade appears to increase with depth. AJ Perron, formerly Deak Resources Corporation, has discovered a new gold zone near the Chesterville boundary. Cyprus Canada Inc. terminated its option on the south part of the Kerr Mine property thus abandoning its potential interest in a partly explored gold mineralized zone to AJ Perron. The zone is thought to contain more than 1 million tons grading 0.198 oz gold per ton.

Overall gold production for 1994 for the Kirkland Lake Resident Geologist's District was 150 777 ounces, a decrease of 21 025 ounces compared to 1993. This reduction is mainly due to the suspension of underground production at the Macassa Mine for the first 4.5 months and the preparations required to change to long hole mining (see Table 1).

There were several exceptionally successful exploration projects: 1) Sudbury Contact Mines Limited continued exploratory drilling of the Victoria Creek gold zone and delineated 4.72 million tons grading 0.132 oz. gold per ton. Drilling of an additional 80 drill holes is planned for 1995, followed by sinking a 3000 ft shaft and the development of two 5000-foot exploration drifts; 2) Pangea Goldfields Inc. completed a total of 87 000 ft of drilling on their Fenn-Gib property and delineated, in two zones, a total of 16.4 million tons grading 0.057 ounce Au per ton; and 3) Cyprus Canada increased reserves at the Amalgamated Kirkland property and is planning another drill program in 1995.

During 1994, gold mining in the Kirkland Lake Resident Geologist District produced 39 184 058 ounces of gold from 126 349 680 tons of gold ore and 126 451 ounces of gold from 2 765 189 tons of tailings recovery (Table 2). Current reserves are 10 058 562 ounces of gold and this is an increase of 3 488 281 ounces from 1993, is due to new discoveries and successful exploration at producing mines and other known deposits (Table 3 and Figure 1).

The Kirkland Lake Resident Geologist District maintained a high level of exploration activity throughout 1994. There were at least 76 active exploration projects (Table 4) and 343 exploration data records were processed and incorporated into the assessment file system (Table 5). In addition, 143 titles were added to the library database (Table 6).

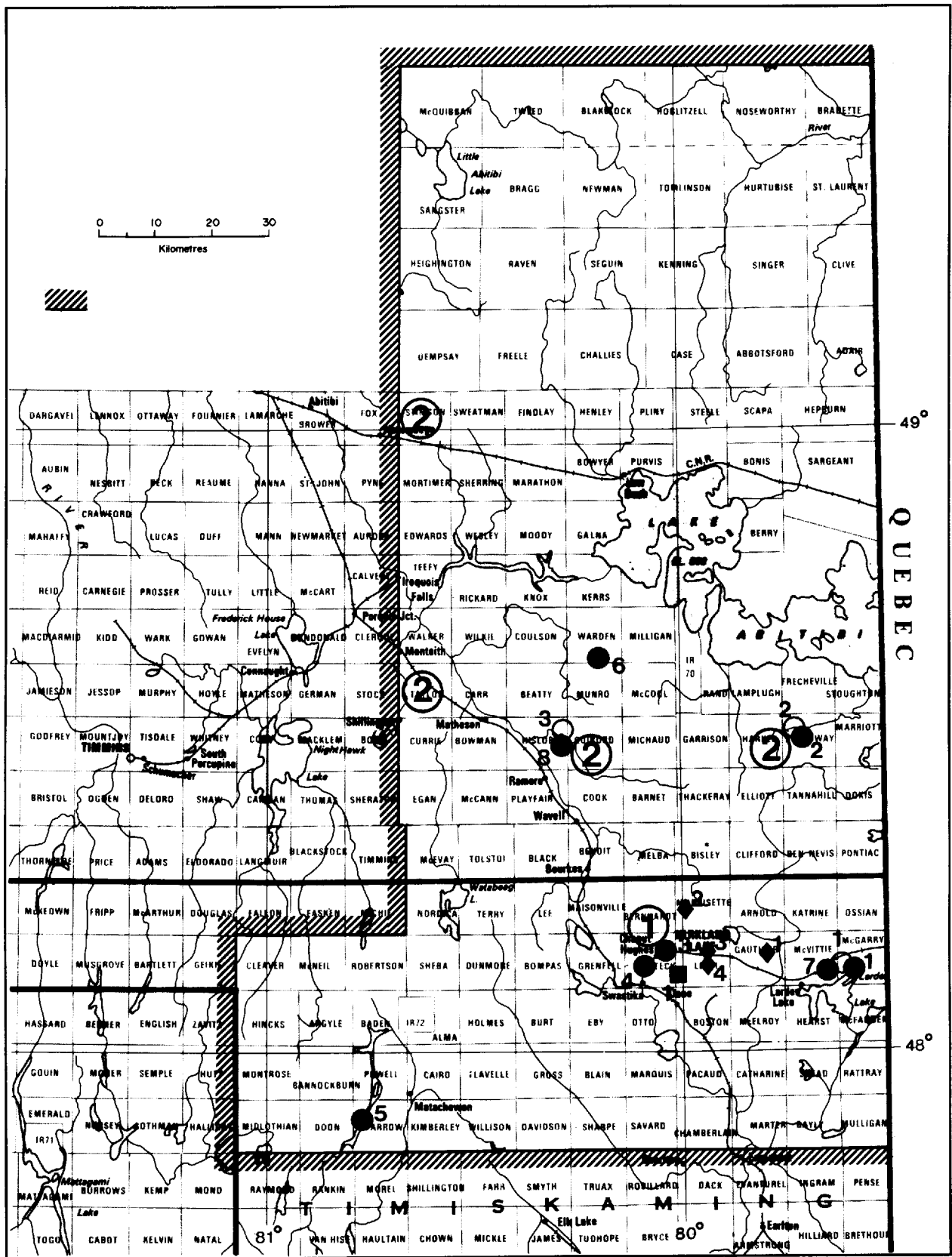


Figure 1. Kirkland Lake Resident Geologist's District

EXPLANATION

● Producing Mines, 1994

1. AJ Perron Gold Corp.
Kerr Mine Au, Ag
2. American Barrick Resources Corp.
Holt-McDermott Mine Au, Ag
3. American Barrick Resources Corp.
Lake Shore Tailings Project Au, Ag
4. American Barrick Resources Corp.
Macassa Mine. Au,Ag
5. Extender Minerals of Canada Ltd.
Yarrow Township Mine barite
6. Hedman Resources Ltd.
Hedman Mine. hedmanite (serpentine filler)
7. Northfield Minerals Inc. - Towerland Properties Inc.
Cheminis Mine Au
8. St Andrew Goldfields Ltd.
Hislop Mine. Au

○ Advanced Exploration Projects

1. Armistice Resources Ltd.
Armistice Mine Au
2. Hemlo Gold Mines Inc.-Teddy Bear Valley Mines Ltd.
Lightning Zone Au
3. Royal Oak Mines Inc.
Hislop Gold Property Au

■ Producing Quarries

1. Tundra Granite and Marble
Teck Township Project marble ("green-carbonate")

◆ Property Visits

1. DKO Property
2. Nettie Lake Area
3. Lebel Oro Prospect
4. Pawnee Kirkland Prospect

① Location of OGS Field Party

1. Multimedia geochemical study of tailings dispersion (R.G. Jackson)
2. Multimedia geochemical study of mineralization covered by thick overburden (R.G.Jackson & D.M. Stephenson)

Table 1. Gold Production in the Kirkland Lake Resident Geologist's District - 1993-1994.

Mine Owner	Township	Tons Milled		Production (oz Au)		Recovered Grade (oz Au/t)	
		1993	1994	1993	1994	1993	1994
Cheminis Northfield Resources Inc.	McVittie	26,126	63,582	2,382	6,254	0.099	0.098
Hislop East St Andrew Goldfields Ltd.-Towerlands Properties Inc.	Hislop	20,708	122,135	1,634	17,401	0.079	0.142
Holt-McDermott American Barrick Resources Corp.	Holloway	427,700	405,000	64,219	59,800	0.150	0.155
Kerr AJ Perron Gold Corp.	McGarry	291,520	257,000	15,350	22,000	0.053	0.086
Lake Shore American Barrick Resources Corp.	Teck	334,148	412,297	17,017	25,466	0.051	0.081
Macassa American Barrick Resources Corp.	Teck	150,697	61,226	71,200	19,856	0.472	0.324
Total Including Tailings		1,250,899	1,321,240	171,802	150,777	0.137	0.114
Total Excluding Tailings		916,751	908,943	154,785	125,311	0.169	0.138

Table 2. Gold Production in the Kirkland Lake Resident Geologist's District to 1994.

Mine	Township	Tons Milled	Production (oz. Au)	Grade (oz. Au/T)	Years of Production
Aljo	Beatty	2,333	42	0.018	1940
American Eagle	Munro	60	40	0.667	1911
Argyll	Beatty	25	30	1.2	1918
Ashley	Bannockburn	157,076	50,123	0.32	1932-36
Barber Larder	McGarry	30,118	3,072	0.1	1988
Barry Hollinger	Pacaud	267,741	77,000	0.26	1918,25-36,44-46
Bidgood	Lebel	586,367	160,184	0.27	1934-51
Blue Quartz	Beatty	500	81	0.162	1923,26,28,34
Bourkes	Benoit	1,298	277	0.21	1918,36-38
Buffonta	Garrison	117,013	12,139	0.103	1981,91-92
Canadian Arrow	Hislop	279,593	17,045	0.06	1980-83
Canamax (Matheson Project)	Holloway	38,675	5,391	0.14	1988
Cathroy Larder (Mirado)	McElroy	89,719	10,231	0.11	1941-44,47,57,87
Centre Hill**	Munro	327,007	422	0.001	1967-70
Cheminis*	McVittie	138,773	13,890	0.100	1991-
Chesterville	McGarry	3,260,439	358,880	0.11	1930-52
Croesus	Munro	5,333	14,859	2.79	1915-18,23,31-36
Eastmaque (tailings)	Teck	1,051,744	28,740	0.027	1988-91
Gateford (Swastika)	Teck	103,684	30,068	0.29	1910-47***
Golden Summit	Maisonville	737	57	0.077	1936-37,45
Gold Hill	Catharine	4,616	660	0.143	1927-28
Gold Pyramid	Guibord	175	36	0.206	1911

Mine	Township	Tons Milled	Production (oz. Au)	Grade (oz. Au/T)	Years of Production
Hislop Mine (Hislop East)*	Hislop	205,125	31,270	0.152	1990-91,93-
Holt-McDermott*	Holloway	3,256,208	377,438	0.116	1988-
Hudson-Rand	Teck	6,496	483	0.074	1922
Kerr*	McGarry	39,873,311	10,423,349	0.261	1911,38-
Kirkland Lake	Teck	3,140,283	1,172,955	0.37	1916-60
Kirkland Townsite	Teck	4,230	1,921	0.45	1958-59
Laguerre	McVittie	40,514	7,568	0.19	1937-39
Lake Shore	Teck	17,117,923	8,573,246	0.5	1918-65,82-87
Macassa*	Teck	7,354,120	3,279,898	0.446	1933-
Macassa (tailings)*	Teck	1,713,445	97,711	0.057	1987-
Matachewan Consolidated	Powell	3,525,200	378,101	0.11	1934-54
McBean	Gauthier	557,621	45,900	0.08	1984-86
Miller Independence	Pacaud	31	59	1.903	1918
Moffat-Hall	Lebel	16,388	4,780	0.29	1934-35
Morris Kirkland	Lebel	127,253	16,999	0.13	1936-38,40-42
New Telluride	Skead	104	62	0.596	1931-32
Omega	McVittie	1,615,081	214,098	0.13	1913,26-28,36-47
Queenston	Gauthier	1,054	177	0.168	1941
Ross	Hislop	6,714,482	995,832	0.15	1936-89
Ryan Lake**	Powell	188,790	1,352	0.01	1948-57,62-64
Stairs	Midlothian	15,835	3,573	0.23	1965-66
Sylvanite	Teck	5,049,536	1,674,808	0.33	1927-61
Teck Hughes	Teck	9,565,302	3,709,007	0.38	1917-68
Toburn	Teck	1,186,316	570,659	0.48	1912-53***
Upper Beaver	Gauthier	580,562	140,709	0.24	1913-72***
Upper Canada	Gauthier	4,648,984	1,398,291	0.3	1938-71
White-Guyatt	Munro	50	10	0.2	1911
Wright Hargreaves	Teck	9,934,327	4,821,296	0.49	1921-65
Young Davidson	Powell	6,213,272	585,690	0.1	1934-57
Total including tailings		129,114,869	39,310,509	0.304	
Total excluding tailings		126,349,680	39,184,058	0.310	

* Producer in 1994

** Base Metal Producer

*** Intermittent Production

Table 3. Gold Reserves in the Kirkland Lake Resident Geologist's District to 1994.

Mine/Property	Township	Tons	Grade	Ounces
Producing Mines (1993)				
Cheminis	McVittie	2,800,000	0.168	470,400
Hislop	Hislop	470,520	0.18	84,694
Holt-McDermott	Holloway	3,915,000	0.224	876,960
Kerr (as of March 31, 1994)	McGarry	4,604,900	0.138	635,476
Macassa (estimated tons)	Teck	3,000,000	0.333	1,000,000
Macassa (tailings)	Teck	1,755,000	0.07	122,850
Other Properties				
Amalgamated Kirkland (Cyprus)	Teck	1,900,000	0.16	304,000
Anoki	Gauthier	650,000	0.136	88,400
Argyll (Maude Lake)	Beatty	813,414	0.24	195,219
Armistice	McGarry	242,224	0.175	42,389
Barber Larder	McGarry	60,000	0.16	9,600
Blue Quartz	Beatty	109,000	0.484	52,756
Buffonta	Garrison	400,000	0.15	60,000
Creek Zone	Hislop	1,118,000	0.184	205,712
Cyrus Zone (1993)	Teck	1,000,000	0.2	200,000
Eastmaque	Teck	6,800,000	0.033	224,400
Fenn-Gib	Guibord-Michaud	16,400,000	0.057	929,978
Garrcon	Garrison	350,900	0.19	66,671
Glimmer	Beatty-Hislop	1,498,355	0.274	410,799
Golden Harker	Harker	500,000	0.16	80,000
Hislop West	Hislop	19,230	0.59	11,346
Iris	Harker	769,756	0.07	53,883
Lightning	Holloway	6,414,100	0.197	1,263,578
Ludgate	Michaud	650,000	0.17	110,500
Matachewan Consolidated	Hislop	93,000	0.11	10,230
Newfield	Garrison	513,000	0.28	143,640
Omega	McVittie	280,000	0.16	44,800
Porphyry	Taylor	316,823	0.08	25,346
Ross	Hislop	1,055,000	0.125	131,875
Shoot Zone	Taylor	2,100,000	0.111	233,100
Teck Hughes	Teck	400,000	0.250	100,000
Upper Beaver	Gauthier	200,000	0.23	46,000

Upper Canada	Gauthier	1,780,000	0.28	498,400
Victoria Creek	Gauthier	4,720,000	0.132	623,040
West Porphyry	Taylor	274,000	0.21	57,540
Young Davidson	Powell	5,420,000	0.119	644,980
Total including tailings		73,392,222	0.137	10,058,562
Total excluding tailings		64,837,222	0.150	9,711,312

Table 4. Exploration activity during 1994.

BM	Beep Mat Survey	IP	Induced Polarization Survey
DD	Diamond Drilling	M	Magnetic Survey
EM	Electromagnetic Survey	OVD	Overburden Drilling
Gc	Geochemical Survey	P	Prospecting
GL	Geological Survey	SA	Sampling
GP	Geophysical Survey (unspecified)	sTr	Stripping
Gv	Gravity Survey		

Township(s)	Company/Name (Property)	Activity	Source
Argyle	Kiernicki, F.	P, sTr, Gc	OPAP
Arnold	Kalahari Resources Inc. (Brokers Fee)	DD	
Arnold	Merrick, A.	DD	
Arnold, Morrisette	Strike Mineral Inc. - Findore Minerals Inc.	DD, M, EM	
Beatty	Ferderber, H.	P, SA, GP, GL	OPAP
Beatty, Hislop	Hemlo Gold Mines Inc. - Glimmer Resources Inc.)	DD(46)(5000m)	OMIP
Ben Nevis	Kiazyk, B.	DD(2)(983'), SA	OPAP
Benoit	Madill, B.	P, SA, GP, Gc	OPAP
Benoit	OTIS J. Explorations (Carmichael, S.)	PW, EM, M	OPAP
Benoit	Skjonsby, K.	DD, GP	OPAP
Benoit	Ward, J.T., Jaspersen, J.K.	P, SA, GP	OPAP
Bernhardt	Link, T.	DD(1)	
Black	Black-Leahy-Bochawna J.V.	sTr, SA, GL, DD(3), IP	OPAP
Boston	Carmichael, S.	PW, M, GL	OPAP
Bowman	Beckett, B.T.	BM, sTr	OPAP
Burt, Eby, Grenfell	Westminer Canada Ltd.	DD, M, Gv	
Cairo	Tagliamonte, F.	P, SA, GP, sTr	OPAP
Cairo	Tchajkov, I.	P, GI, SA	OPAP
Carr	Pokino Prospecting Syndicate	DD	OMIP
Catharine	Atapa Minerals Ltd.	DD(31)(3000m), Gc, GP, SA	OMIP
Catharine	Ploeger, F., Hill, R.	P, SA, sTr	OPAP
Catharine	Sudbury Contact Mines Limited (F. Marshall)	DD, M, EM, GL, sTr, SA	
Eby	Greater Lenora Resources Corp.	DD(1)	

Township(s)	Company/Name (Property)	Activity	Source
Eby	Reed, J.	P, GL, GP, SA, sTr	OPAP
Eby	Robinson, D.	GP, SA, sTr, GL, Gc	OPAP
Edwards	Benham, W.	DD	OPAP
Edwards	Ellgring, F.H.	GL, GP, SA	OPAP
Egan	Hopson, R.	sTr, P	OPAP
Elliott	Carmichael, S.	IP	OPAP
Flavelle	Dusfresne, R., Chartre, D.	P, GL, SA	OPAP
Garrison	Jonpol Exploration Limited	DD(3)	
Gauthier	Dyment, M., Kidston, J., Obradovich, T. (DKO)	P, EM, M, IP, sTr, SA	OPAP
Gauthier	International Homestead Resources Inc. (DKO)	DD(9), IP	
Gauthier	Ploeger, F., Hill, R.	SA, sTr, DD(3)	OPAP
Gauthier	Sudbury Contact Mines Limited (Victoria Creek)	DD, M, IP	OMIP
Gauthier, McElroy	Carmichael, S.	PW, M	OPAP
Grenfell	Ducharme, M.	P, SA, GP, GL	OPAP
Grenfell	Vallier, B.	GP, GL, DD, GL	OPAP
Guibord	Tandem Resources Ltd.	OVD	
Guibord, Michaud	Pangea Goldfields Inc. (Fenn-Gib)	DD(87,000'), M	OMIP
Harker	Gwen Resources Ltd.	DD	OMIP
Harker, Holloway	Noranda Exploration Company Ltd. (Golden Highway)	DD	
Hincks	Forbes, C.	DD, SA	OPAP
Hislop	Cameco Corporation	DD, GL, GP	OMIP
Holmes	Lourim, J.	P, sTr, GP	OPAP
Lebel	Ferderber, R.	P, SA, GP	OPAP
Lebel	Queenston Mining Inc. (Pawnee)	DD(9)(9000')	OMIP
Lebel, Morrisette	Kalahari Resources Inc. (Murdock Creek)	DD(7), M, EM	
Marriott	Dmitrovic, D.	SA, GP, BM	OPAP
McGarry	Salo, A.	DD, SA	OPAP
McGarry	Transpacific Resources	GL	
McVittie	Hemlo Gold Mines Inc. (Bear Lake)	DD(4)	
McVittie	International Homestead Resources Inc.	DD	
McVittie	Northfield Minerals Inc.	DD	
McVittie	Royal Oak Mines Inc. - Sudbury Contact Mines Limited - Queenston Mining	DD, M, EM	
Melba	Carmichael, S.	PW, EM	OPAP

Township(s)	Company/Name (Property)	Activity	Source
Michaud	American Barrick Resources Corporation (Moneta - Nufort)	DD(36,000')	
Michaud	Hawley, P.J.	P, SA, GP, GL	OPAP
Moody	Westminer Canada Limited	DD, P, GP	OMIP
Morrisette	Thompson, J.	P, SA, Gc, GL	OPAP
Munro, Warden	Granges Inc.	DD, GL, Gc, GP	OMIP
Otto	Queenston Mining Inc. (Vigrass Lake)	DD(3)	OMIP
Pontiac	Chouinard, C., Griesbach, G.	sTr, SA, Gc, GP	OPAP
Powell	Royal Oak Mines Inc.	DD(4)(4500')	
Skead	Atapa Minerals Ltd.	DD	
Skead	Panthco Resources Inc. (Benson Creek)	DD, M	
Stimson	Cross Lake Mineral Ltd. - Noranda Exploration Company Ltd.	DD	
Tannahill	Bastarache, G.	DD	OPAP
Tannahill	Cutting, D.	P, SA, sTr, GL	OPAP
Teck	Campbell, R.	P, SA, Gc, GP	OPAP
Teck	Cyprus Canada Ltd. (Kirkland Lake West)	DD(4)(10,000')	
Teck	Cyprus Canada Ltd. (Amalgamated Kirkland)	DD(13)(7168.5m)	
Teck	Cyprus Canada Ltd. - International Homestead Resources Inc. (Rand)	DD(3)(1300m)	
Teck	Henriksen, G.	P, SA, Gc, GP	OPAP
Teck	Moore, H.	GL, GP, Gc	OPAP
Teck	Mullan, G.	P, SA, GP, GL	OPAP

Table 5. Assessment, donations, OMIP and OPAP files processed in 1994.

AEM	Airborne Electromagnetic Survey	M	Magnetic Survey
AM	Airborne Magnetic Survey	OVD	Overburden Drilling
BM	Beep Mat	PEM	Pulse Electromagnetic Survey (down hole)
DD	Diamond Drilling	Pr	Prospecting
DH	Drill Hole Locations	PW	Physical Work (not covered elsewhere)
EM	Electromagnetic Survey	R	Resistivity Survey
Gc	Geochemical Survey	RD	Re-evaluation of Data
GL	Geological Survey	rTr	Trenching
Gv	Gravity Survey U/G	sTr	Stripping
IP	Induced Polarization Survey	U/G	Underground Geology

Township(s)	Company/Name (Property)	Activity	File Number(s)
Abbotsford, Adair	BPH-Utah Mines Ltd. (Abbotsford Property)	DD(15)(2069m), PW, M, EM, Gv, Gc, SA, AEM, AM	KL-3415, KL-3416
Abbotsford, Adair, Hepburn, Kenning, Singer	BPH Minerals Canada Ltd. (Abbotsford Properties)	DD(16)(2473.8m), PW, GL, Gc, M, EM, SA	KL-3278, KL-3284, KL-3486
Adair	Noranda Exploration Company Ltd. (Adair 1-89 Property)	GL	KL-3375

Township(s)	Company/Name (Property)	Activity	File Number(s)
Adair, Hepburn, Scapa	Griesbach, G.	Pr, SA	KL-3446
Alma, Cairo, Catharine, Gauthier, Lebel, McElroy, MacGarry, McVittie, Pacaud, Playfair	Hill, R., Ploeger, F.	DD(3)(393'), sTr, rTr, GL, Pr	KL-3453
Alma, Cairo, Pacaud	Ploeger, F.R. (Pacaud Group)(Alma/Cairo Group)	GL	KL-3383
Alma, Cairo, Holmes, Flavelle	Biragler Resources Ltd.	GL, Pr, M, EM	KL-3229, KL-3230
Argyle	Joutel Resources Ltd. (Tom Fox Project)	GL, AEM, AM, EM, SA	KL-3422
Argyle	Sudbury Contact Mines Ltd. (Blake River Project)(Whelan Property)	EM, M	KL-3493
Argyle	Kiernicki, F.	M, EM, AEM, GL, SA	KL-3247
Argyle, Baden	Richardson, N.	GL, SA	KL-3389
Argyle, Bannockburn	Kiernicki, F. (Ashley West Property)	DD(3)(1113'), SA	KL-3445
Argyle, McNeil, Robertson	Trinity Explorations	EM, M, GL, SA	KL-3480
Arnold	Kalahari Resources Inc. (Crossroads Property)	IP, M, EM, R	KL-3543
Arnold	Leahy, M. (Victoria Lake Property)	OVD(3)(162')	KL-3332
Arnold	Merrick, A. (Motherwell E/W Grid 1993)	M, EM, GL	KL-3231
Arnold, Ben Nevis, Bisley, Gauthier, Holloway, Katrine, Marriott, Melba, Rand, Tannahill	Sudbury Contact Mines Ltd. (Blake River Recon. and Moosehead Lake Project)	GL, SA, PW	KL-3302
Arnold, Gauthier, Katrine, McVittie	Sudbury Contact Mines Ltd. (Mossehead Claims Group)	OVD, SA, DD(20)(338m)	KL-3302
Arnold, Lebel, Morrisette	Mullan, G.J.	GL, M	KL-3254, KL-3364
Arnold, Lebel, Morrisette	Pamorex Minerals Ltd. (Murdock Creek Property)	GL, Pr	KL-3324
Arnold, Lebel, Morrisette	Mullan, G.J. (Victoria Lake Property)	EM, M, GL	KL-3465
Arnold, Morrisette	Kinbauri Gold Corporation	DD(91)(300')	KL-3326
Barnet	Canadian Nickel Company Ltd.	M, EM, SA	KL-3309
Barnet	Skojonsby, K.	DD(3)(207')	KL-3372
Beatty	Blue Quartz, Devon and Clifford Gold Mines	DD, GL, SA, U/G	KL-3529
Beatty	Falconbridge Ltd.	PW, EM, M	KL-3362
Beatty	Hollinger Consolidated Gold Mines Ltd.	DH, M, GL, SA, EM	KL-3531
Beatty	Lalonde, D.	EM, M	KL-3519
Beatty	Trinity Explorations	GL, SA, EM, M, Pr	KL-3519
Beatty, Coulson	Kingswood Resources Ltd. (Devon Property)	DD(17)(7889')	KL-3273
Ben Nevis, Clifford, Pontiac	Rio Algom Exploration Inc. (Marten Lake-Grid#1 Project 9206)	GL, EM, SA	KL-3246

Township(s)	Company/Name (Property)	Activity	File Number(s)
Ben Nevis, Tannahill	Strike Minerals Inc.	M	KL-3307
Benoit	Carmichael, S. & Whelan, J.	M, EM	KL-3253
Benoit	Hawley, P.J.	AM, AEM, GL, Pr, M, EM, SA	KL-3455
Benoit	Jasperson, J.	OVD(2)(474'), SA, Gc, Gv	KL-3297, KL-3472, KL-3340
Benoit	Lourim, J. (Butler/Eleven Property)	DD(1)(394'), Gc, sTr	KL-3379, KL-3441
Benoit	Rodholm, C.	SA	KL-3318
Benoit	Rodholm, C. & Rodholm, C.	PW	KL-3353
Benoit	Ward, J.T.	Gv	KL-3313
Benoit, Maisonville	Villeneuve Resources Ltd. (Benoit-Maisonville Township Claim Group)	DD(4)(1765'), SA	KL-3381, KL-3272
Berhardt	Boone, P.	sTr	KL-3373
Bernhardt	Trinity Exploration	GL, M, EM, Pr, SA	KL-3232
Bernhardt, Morrisette	Glencairn Explorations Ltd. (Goodfish Property)	DD(4)(2565'), U/G, SA	KL-3396
Bernhardt, Morrisette	Merrick, A. (Dorothy Lake)	GL, M	KL-3233, KL-3235
Bisley	Davies, M. & Davies, R. (Nikila Lake Claims)	PW, EM, GL, Gc	KL-3450
Bisley	Davies, M., Davies, R. & Davies, A.	Gc, GL, SA	KL-3223
Bisley	Duquette, E.A.	Pr, SA	KL-3473
Bisley	Sudbury Contact Mines Limited (Blake River Recon. Project)	M, IP, R	KL-3287, KL-3316
Bisley	Sudbury Contact Mines Limited (Blake River Recon., O-Block Property)	PW, M, IP, R	KL-3404
Bisley	Sudbury Contact Mines Limited (Blake River Recon., Q-Block Property)	PW, M, IP, R	KL-3407
Bisley	Tagliamonte, F.P.	GL, EM, M, IP, SA	KL-3366
Bisley	Tagliamonte, F.P. & Toews, F.H. (Bisley & Melba Pwp Project)	EM, GL, SA, BM	KL-3514
Bisley, Melba	Tagliamonte, F.P.	GL, M, EM, SA	KL-3259
Bisley, Melba	Tagliamonte, F.P. & Toews, F.H. (Bisley & Melba Pwp Project)	GL, EM, M, SA	KL-3385
Black	Joutel Resources Ltd. (Canuc Joint Venture - Butler Lake Group)	EM	KL-3234
Black	Leahy-Black Joint Venture (Bochawna Copper Mines Ltd.)	DD(3)(654'), IP, sTr, SA	KL-3501
Black	Regal Goldfields Ltd. (Butler Lake Property)	IP	KL-3255
Black	Trinity Explorations	GL, SA	KL-3516

Township(s)	Company/Name (Property)	Activity	File Number(s)
Bonis, Hepburn, Scapa	Seal River Exploration Ltd. (Departure Creek Property)	M, EM, SA	KL-3312
Boston	Perron, A.H. (O'Donald Lake Claim)	RD, EM, M	KL-3281, KL-3499
Boston, McElroy	Paerron, A.H. (Gwen-23 Claim Group)	GL	KL-3282
Bradette	TVX Gold Inc. (Casa Barardi Project)	DD(3)(665m), IP, SA	KL-3320
Burt, Eby, Gross, Otto	McCormick, D.	PW, GL, Gc, SA	KL-3447
Cairo	Dufresne, R. & Chartre, D.	Pr, rTr, M, EM, SA, sTr, GL	KL-3311, KL-3241, KL-3481
Cairo	Tagliamonte, F.P.	GL, Pr, IP, EM, M	KL-3237, KL-3344
Cairo	Tagliamonte, F.P. & Toews, F.H. (Cairo Township Project)	GL, EM, M, SA, BM	KL-3387, KL-3513
Cairo, Flavelle	Biralger Resources Ltd.	M, EM	KL-3230
Carr	Harley Phibbs Project	EM, M, sTr	KL-3459
Carr	Parsons, G.E.	DD(3)(1265'), M, SA	KL-3479
Carr	Pentland Firth Ventures (McChristie Option)	M	KL-3541
Carr, McCool, Munro, Warden	McChristie, N.	SA, sTr, rTr	KL-3461
Catharine	Cook-Gamble Property	DD(1)(2831'), SA	KL-3391, KL-3442, KL-3295
Catharine	Hill, R.	GL	KL-3258
Catharine	International Kengate Ventures (Catharine Twp Property)	DD(6)(478'), EM, M	KL-3492, KL-3498
Catharine	Kiernicki, F. & Kosy, G.	DD(3)(292m)	KL-3328
Catharine	Kosy, R. (Kosy-Salo Property)	DD(2)(704'), SA, EM, M	KL-3417, KL-2448, KL-3478
Catharine	Patrick, T. & Kosowan, L. (Misema River Property)	M, GL, Gc, SA	KL-3475
Catharine	Perron, A.H.	PW	KL-3330
Catharine	Santa Fe Canadian Mining Ltd. (Kaliniuk Property)	M, EM	KL-3303
Catharine	Santa Fe Canadian Mining Ltd.	DD(2)(1006')	KL-3351
Catharine	Wigglesworth, F. & Ferguson, R.	DD(1)(490'), sTr, rTr, M, SA	KL-3319, KL-3482
Catharine, Gauthier, McElroy	Ploeger, F. & Hill, R. (Catharine Group)(Gauthier Group)	DD(2)(255'), GL, sTr, rTr, SA	KL-3384
Catharine, McElroy, Hearst	Mirado Nickel Mines	DH, GL, SA, U/G	KL-3523
Catharine, McElroy	Yama Gold Mines (Boston Creek)	GL, SA, DH, U/G	KL-3528
Catharine, Mulligan	Ellgring, F.H.	EM, M	KL-3522
Catharine, Pacaud	Atapa Minerals Ltd. (Block 1 & 1A)	DD(6)(959'), SA, GL, Gc, IP	KL-3290
Catharine, Pacaud	Trinity Explorations (Mindoka Prospect)	GL, Pr, M, EM, SA	KL-3456

Township(s)	Company/Name (Property)	Activity	File Number(s)
Cleaver	Durham, B. (O'Connor Gold Property)	GL, rTr, M, EM, IP, SA	KL-3245
Clifford	Joutel Resources Ltd.(Clifford Township Project)	M	KL-3470
Clifford	Joutel Resources Ltd.	M	KL-3325
Clifford	Regal Goldfields Ltd. (C-14 Pipe)	EM, M	KL-3432
Clifford, Elliott	Merrick, A. (A&A Mining Claims)	GL, SA	KL-3238
Cook	Marshall, C.	sTr	KL-3337
Cook, Playfair	Hollinger Mines Ltd. (Sand Claims)(Tremblay, F. Claim)	GL	KL-3532
Coulson	Campsall, L.	sTr, rTr	KL-3370
Coulson, Fox	Noranda Exploration Company Ltd.	DD(1)(227.4m)	KL-3350
Coulson, Warden	Noranda Exploration Company Ltd. (Shallow River Property)	GL, EM, M, SA	KL-3286, KL-3334
Currie	Salo, J.G.	PW	KL-3521
Dokis, Pontiac	Poirier, E. (Poirier Claim Group)	Pr, SA, IP, Pw	KL-3472
Eby	Rigas, N. (Eby West & Eby East Properties)	GL, sTr, SA	KL-3454
Eby	Westminer Canada Ltd.	DD(3)(830.6m), SA	KL-3305
Eby	Greater Lenora Resources Corporation	GL, M, OVD(4)(57m), SA	KL-3299
Edwards	Benham, W.	EM, M, GL	KL-3227
Edwards	East West Resources Corp.	M	KL-3500
Egan, Sheraton, Timmins	Kaltwasser, R.F. & Demarchi, D.	sTr, SA	KL-3520
Elliott	Bastarache, G. & Mathias, A.	IP	KL-3262
Elliott	Carmichael, S. & Mullan, G.	GL, M, EM	KL-3252
Elliott	The Perron Gold Corp. (Ghost Lake Grid 94)	M	KL-3321
Elliott, Harker	Perrex Resources Inc. - Alberta Gold Corp. (Perrex-Iris J.V. Project)	GL, EM, M	KL-3430
Elliott, Thackeray	Perrex Resources Inc. (Ghost 50 Group)	GL	KL-3323
Elliott, Thackeray	Perron, A.H.	PW, EM	KL-3360
Flavelle	Dufresne, R. & Chartre, D.	sTr, SA	KL-3449
Frecheville	Seal River Exploration Ltd.	M,EM	KL-3358
Garrison	Deak Resources Corp. (The New Buffonta)	BS	KL-3279
Garrison	JONPOL Explorations Ltd. & T&H Resources Ltd. (Garrison Gold Project)	DD(9)(3384'), EM, M, sTr, SA	KL-3397
Garrison	Mahood-Greer, M. (M.G. Three Claims)	Gc, SA, sTr, rTr	KL-3438
Garrison, Michaud	Moses, J.R.	DD(1)(343m)	KL-3367

Township(s)	Company/Name (Property)	Activity	File Number(s)
Garrison, Harker	Noranda Exploration Company Ltd. (Golden Highway Thackeray Creek)	DD(8)(2452.4m)	KL-3285
Garrison, Harker	Noranda Exploration Company Ltd.	DD(222)(13912.8m)	KL-3335, KL-3347
Garrison, Holloway, Thackeray	Perron, A.H. (The New Buffonta)	M, EM	KL-3280
Garrison, Michaud	Moneta Porcupine Mines	SA	KL-3510
Gauthier	Dyment, L.M. (DKO Property)	GL, sTr	KL-3288
Gauthier	Kidston, J.	DD(1)(405'), SA	KL-3250
Gauthier	Queenston Mining Inc. (Jascan Claims)	Pr, SA	KL-3537
Gauthier	Sudbury Contact Mines Limited (CTL Option)	IP, M, EM	KL-3251
Gauthier	Sudbury Contact Mines Limited (Victoria Creek Project)	EM, M	KL-3517
Gauthier, McElroy	Hill, R. (Moose Crossing Property)	DD(2)(255')	KL-3269
Gauthier, Hearst, McElroy, McVittie	Sudbury Contact Mines Limited (Diamond Lake Property)	DD(10)(1573m), M, EM, Gv, AEM, AM	KL-3301, KL-3403, KL-3425, KL-3426
Gauthier, McElroy, McVittie, Melba, Tannahill	Sudbury Contact Mines Limited (Diamond Lake & Blake River Recon. Properties)	DD(16)(2244.5m), PW, SA	KL-3401
Gauthier McVittie	Beaverhouse Resources Ltd. (Upper Beaver Project)	DD(17)(24693'), SA, PEM	KL-3437
Gauthier, McVittie	Skead Holdings Ltd. (Diamond Lake Grid)	M, EM, Gv	KL-3315
Gauthier, McVittie	Sudbury Contact Mines Limited. (Royal Oak Mines Ltd. - Beaverhouse Option JV)	DD(5)(631.1m), SA	KL-3310
Gauthier, Hearst, McElroy, McVittie, Mulligan, Skead, Rattray	Sudbury Contact Mines Limited (The Diamond Lake and Wendigo Project Areas)	DD(11)(2220m), KL-3424, SA	KL-3424
Grenfell	Leahy, M. (Hotchkin Lake Property)	OVD(4)(25m)	KL-3327
Grenfell	Vallier Exploration (Kapakita Creek Property)	DD(8)(2230'), GL, EM, SA, M, AM, AEM	KL-3236, KL-3439, KL-3458, KL-3471
Guibord	Homestake Canada Inc.	M, GL, Gc, PW, SA	KL-3352
Guibord	Homestake Minerals Development Company (United Reef Petroleum Ltd. Property)	DD(4)(739.2m), PW, M, SA	KL-3395
Guibord	Tandem Resources Ltd. (Metal Option)	DD(27)(278m), M, IP, R, OVD, GL, SA	KL-3304
Guibord, McCool, Michaud, Munro	American Barrick Resources Corp. (Meunier Project)	DD(3)(967.6m), GL, SA	KL-3243
Guibord, Michaud	Falconbridge Ltd.	DD(5)(3816'), SA	KL-3414
Halliday, Midlothian	Rio Algon Exploration Inc. (Project 9208)	GL, SA	KL-3317
Harker	Neal, H.E.	DD(6)(141m), PW, SA	KL-3443

Township(s)	Company/Name (Property)	Activity	File Number(s)
Harker	Perrex Resources Inc.	EM	KL-3365
Harker, Holloway	Hemlo Gold - Freewest JV (Holloway & Teddy Bear Properties)	DD(19)(11834m), SA	KL-3431
Hearst	MacGregor, R.A.	DD(2)(358'), SA, P	KL-3276
Hearst, McElroy	MacGregor, R.A.	PW, M, SA	KL-3357
Hearst, McElroy	Skead Holdings Ltd. (Spring Lake Project)	DD(11)(1356.2m), M, EM, IP, R	KL-3345
Hearst, McElroy, McVittie, Skead, Rattray	MacGregor, R.A.	SA	KL-3469
Hearst, McVittie	MacGregor, R.A.	EM	KL-3277
Hincks	GRQ Syndicate	PW, Pr, GL, sTr, SA, M, EM	KL-3451
Hincks	Halladay, L.B.	Pr, SA	KL-3444, KL-3382
Hislop	Noranda Exploration Company Ltd. (Glimmer Property)	DD(4)(673m)	KL-3538
Hoblitzell	Aurizon Mines Ltd.	DD(6)(1325m), SA	KL-3394
Hoblitzell, Noseworthy	Royal Oak Mines Inc. (Mikwan JV)	DD(9)(2597m), SA, GL	KL-3266
Holloway	Perron, A.H. (HT-21 Group)	GL	KL-3497
Holloway, Tannahill	Bastarache, G.	sTr, rTr, SA	KL-3348
Holloway, Tannahill	Bastarache, G. (Magusi Property)	DD(1)(361'), IP	KL-3542
Holmes	Sutton, M.W.	DD(9)(634'), GL, SA	KL-3244, KL-3355, KL-3468
Katrine	Kiazyk, B.	DD(2)(248')	KL-3374
Katrine	Sudbury Contact Mines Limited (Blake River Recon. J-Block Property)	IP, M	KL-3410
Katrine	Wilson, M.	M	KL-3483
Katrine, Tannahill, Rand	Sudbury Contact Mines Limited (Blake River Recon. Project)	M, IP	KL-3287, KL-3316
Lamplugh	Seal River Exploration Ltd. (Lightning River Property)	Gc, PW, SA	KL-3376, KL-3398
Lamplugh, Rand	Lapierre, K.	M	KL-3503
Lebel	Lac Minerals Ltd.	DD(8)(9133')	KL-3331
Lebel	Ramshackle Resources Inc. (King Kirkland Gold Property)	IP, M	KL-3248, KL-3507
Lebel, Teck	Waldie, S. (Harvey Kirkland Property)	sTr, rTr, SA	KL-3466
Maisonville	Dyment, L.M. (Goose Egg Lake Claims)	EM DD(1)(645')	KL-3249
Maisonville	Dyment, L.M. (White Clay Grp)	M, EM	KL-3289
Maisonville	Dyment, L.M. (Twin Lakes Property)	GL, SA	KL-3534
Mainsonville	Dyment, L.M. (Maisonville Pipeline)	PW, GL, M, EM, Gc, SA	KL-3462

Township(s)	Company/Name (Property)	Activity	File Number(s)
Mainsonville	Joutel Resources Ltd. (Canuc Project)	AEM, AM	KL-3419
Maisonville	Kidston, J.A. (Maisonville Pipeline North & South)	GL, EM, M, sTr, SA, PW	KL-3392
Maisonville	Mullan, G.J.	SA	KL-3226
Mainsonville	Trinity Explorations (Wickstead Propsect)	sTr, GL, M, EM, SA	KL-3457
Marathon	East West Resources Corporation	M	KL-3504
Marathon, Sherring	Cross Lake Minerals Inc.	M	KL-3496
Marriott	Noranda Exploration Company Ltd.	DD(5)(1438m)	KL-3349
Marriott	West Viking Exploration Ltd. (McDiarmid Lake Project)	EM, M	KL-3433
Marter	Richardson-Kurz Property	GL, SA, EM, M	KL-3388, KL-3440
McCool	Granges Inc. (McCool Project #537)	M, EM	KL-3275
McCool, Munro	Granges Inc. (Munro Lake Property)(McCool Twp Project)	PW, M, EM	KL-3399
McCool	Von Cardinal, T. (McCool Twp Property)	EM, M	KL-3464
McElroy	Black Hawk Mining Inc. (Big Bend Property)	DD(4)(962'), SA	KL-3418
McFadden	Forbes, C.	M, PW	KL-3356
McFadden, McGarry	Wright, B.	GL, SA	KL-3267
McGarry	Beckett-Salo Property	PW, GL, EM	KL-3412
McGarry	Boucher, D.R. (Foxearth Lake Project)	GL, SA, M	KL-3265
McGarry	Cyprus Canada Inc. (Kerr Mine)	DD(8)(11040'), U/G, SA, GL, Gc	KL-3400, K1-3488
McGarry	Kennecott Canada Inc. (Pelangio-Larder JV)	DD(14)(16114m), SA	KL-3393, KL-3421
McGarry	McGregor, R.A.	Pr, SA	KL-3336, KL-3363
McGarry	Noranda Exploration Company Ltd. (Bear Lake Project)	DD(1)(685m)	KL-3533
McGarry	Proprietary Mines Ltd. (Kerr Addison, Harris Maxwell & Dr. Reddick)	Pr	KL-3300
McGarry	Salo, A. (Foxearth Property)	GL	KL-3261
McGarry	Salo, A. (Salo-Dump)	DD(1)(471')	KL-3539
McGarry	Salo, A.	DD(4)(1229')	KL-3505
MacGarry	Sudbury Contact Mines Limited (Wendigo Project)(Wright Property)	EM, M	KL-3502
McGarry, McVittie	Beckett, T.	AM, AEM, Pr	KL-3377
McNeil	Argyle Ventures Inc.	PW	KL-3368

Township(s)	Company/Name (Property)	Activity	File Number(s)
McNeil	Queenston Mining Inc./Stike Minerals Inc. (McNeil Project)	PW, AEM, AM, EM	KL-3435
McQuibban	Glencairm Exploration Ltd.	DD(1)(329')	KL-3296
McVittie	Cheminis & Fernland Gold Mines Ltd.	GL, U/G	KL-3524
McVittie	Forbes, C. (Fork Lake Project)	DD(2)(1026'), SA	KL-3293
McVittie	Queenston Mining Inc.-Royal Oak Mines Ltd. (Lac/McVittie JV)	DD(4)(3432')	KL-3420
Melba	Boone, P.	sTr, rTr, SA	KL-0523
Melba	Gleason-Rampton Exploration (Melba CLaim Group)	DD(1)(184.5m), Pr, SA	KL-3477, KL-3260
Melba	Sudbury Contact Mines Limited (Blake River Recon. Project)	M, IP, R	KL-3316
Melba	Sudbury Contact Mines Limited (Blake River Recon. M-Block Property)	PW, M, IP, R	KL-3405
Michaud	Falconbridge Ltd. (Garrison Creek)	DH, SA	KL-3339
Michaud	Homestake Canada Inc.	DD(17)(493.2m), SA	KL-3298
Michaud	Trinity Explorations	EM, M, GL, SA, Pr	KL-3511
Milligan	Hedman Resources Ltd. (McCool-Milligan)	DD(2)(307m)	KL-3155
Milligan	Hedman Resources Ltd. (Milligan Lake Property)	EM, M	KL-3508
Milligan	Hedman Resources Ltd.	DD(1)(152.4m)	KL-3512
Milligan, Munro	McChristie, N.	sTr, rTr, SA	KL-3484
Montrose	Inco Ltd.	M, EM	KL-3341
Montrose	Mullen, D.V. (Montrose Twp Project)	Pr, SA	KL-3515
Morrisette	Gold Insight Resources Ltd. (Morrisette Twp Property)	DD(1)(121m)	KL-3271
Morrisette	Link, T.	DD(1)(970'), SA	KL-1628, KL-3270
Morrisette	Queenston Mining Inc. (Morrisette Creek Property)	M	KL-3308
Mortimer	St. Denis, R.	rTr, SA	KL-3369
Mortimer	Ward, J.T. & Ward, D.A. (Nickel PGE Project)	M, EM, IP, Gv	KL-3343
Mortimer	Ward, J.T. & Ward, D.A. (Mortimer Twp Project)	M, EM, IP, Gv	KL-3506
Mulligan	Ellring, F.	GL, P, EM, M	KL-3225, KL-3274
Mulligan	Sudbury Contact Mines Limited (Wendigo Project)(Ellring Property)	EM, M	KL-3494
Mulligan, Skead, Rattray	Sudbury Contact Mines Limited (Wendigo Lake Properties)	GL, Gc, SA, EM, Gv, M	KL-3427, KL-3428, KL-3429

Township(s)	Company/Name (Property)	Activity	File Number(s)
Munro	Ferderber, R. (Munro Project)	GL, EM	KL-3206
Munro	Lalonde, D.	M, EM	KL-3257
Munro	Mullan, G.	sTr, PW, SA	KL-3338
Munro, Warden	Granges Inc. (Potter-Doal Prospect)	DD(15)(3258.2m), EM, SA, M	KL-3489, KL-3490
Munro, Warden	Granges Inc.	EM	KL-3359
Ossian	Boudreault, B.	M, EM	KL-3291
Otto	Rivard, F.	GL, EM	KL-3346
Pacaud	Mullan, G.J. (Silver Bar Extension Prospect)	PW, M, EM, GL, SA	KL-3463
Pacaud	Tagliamonte, F.P.	M, EM	KL-3239
Pacaud	Tagliamonte, F.P. (Pacaud Twp Project)	GL, EM, M	KL-3386
Playfair	Salo, L.	sTr, rTr	KL-3518
Pontiac	Griesbach, G., Chouinard, M. & Chouinard, C. (Clarice Lake Property)	Pr, M, SA, rTr	KL-3380, KL-3197
Pontiac	Rio Algom Exploration Inc. (Orofino Option)	GL, EM, DD(1)(342m), SA, M, IP	KL-3329, KL-3256
Powell	Kiernicki, F. (102 Group)	PW, GL, EM, SA	KL-3378
Rand	Sudbury Contact Mines Limited (Blake River Recon. P-Block)	IP, M	KL-3411
Rickard	Hollinger Argus Ltd. (Rickard #1)	EM, M, AEM, GL, DH	KL-3525
Robertson	Falconbridge Ltd. (Whitefish East Grid)	M, EM	KL-3224
Robertson	Queenston Mining Inc./Strike Minerals Inc. (Robertson Twp Project)	DD(14)(4654m), GL, M, EM, SA, PEM, AEM, AM, IP	KL-3436
Robertson	Total Energold Corporation (Robertson Twp Project)	M, EM, Gc, GL	KL-3423
Robertson	Trump Reserve Minerals & Stormin Exploration Ltd. (Robertson Twp Property)	GL	KL-3413
Skead	Cameco Corporation	GL, M, EM, IP, SA, DD(9)(1405.4m)	KL-3342
Skead	Kosy, G. (Benson Lake Property)	DD(4)(1781'), GL, sTr, rTr, SA	KL-3540
Skead	Phelps Dodge Corporation of Canada Ltd. (St.Anthony Property)	M, IP, EM	KL-3322
Steele	Burns, J.G.	M, SA	KL-3240
Steele	Morin, G.J. (Little Joe Creek Property)	EM, M, sTr, Pr	KL-3485
Stoughton	Kasner, G. & Workman, A.	DD(1)(160.1m), SA,	KL-3371
Stoughton	Workman, A. (Abitibi-9 Claim Block)	GL, Gc, SA, PW, IP, M	KL-3460, KL-3467

Township(s)	Company/Name (Property)	Activity	File Number(s)
Tannahill	Sudbury Contact Mines Limited (Blake River Recon. Project)	DD(4)(520m), SA	KL-3228
Tannahill	Sudbury Contact Mines Limited (Blake River Recon. B-Block Property)	IP, M	KL-3408
Tannahill	Sudbury Contact Mines Limited (Blake River Recon. C-Block Property)	IP, M	KL-3409
Teck	Casakirk Mines Ltd.	GL, U/G	KL-3526
Teck	Cyprus Canada Inc. (Rand Property)	DD(3)(1308.6m), SA	KL-3509
Teck	Perron, A.H. (Lois Lake Grid)	EM	KL-3314
Teck	Perron, A.H.	M	KL-3361
Teck	Teck Hughes & Toburn Gold Mines	GL, U/G	KL-3527
Teck	Trinity Explorations	GL, SA, EM, M, Pr	KL-3536
Thackeray	Perron, A.H. (Thackeray Lake Claims)	GL	KL-3283
Thackeray	Perron, A.H.	GL	KL-3354
Thackeray	Perron, A.H. & Merrick, A. (AAK Group)	GL	KL-3354
Walker	Cosby, M.S. (Walker Twp Claims)	M	KL-3495
Wesley	Greater Lenora Resources (Wesley Twp Property)	DD(1)(71.6m)	KL-3476
Wesley	Kasner, G.C. (Wesley Twp Property)	DD(1)(123.5m), EM, M	KL-3476
Wilkie	Falconbridge Ltd. (Wilkie Twp Property)	DD(1)(184.0m), M, EM	KL-3264
Wilkie	Fournier, E.	DD(3)(1315')	KL-3294

Table 6. Selected references received in 1994.

Author	Title	Sources/Year	Local Number
Averill, S.A. and McClenaghan, M.B.	Distribution and character of kimberlite indicator minerals in glacial sediments, C14 and Diamond Lake kimberlite pipes, Kirkland Lake, Ontario	Geological Survey of Canada, Open File 2819, 48p. /1994	119075
Byron, M.	Anomalous haloes of pathfinder elements for gold, Upper Canada Deposit, Kirkland Lake, Ontario	Explor. Mining Geology, v.3, no.2, p161-179 /1994	14765
Collison, M.S.	Mineralogy, petrology and geochemistry of upper Timiskaming metavolcanic flow rocks near Kirkland Lake, Ontario	Unpublished M.Sc. Thesis, University of Western Ontario, 291p. /1993	120064
Cruden, A.R. and Launeau, P.	Structure, magnetic fabric and emplacement of the Archean Lebel Stock, SW Abitibi Greenstone Belt	Journal of Structural Geology, v.16, p.677-691 /1994	14782
Jackson, S.L.	The Precambrian geology of Pacaud and Catharine townships and portions of adjacent townships, District of Timiskaming, Ontario	Ontario Geological Survey, Open File Report 5884, 86p. /1994	105884

Author	Title	Sources/Year	Local Number
Jackson, R.G. and Stephenson, D.M.	Geochemical method development for the detection of blind mineralization in clay belts	in Summary of Field Work and Other Activities, Ontario Geological Survey, Miscellaneous Paper 163, p.268-269 /1994	102163
Legault, M.I. and Hattori, K.	Late Archean geological development recorded in the Timiskaming Group sedimentary rocks, Kirkland Lake area, Abitibi greenstone belt, Canada	Precambrian Research, v.68, p.23-42 /1994	14780
Lightfoot, P.C., de Souza, H. and Doherty, W.	Differentiation and source of the Nipissing Diabase intrusions, Ontario Canada	Canadian Journal of Earth Science, v.30, p.1123-1140 /1993	14811
McClenaghan, M.B.	Till geochemistry in areas of thick drift and its application to gold exploration, Matheson area, Northeastern Ontario	Explor. Mining Geology, Vol.3, No.1, p.17-30 /1994	14731
McClenaghan, M.B.	Exploration for kimberlites using drift prospecting, Kirkland Lake region	in Summary Report 1993-1994 Canada - Ontario Northern Development Agreement - minerals p.72-76 /1994	107007
McClenaghan, M.B., Kjarsgaard, I.M., Stirling, J.A.R., Pringle, G. and Crabtree, D.	Chemistry of kimberlitic indicator minerals in drift from the Kirkland Lake area, northeastern Ontario	Geological Survey of Canada, Open File 2761, 375p. /1993	119074
Meyer, G., Guindon, D. and Bettiol, D.	Kirkland Lake Resident Geologist's District	in Summary of Field Work and Other Activities, Ontario Geological Survey, Miscellaneous Paper 163, p.118-120 /1994	102163
Meyer, H.O.A., Wladman, M.A. and Garwood, B.L.	Mantle xenoliths from kimerlite near Kirkland Lake, Ontario	The Canadian Mineralogist, v.32, p.295-306 /1994	14768
Meyer, G., Guindon, D.L. and Boucher, F.M.	Kirkland Lake Resident Geologist's District-1993	in Ontario Geological Survey, Open File Report 5892, p.149-178 /1994	105892
Powell, W.G., Carmichael, D.M. and Hodgson, C.J.	Thermobarometry in a subgreenschist to greenschist transition in metabasites of the Abitibi greenstone belt, Superior Province, Canada	Journal of Metamorphic Geology, v.11, p.165-178 /1993	14815
Powell, W.G. and Jackson, S.L.	Metamorphism of the Larder Lake - Boston Creek area, District of Timiskaming	Ontario Geological Survey, Open File Report 5885, 29p. /1994	105885
Riley, J.L.	Peat and Peatland resources of northeastern Ontario	Ontario Geological Survey, Miscellaneous Paper 153, 155p. /1994	102155
Riley, J.L. and Michaud, L.	Ontario Peatland Inventory: Field-work methods	Ontario Geological Survey, Miscellaneous Paper 155, 62p. /1994	102155
Rogers, M.C.	A qualitative mineral potential evaluation procedure developed for use by the Ontario Geological Survey	in Summary of Field Work and Other Activities 1994, Ontario Geological Survey, Miscellaneous Paper 163, p.56-58 /1994	102163
Sage, R.P.	Kimberlites in Ontario	in Summary of Field Work and Other Activities 1994, Ontario Geological Survey, Miscellaneous Paper 163, p.11-115 /1994	102163
Siragusa, G.M.	Mineralization in the Stock and Taylor townships and Penhorwood Township, Abitibi Greenstone Belt	Ontario Geological Survey, Open File Report 5905, 4p. /1994	105905

Author	Title	Sources/Year	Local Number
Stone, W.E., Crocket, J.H. and Fleet, M.E.	Sulfide-poor platinum-group mineralization in komatiitic systems: Boston Creek flow, layered basaltic komatiite, Abitibi Belt, Ontario	Economic Geology, v.88, p.817-836 /1993	14785
Wyman, D.A. and Kerrich, R.	Archean shoshonitic lamprophyres of the Abitibi Subprovince, Canada: petrogenesis, age and tectonic setting	Journal of Petrology v.34,p.1067-1109 /1993	14845
Zalnieriunas, R.V. and Sage, R.P.	Kimberlite map project	in Summary of Field Work and Other Activities 1994, Ontario Geological Survey, Miscellaneous Paper 163, p.116-117/1994	102163

47 Ontario Prospectors Assistance Program (OPAP) projects, including 5 winter 94/95 projects, with grants totalling \$446 650, were designated within the Kirkland Lake Resident Geologist's District. 14 projects received Ontario Mineral Assistance Program (OMIP) grants totalling \$752 712.

Active claim units for the Larder Lake Mining Division at the end of 1994 totalled 28 113. This figure is up by 4.2% over last year's total. Exploration expenditures filed for assessment work in The Larder Lake Mining Division in 1994 totalled \$4 112 512. This figure is down by 21.5% compared to 1993 (see Table 7).

Mining Activity - Precious Metals

American Barrick Resources Corp. - Holt-McDermott Mine

American Barrick Resources Corp. completed deepening the Holt-McDermott Mine Shaft to a depth of 941 m in December 1994. Drifting is currently under way on the 650 and 700-m levels to access the South Zone, discovered in 1993. Exploration drilling was carried out from the 550-m level. A bore raise was completed from the 550 m level to surface and will be used for back fill of the South Zone. The ore passes, waste passes and new crusher should be operational by April 1995 .

In 1994 a total of 59 800 ounce Au was produced from 405 000 tons ore for an average recovered grade of 0.155 ounce Au per ton. Reserves at the mine at the end of 1994 are calculated to be 3 915 000 tons grading 0.224 ounce Au per ton, representing 876 960 ounces of gold.

American Barrick Resources Corp. has reached an agreement to process the ore from Hemlo Gold Mines Inc. Holloway Joint Venture project. Tenders were called to modify the mill and ore handling facilities. Construction is scheduled for 1995 (J. Hafliudson personal communication Northern Daily News, September 8, 1994).

American Barrick Resources Corp. (Lac Minerals Ltd.) - Macassa Mine

The Macassa Mine was acquired as part of a take over of Lac Minerals Ltd. by American Barrick Resources Corp.

Following the fatal rock bursts on November 26, 1993 in which two miners were killed, underground mining resumed at the mine on May 16, 1994. Eighty-five percent of the cut and fill mining method will be changed to long hole mining in an effort to improve productivity and safety. The newly adopted mining method causes considerable dilution and the mining cut off has been lowered from 0.35 to 0.25 ounce gold per ton. Anticipated production from the No. 3 shaft is 135 000 tons in 1995 and 150 000 tons in 1996.

The mine has commenced refurbishing the No. 2 shaft., a two compartment shaft, which will be rehabilitated to below the 4500-foot level. Old workings will be accessed and remnants and pillars mined. Production from this shaft is projected to be 14 500 tons of ore and is anticipated to commence in the last quarter of 1995. Thereafter the projected rate of production will be 400 tons per day. Ore reserves in the No. 2 Shaft area are expected to exceed 1

Table 7. Summary of Claims recorded and assessment work credit.

Year	Claim Units Recorded	Claim Units Cancel	Active Claim Units	Diamond Drilling (\$)	Physical Surveys (\$)	Geotech Surveys (\$)	Total Filed (\$)
1994	7006	5872	28113	1 899 772	64 189	1 321 713	4 112 512
1993	6077	4626	26979	2 291 228	844 515	1 988 618	5 236 181
1992	6194	776	25528	included	3 896 493	1 761 393	5 805 779
1991 (June-Dec)	3130	1799	20168	in phys. surveys	1 155 649	993 444	2 443 697
Year	Claims Recorded	Claims Cancelled	Active Claims	Diamond Drilling (man days)	Geophysical Surveys (man days)	Geological Surveys (man days)	Total Filed (man days)
1991 (Jan-May)	1659	2463	18 948	40 750	89 987	16 935	167 964
1990	4170	6838	19 821	100 787	132 394	24 048	302 037

million tons. An existing underground winze from the 4626-foot to 6950-foot level could be refurbished in the future to access mine workings below the bottom of the shaft.

The mill is capable of processing 550 tons ore and 1300 tons tailings per day. By stepping up the crushing of coarse ore and reducing the tailings throughput, the mill will be able to handle the proposed increase in ore to 900 tons per day without any changes. Provisions call for a future decision on installing a coarse ore bin.

Reserves at the mine are expected to exceed 1 million ounces of gold. It is, however, difficult to predict the tonnage due to dilution caused by the long hole mining method. With the current reserves, the mine should have a life span of between six and eight years. As part of underground exploration the mine is planning to further explore the 05 Break, a gold zone north of and sub-parallel to the 04 Break. The mine has been recalling employees and by early September employment stood at 204 people. Prior to the rockbursts employment stood at 254 .

Gold production at the mine was down substantially due to the suspension of underground operations early in the year and change over to the long hole mining method. The mine produced a total of 19 856 ounces of gold from 61 226 tons of ore for an average recovered grade of 0.324 ounce Au per ton. (R. Rucker, personal communication, Kirkland Lake Gazette, April 29, 1994, Northern Daily News, August 12, 1994 and Northern Daily News, September 7 & 13, 1994)

American Barrick Resources Corp. (Lac Minerals Ltd.) - Lake Shore Tailings Project

As part of the acquisition of Lac Minerals Ltd., American Barrick Resources Corp. also took possession of the Lake Shore Tailings Project. Gold tailings continued to be processed despite the disruption to mining at the Macassa Mine due to the 1993 rock bursts. Production from the operation stood at 25 566 ounce gold from 412 297 tons of tailings processed at an average recovered grade of 0.081 ounce Au per ton. In 1995 plans are to process 365 000 tons of tailings (R. Rucker, personal communication). Proven and probable tailings reserves at the end of 1994 are approximately 1 342 700 tons grading 0.07 ounce Au per ton.

AJ Perron Gold Corp. - Kerr Mine

Deak Resources Corporation has changed its name to AJ Perron Gold Corp.

In 1994 the mine produced approximately 22 000 ounces of gold from 257 000 tons of ore at an average recovered grade of 0.0856 ounce Au per ton. Although not all figures are available, it appears that the mine made a profit during the second half of the year. The reason for this is the mining of higher grade ore. In addition the mine provides custom milling. 12 000 tons of ore from the Astoria Mine and 7000 tons of slag from Sabin Metals, New York State, were processed.

Cyprus Canada Inc. dropped its option on part of the Kerr Mine property. AJ Perron estimates that Cyprus discovered a mineralized zone containing drill indicated reserves of over 1 million tons grading 0.198 ounce Au per ton. A new gold mineralized zone, called the Green Giant Zone, has been discovered near the Chesterville boundary. Drill results from the new zone include some of the following intersections: 0.155 ounce Au per ton over 35 feet, 0.182 ounce Au per ton over 13 feet, 0.73 ounce Au per ton over 4 feet, 0.202 ounce Au per ton over 10 feet, 0.103 ounce Au per ton over 21 feet and 0.146 ounce Au per ton over 13 feet. This work has been done from drill stations established on the 1300-foot level of the mine and AJ Perron is planning to expose the top of this zone at the 1000-foot level. By year-end the company has two underground drills in operation. The mine currently employs 155 people (Northern Daily News, November 11 & 16, 1994 and Bill Glover personal communication).

AJ Perron upgraded its new 500 tons per day gravity flotation circuit at the Kerr mill for custom milling. This circuit is capable of processing up to 250 tons of precious metal slag, containing gold, silver, platinum, palladium and copper or 500 tons of carbonaceous ore, which is considerably softer than slag (The Northern Miner, November 7, 1994, Northern Daily News, November 9, 1994 and Bill Glover personal communication).

Reserves on March 31, 1994 were 4 604 900 tons grading 0.138 ounce Au per ton or containing 635 476 ounces of gold.

Northfield Minerals Inc.

Northfield Minerals Inc. and Towerland Properties Inc. hold 78.5% and 21.5% interest in the Cheminis Mine, respectively. Production increased from 200 to 300 tons per day and is projected to increase to 400 tons in 1995. Milling is carried out at the Holt-McDermott Mine and 6254 ounce Au were produced from 63 582 tons of ore at a recovered grade of 0.098 ounce Au per ton. Average gold recovery was 90.36%.

Underground exploration drilling in 1994 totalled 6067 feet and was, in part, financed by the NOHFC. Surface exploration drilling totalled 2157 feet and a hole was wedged off an old hole (84-5).

Shaft rehabilitation is complete down to a depth of 954 feet. In 1995 shaft rehabilitation will continue to the 1035-foot level. The 1035-foot level will be rehabilitated to allow for detailed exploration and evaluation of the D Zone and structures at depth.

Several milling options are being investigated at the present time, including the construction of a mill on the Cheminis Mine site (V. Popov and D.R. Cutting personal communication).

St Andrew Goldfields Ltd.

St Andrew Goldfields Ltd. Hislop Mine is located in Hislop Township. Commercial production commenced on December 22, 1993. Initial production of 500 tons per day has been increased to 600 tons. The ore is milled 40 km to the west at St Andrew's Stock Mine. Gold mineralization occurs in three zones: the South, Shaft and West zones. The Shaft Zone is accessible by a vertical shaft and decline, the South Zone by another portal and ramp system and the West Zone is currently undeveloped.

To the end of November, the mine had produced 17 401 ounce Au from 122 135 tons at an average recovered grade of 0.142 ounce Au per ton.

Reserves at the end of 1993 in the possible and probable categories are 470 520 tons grading 0.18 ounce Au gold per ton (P. Atherton personal communication).

Mine production was suspended, on a temporary basis, on January 5, 1995, and the mine is now kept on a care and maintenance basis (P. Atherton personal communication).

St Andrew Goldfields Ltd. is experiencing financial difficulties and filed an application under the Company's Creditors Arrangement Act, seeking a stay of proceedings and authorizing the company to file a plan of compromise or arrangement, to be approved by secured and unsecured creditors. St Andrew Goldfields Ltd., which reported a loss of \$2.5 million for the first half of 1994, wants to safeguard its assets while it seeks a partner. The company's aggregate debt is about \$7 million. Its assets, as of December 31, 1994 were worth \$23.6 million (The Northern Miner, November 28, 1994).

Mining Activity - Industrial Minerals

Extender Minerals of Canada Ltd.

Extender Minerals of Canada Ltd. produced approximately 12 000 tons of barite in 1994. The company has approximately two years of reserves at the mine site in Yarrow Township (R. Hill personal communication).

Hedman Resources Ltd.

Hedman Resources Ltd. produced 4000 tons of hedmanite, a lizardite mineral filler, from an open pit in southern Warden Township. Milling is done in Matheson. Last year the operation was in production for approximately six months and employed 12 people at the mill and 3 at their head office in Lively. The company is negotiating a deal with Saudi Arabia for the purchase \$1.2 million worth of hedmanite. Proven reserves at the open pit are 10 000 000 tons (F.R. Bertrand personal communication and The Northern Miner, July 11, 1994).

Tundra Granite & Marble Inc.

Tundra Granite and Marble Inc. produced 21 blocks of green marble (carbonate) totalling approximately 220 tons. The entire production was shipped to Italy for processing into decorative stone products (J. Palu personal communication).

ADVANCED EXPLORATION

Armistice Resources Ltd.

Armistice Resources Ltd. cleared its debt load and began an underground exploration program at the Armistice Mine in McGarry Township. By early November 1994, de-watering was completed, permitting underground exploration and the extraction of a 10 000 ton bulk sample. Drill indicated reserves are 357 000 tons at 0.178 ounce Au per ton (Northern Daily News, October 5, 1994 and Armistice Resources 1994 Annual Report).

Hemlo Gold Mines Inc. - Teddy Bear Valley Mines Ltd.

Hemlo Gold Mines Inc. has amalgamated with Freewest Resources Inc. This will give Hemlo Gold Mines Inc. 84.65% ownership of the Holloway project (The Northern Miner, October 17, 1994).

A production decision was reached by joint venture partners, Hemlo Gold Mines Inc. and Teddy Bear Valley Mines Ltd. to mine the Lightning gold zone in Holloway Township. Construction of surface structures as well as underground developments will take 2 years and is expected to cost \$58.7 million. Once the mine is in production it is expected to employ 130 people and will produce 100 000 ounce Au per year. A feasibility study has indicated that there are 2 063 000 tonnes of proven minable gold reserves grading 0.247 ounce Au per tonne and 3 768 000 tonnes of probable reserves grading approximately 0.2 ounce Au per tonne. The proposed production rate is 1250 t of ore per day from long hole mining method. Expected production costs are \$200 per ounce of gold.. Most of the ore will be processed at the Holt-McDermott Mine. There are sufficient gold reserves to warrant at least 13 years of

production. Constuction of the mine will create as many as 250 construction jobs (The Daily Press, March 30, 1994 and Northern Daily News, March 30, 1994 and Northern Daily News, June 6 & 7, 1994).

Royal Oak Mines Inc.

Royal Oak Mines Inc. extracted a 25 000 ton bulk sample from their Hislop Gold property in Hislop Township in 1993/94. The company plans a diamond-drill program in the first quarter of 1995 and the mining of 31 000 tons of ore (P. Coats, personal communication).

EXPLORATION HIGHLIGHTS - PRECIOUS METALS

Atapa Minerals Limited

Atapa Minerals Limited completed 31 drill holes totalling 3000 m on their Boston Creek gold project located in Catharine and Pacaud townships. Drill-indicated ore reserves are 368 000 tons grading 0.12 ounce Au per ton. The ore zone is a shallow-dipping quartz vein averaging approximately 8 feet in width. The company may drive a 500-foot ramp to a depth of about 100 feet. The ramp will allow for the recovery of a 20 000 ton bulk sample (Northern Daily News, November 23, 1994 and Leo Kosowan, personal communication).

Cyprus Canada Inc.

During 1994, Cyprus Canada Inc. diamond drilled 13 holes totalling 7168.5 m, to test the up-dip and down-plunge extension of the Cyprus gold zone on the Amalgamated Kirkland Property located southwest of Kirkland Lake in Teck Township. The company has now outlined total geological reserves of 1 900 000 tons grading 0.16 ounce Au per ton or 315 000 ounces of gold. The Cyprus zone, which comprises the bulk of the mineralization, contains 1 400 000 tons of 0.2 ounce Au per ton, or 286 000 ounces of gold. A 5000 m drill program is planned for 1995 to further test the extension of the Cyprus zone and an on-strike parallel mineralized zone.

Under terms of the option agreement with Queenston Mining Inc., Cyprus Canada Inc. can earn a 70% interest in the Amalgamated Kirkland Property by making semi-annual option payments, expending \$250 000 every six months and providing Queenston with a positive feasibility study (News Release, January 4, 1995 and Northern Daily News, January 6, 1995).

Hemlo Gold Mines Inc. and Glimmer Resources Inc.

Joint venture partners Hemlo Gold Mines Inc. and Glimmer Resources Inc. completed the eighth phase of drilling on their Beatty and Hislop townships property. Thirty-six holes were drilled, totalling more than 5000 m. Twenty-two of these holes had forty ore-grade intersections, i.e., more than 3.5 g/t over 1.5 m. The results will add to the previously released proven and probable reserves of 1 359 285 t averaging 9.4 g/t or containing 410 798 ounce Au (The Northern Miner, November 28, 1994 and Canadian Mines Handbook 1994-95).

Pangea Goldfields Inc.

Pangea Goldfields Inc. has calculated a drill indicated geological resource of 929 978 ounce Au at its Fenn-Gib property in Guibord and Michaud townships. The resource, based on 87 000 feet of drilling, is contained in the Main and Deformation zones. The former consists of a broad zone of disseminated and stringer mineralization within an area that measures 492 by 820 feet. Using a cut-off of 0.029 ounce Au per ton over a minimum width of 16.4 feet, the Main zone is estimated to contain just over 11 million tons grading 0.046 ounce Au per ton. The Deformation zone consists mainly of high-grade shoots ranging in thickness between 9.8 and 50 feet and grading in excess of 0.204 ounce Au per ton. These shoots occur within a mineralized envelope, up to 98 feet thick, grading 0.058 to 0.088 ounce Au per ton. The shoots are continuous along a steep southeasterly plunge. Using criteria

similar to that applied to the Main zone, the Deformation zone contains 5.3 million tons grading 0.081 ounce Au per ton. About 65% of the total indicated reserve of 16.4 million tons grading 0.057 ounce Au per ton is contained within 650 feet of surface and much of it can be extracted by open-pit mining. Additional drilling will precede a feasibility study to be undertaken late in 1995.

Pangea Goldfields Inc. can earn a 60% interest in the Gib property. If property vendor, Cominco Ltd., elects not to participate in the development of a mine, Pangea Goldfields Inc. will be able to earn a 100% interest, subject to a 1% net smelter return (NSR) royalty during the first three years of production and, thereafter, up to a maximum of 3% depending on the price of gold. To earn the option Pangea Goldfields Inc. must spend \$3 million on exploration by July 30, 1998.

Pangea Goldfields Inc. may earn a 51% interest in the Fenn property by incurring \$1 million in exploration expenditures by July 14, 1996. Should the vendors, Homestake Canada Ltd. and Nanisivik Mines Ltd., elect not to participate, Pangea Goldfields Inc. will be able to earn an additional 19% interest by spending a further \$500 000 on exploration by September 30, 1998. The property is subject to a 2% NSR royalty (The Northern Miner, January 2, 1995).

Regal Goldfields Limited

Regal Goldfields Limited further drill-tested a gold mineralized zone on their Black Township property. Three holes were completed in 1994. Between 50 000 and 65 000 tons of ore have been outlined containing approximately 10 000 ounces of gold. (M. Leahy personal communication and Northern Daily News, Mining Edition, March 3, 1994).

Sudbury Contact Mines Limited

Sudbury Contact Mines Limited has spent approximately \$1.8 million in 1994 on the Victoria Creek Project in Gauthier Township. The summer exploration program, completed by the end of October, consisted of diamond drilling 28 holes totalling approximately 56 000 feet. Since the discovery of the Victoria Creek deposit in October 1993, 52 drill holes totalling approximately 85 000 feet of drilling have been completed down to a vertical depth of 3444 feet over an east-west strike length of 12 000 feet. The drilling on 330 to 660-foot drill centres delineated a gold zone over a strike length of 4000 feet. The company has delineated an inferred resource of 4.72 million tons grading 0.132 ounce Au per ton over an average width of 14.3 feet. This includes the western portion of the main zone, containing 1.97 million tons grading 0.07 ounce Au per ton over an average width of 14 feet, and the eastern portion of the main zone containing 2.75 million tons grading 0.174 ounce Au per ton over an average width of 14.4 feet. The western part of the Main zone has been outlined to a depth of 2400 feet and the eastern part of the Main zone has been outlined to a depth of 2600 feet.

The 1995 drill program is expected to cost \$3.3 million and will utilize three surface drills to complete approximately 80 drill holes totalling in excess of 100 000 feet of drilling. Information obtained from the drill program in the first half of 1995 will be used to select an appropriate shaft site for a planned underground exploration program. The underground program is expected to consist of a 3000-foot shaft, two 5000-foot exploration drives and over 30 000 feet of underground drilling. Preliminary cost estimates for this program are approximately \$25 million. Shaft sinking would likely begin in late 1995 or early 1996 once the permitting process is complete.

Agnico-Eagle Mines Limited, on completion of a private placement, will increase its outstanding share holding in Sudbury Contact to 21.7%. Two associated companies of Agnico-Eagle own approximately 41.6% of the outstanding shares (News Release, November 22, 1994 and January 12, 1995, Northern Daily News, November 29 and 30, 1994).

PROPERTY VISITS

DKO Property

International Homestead Resources Inc. optioned 20 adjoining claims (units) from Mike Dymont, Jocelyn Kidston and Tom Obradovich in Gauthier Township. This claim group is located approximately 4 km east southeast from Sudbury Contact's Victoria Creek gold discovery. The property is centred at approximately UTM Zone 17, 588600E 5334600N.

In 1949, Larden Gold Mines trenched and completed five diamond drill holes averaging 64 feet. Hoffman Exploration & Minerals Ltd. carried out blasting and sampling of quartz veins in 1982, and magnetometer, VLF-EM and geological surveys in 1983. This work was followed by the drilling of 63 reverse circulation holes in 1984 and 1985 and three diamond drill holes in 1985. Mike Dymont, Jocelyn Kidston and Tom Obradovich pooled their OPAP funding, completed a grid covering the property with 100-m spaced north-south lines, performed VLF and magnetometer surveys as well as an I.P. survey on 200-m spaced grid lines. In addition, geological mapping, prospecting, stripping and sampling were carried out. Stripping, conducted in two locations more or less on strike, revealed rocks with intensive hydrothermal alteration. In 1994 International Homestead did additional I.P. surveying and completed 9 diamond-drill holes.

The property is mostly underlain by Gauthier calc-alkaline pyroclastic volcanic rocks and the in south-western portion of the property by Timiskaming sedimentary rocks. Outcrops are scarce due to an extensive cover of Pleistocene sand and gravel, which are part of the Munro Esker.

The I.P. surveys detected several zones of high resistivity with associated low chargeability values. In the southern part of the property three out of four holes intersected shear zones with associated carbonate and/or sericite alteration related to the I.P. resistivity anomalies. No significant gold assays were returned from these holes. In the drilling to the north, sections of strong alteration were intersected in all of the remaining five holes. At least seven alteration zones were intersected varying in true width from 8 to 280 feet. The alteration comprises intense sericite, carbonate, silica and potassic metasomatism. Distinct units of spotted chloritic alteration proximal to "hanging wall" zones of weak sulphide mineralization occur within the alteration zones. The most significant alteration zone was intersected in DK94-5 over a core length of 321.6 feet and DK94-6 over a core length of 169.6 feet. The alteration is so intense that the original rock type is often difficult to determine. A syenite intrusion occurs within the main alteration zone in diamond drill hole DK94-5. The intrusion grades from a narrow fresh core to wide altered margins. Intensity of alteration increases towards the contacts which are diffuse and difficult to recognize. Presumably the hydrothermal alteration post dates this intrusion. Quartz stringers with coarse pyrite occur in the sericite-carbonate alteration zone and, locally, finely disseminated pyrite is associated with chlorite stringers. In some other sections of Diamond-Drill Hole DK94-5, massive, relatively unaltered feldspar porphyry occurs in contact with unaltered host rock. In these situations the age relationship is less certain. The main alteration zone appears to be continuous between diamond drill holes DK94-5 and DK94-6 over a strike length of 650 feet. The I.P. survey indicates an additional strike length of 600 feet to the east and 700 feet to the west where it is partially exposed in a trench. The overall possible strike length is a minimum of 2000 feet and is open along strike and down dip. There is a north-south shift of the I.P. anomaly by as much as 400 ft and folding or faulting are thought to have deformed a previously planar alteration zone. The configuration of the I.P. results suggest a dip of about 70-80 degrees to the north (Stewart Carmichael, personal communication).

Gold mineralization is generally absent in the alteration zones in the north holes, however, one anomalous section exceeds several 100 parts per billion Au (Stewart Carmichael, personal communication). Although gold values are not spectacular, the hydrothermal alteration zones are considered very significant. The alteration zones appear to have certain characteristics similar to the alteration peripheral to Hemlo Gold and Joint Venture Partner's Lightning Zone in Holloway Township, where albite-quartz alteration containing only negligible gold values occur in the plane of the ore zone and up to 200 m above and on strike from it. The DKO alteration zones appear to be on separate, sub-parallel structures to Sudbury Contact's Victoria Creek zone. Since gold is associated with

hydrothermal alteration zones at the Victoria Creek discovery, chances are favourable for gold mineralization to be found with other, similar alteration zones within the vicinity. As already stated, near surface tests of the main alteration zone on International Homestead's DKO property have not returned significant gold mineralization. However, the same would hold true for Hemlo Gold's Lightning Zone in Holloway Township, if the alteration zone was to outcrop. Therefore, diamond-drill testing of the main alteration zone at greater depth may increase the likelihood of finding gold mineralization.

Nettie Lake Area

In the Nettie Lake area in Morrisette Township, a felsic lapilli crystal tuff unit, oval in shape and measuring 3.3 by 1.6 km with the long axis striking at an approximate azimuth of 115 degrees, is extensively intruded by quartz-feldspar porphyry. Outcrops and several trenches were examined east of Nettie Lake as well as drill core from this area (KL-0742, 0743 and 0744 - stored at the Drill Core Library). The centre of the lapilli tuff unit is located at approximately UTM Zone 17, 576000E 5341000N.

Fragments of the tuff unit comprise 30% to 40% of the rock and are essentially felsic and rarely mafic in composition. Lapilli, up to 2 cm in diameter, range from round to angular and are mostly made up of feldspar porphyry. The matrix, like the fragments, has a high proportion of feldspar phenocrysts. Fragments and matrix material are unsorted and do not appear to exhibit a preferential orientation. Fine grain pyrite, constituting approximately 1% of the rock, borders some fragments and occurs as blebs in the matrix. The similarity of the feldspar porphyry both in the fragments and the intrusions suggests a genetic relationship between the two rock types. Mapping by R.J. Rupert and H.L. Lovell (1970) located a highly irregular quartz-feldspar porphyry intrusion to the southeast measuring 2.5 by 1.5 km adjacent to and intruding the lapilli tuff unit.

The tuff unit and the feldspar porphyry have undergone extensive hydrothermal metasomatism. Alteration is highly variable and ranges from minor inter-fragmental sericitization and carbonitization to complete carbonitization and sericitization of the rock. Relict textures are usually preserved. Some zones, in addition, appear to have undergone silicification. Occasional blebs of green fuchsite occur and are thought to represent altered mafic or ultramafic fragments. In outcrop the high iron content of the carbonate causes the rock to weather to a rusty brown colour.

Hydrothermal alteration of the feldspar porphyry suggests that the alteration post-dates the porphyry intrusive event. Further, widespread hydrothermal metasomatism of the lapilli crystal tuff unit, without evidence for structural control, suggests high permeability of the rock at the time of hydrothermal activity.

Gold values are generally low and the highest value obtained by J. Ward in an old trench is 0.01 ounce Au per ton. Despite the low gold values the extensive hydrothermal alteration, more or less on strike with Sudbury Contact's Victoria Creek zone, makes the area an attractive target for gold exploration.

Lebel Oro Prospect

The Lebel Oro Prospect (MDI T 0581) is located in central Lebel Township southeast of the hamlet of King Kirkland (UTM 17 578200E 5334500N). The property is presently under option to International Homestead Resources Inc. According to Savage (1950, Assessment File KL-1603), the company was incorporated in 1920 on 5 patented claims in Lebel Township. By 1924, an inclined shaft was sunk to a vertical depth of 61.8 m (203 feet) with levels at 30.5 (100) and 61 m (200 feet). The Main vein was drifted on for 183 m on the 61-m level. Between 1927 and 1928, a number of surface and underground holes were drilled with intersections up to 0.5 ounce Au per ton over 0.91 m (3 feet). Gold values on the Main Vein were erratic and in 1929 underground development ceased. Additional surface drilling was carried out in 1936. A surface resistivity survey, geological mapping and surface diamond drilling was carried out in 1948. The property has been under intermittent exploration since 1979 with stripping, geological mapping and sampling in the shaft area.

The property is underlain by rocks mapped as porphyrite (McLean 1956). The northern portion is underlain by southeast striking Timiskaming conglomerates and tuffs. The central portion is covered by sands of the King

Table 8. Analytical results of samples from Lebel Oro and Pawnee Kirkland.

Sample Number	Cr ppm	Ni ppm	Cu ppm	Zn ppm	As ppm	Se ppm	Mo ppm	Ag ppm	Sn ppm
94315	66	<40	<100	55	152	<60	49	<20	<40
94333	220	<40	261	2469	<100	<60	<20	<20	<40
94335	<40	<40	153	4274	<100	<60	267	<20	<40
93336	156	<40	164	324	122	<60	<20	<20	<40
94337	<40	<40	219	282	<100	<60	<20	<20	<40

Sample Number	Sb ppm	Ba ppm	Pb ppm	Bi ppm	Au ppb
94315	<20	>5000	87	<50	499
94312					49
94313					2097
94314					669
94333	<20	643	3300	<50	182
94335	<20	2337	2672	<50	6975/7129
94336	<20	1376	297	<50	2702
94337	<20	884	<40	<50	47

Analyses by Geoscience Laboratories, Sudbury using Propsectors and AuPP packages.

Kirkland Esker. The Kirkland Lake Incentives Program (KLIP) airborne magnetic survey maps (P.2264) shows the shaft area is situated on the southern edge of a southeast trending magnetic low trough. The Bidgood Fault or a branch of the North Harvey Fault crosses about 150 m (500 feet) south of the shaft in an easterly direction. In addition, Ferderber Geophysics interprets a northwest striking fault just to the west of the shaft (Assessment File KL-2297) based on local airborne magnetic and electromagnetic surveys.

The shaft is located on an outcrop described as syenitized country rock approximately 30 m east of the contact with a feldspar porphyry stock (Burr, 1948, Assessment File KL-1603). The main vein width is about 0.46 m (1.5 feet) wide with pyrite mineralization in shearing on both sides extending the width to about 1.8 m (6 feet). The wall rock is altered with iron-poor calcite as veinlets and blebs and minor iron-poor dolomite further away from both sides of the vein. The vein contains both white and dark quartz. According to a report by Todd (1928, Assessment File KL-1603) the gold appears to be associated with the dark quartz. The majority of the quartz is white, thus assays are erratic. The quartz vein occupies a fault according to the reports from 1928. The vein strikes at an azimuth of 210° and dips 70° northwest. Schistosity on outcrop near the vein was measured at 060° dipping 50° southeast.

Samples were collected and analyzed on a sulphide-rich vein approximately 100 m west of the shaft (sample 94333)(see Table 8 for analytical results), as well as material from the shaft vein (sample 94335,) and samples on west side of it (94336-94337). The vein and sulphide enriched rocks to the west form a zone at least 1.4 m true thickness and assay greater than 1 ppm Au. The rock on either side of the vein appears to be an altered trachyte tuff. Magnetic susceptibility readings on either side of the vein are high, supporting this idea. The sulphide-rich vein is approximately 0.15 m (0.5 feet) wide and occupies a naturally occurring depression. It is very similar in appearance to a vein observed on the Bidgood Mine property that assayed about 1 ounce Au per ton but assayed 182 ppb Au (GE Parsons personal communications 1990).

Pawnee Kirkland Prospect

The Pawnee Kirkland shaft (MDI T 0577) is located south of the hamlet of King Kirkland in central Lebel Township (UTM 17 578302E 5333080N). The property consists of 42 patented and leased claims encompassing the former Pawnee Kirkland property as well as properties to the west and northeast.

Pawnee Kirkland Mines Ltd. was incorporated in 1922 on four claims in Lebel Township. In 1927 a vertical 2-compartment shaft was sunk to a depth of 238 m (780 feet) with levels every 38 m (125 feet) to the 229 m (750-foot) level. The Number 2 vein was explored on the 125, 250 and 500-foot levels with most of the work concentrated on the 750-foot level. Underground operations closed at the end of 1928. Regal Kirkland Gold Mines was incorporated in 1933 to take over the property. The shaft was dewatered in 1936 and a program of sampling,

diamond drilling and drifting was carried out. Work was suspended in 1936 and the property reverted to Pawnee Kirkland Gold Mines Ltd. in 1937. In 1963 Upper Canada Mines Limited acquired the property. In 1964, it was optioned to Labrador Mining Exploration (Ontario) Limited who carried out an IP survey and diamond drilling. The mine was dewatered, a headframe erected and more than 915 m (3000 feet) of drifting as well as underground diamond drilling was done on the 152 m (500-foot) and 229 m (750-foot) levels. No ore was outlined. In 1981, Labrador Mining & Exploration Limited carried out geological mapping, sampling and VLF-EM surveys over the property. As follow-up, they completed 1615 m (5297 feet) of diamond drilling in 9 holes in 1982. In 1990, Central Crude Limited completed geophysical surveys and 15 diamond drill holes totalling 3633 m (11 920 feet). Queenston Mining Inc. completed a nine-hole 2948 m (9672 feet) diamond drill program in 1994.

According to McLean (1956), the majority of the property is underlain by east striking and south dipping Timiskaming trachytes, conglomerates and wackes. A small band of wackes separates trachytes and porphyrite to the north. In the middle, a narrow band of tuff separates porphyritic trachyte from a trachyte sill. A small band of conglomerate is contained within the sill on the western edge of the property. Coarse wackes and conglomerates can be found on the southern boundary. The Long Lake Fault Zone crosses the eastern end of the property, striking at 030°. The fault is split and the rocks between the branches appears to have been displaced to the south.

Development work took place on a vein striking approximately 075° and dipping 75° south. The vein is exposed on surface west of the shaft (samples 94312-host, 94313-vein - UTM Zone 17 578267E 5333010N)(see Table 8 for analytical results). Langford (1928 Assessment File KL-2196) reports that the Number 2 vein is within carbonated volcanic rocks. He suggests that it is not well defined and continuous because the country rock is soft and not brittle. The vein contains pyrite, traces of chalcopyrite, molybdenite, telluride minerals and free gold. Sample 94313 contains 5-10% fine grain pyrite and was intensely altered by iron-poor to iron-rich dolomite. A composite underground plan in Assessment File KL-2196 shows mineralized zones on the 125, 250, 500 and 750-foot levels. The zones are narrow, 0.8 to 0.9 m (2.5 to 3 feet) in width with lengths to 35 m (115 feet). Zones grades vary between 0.06 and 0.38 ounce Au per ton. Resampling by Labrador found the earlier reported grades too high (Lovell 1982 PV026-2).

The zone appears to change orientation to a strike of 060° about 150 m west of the shaft and appears to be cut off by a north-south striking fault approximately 335 m west of the shaft. L. Cunningham (personal communications 1994) refers to this fault the Tully Fault and describes it as a wide zone. The surface exposure of this vein and the Tully Fault is exposed in a gully north of the power line, west of the shaft (sample 94314). The exposure was found by Cunningham in 1991 (L. Cunningham, personal communications 1994).

Old trenching from the early 1920's near the old southern boundary of the property is on 2 east-trending fractures with heavy sulphide mineralization within conglomerates (Hopkins 1923) (sample 94315 UTM Zone 17 578100E 5332700N). Little gold is contained in the wide alteration zone. The zone is 10-15 feet wide and cut by 3 trenches perpendicular to stratigraphy. To the south the rocks are wackes.

The 1994 drill program was a follow-up to encouragement in previous drill programs. In 1962 and 1963, Upper Canada Mines outlined, by diamond drilling, a small mineralized zone (Bragg Zone MDI T 0805) to the southeast of the Pawnee Kirkland shaft on the Pawnee Ritchie-Moore border. The zone has a strike length of about 100 feet and grades 0.1 to 0.2 ounce per ton Au over narrow intersections in the order of 2.5 feet (W. Benham personal communications 1994). The zone is on or near the South Harvey Fault.

In 1990 Central Crude drilled 15 holes with the best assay of 0.24 opt Au over 6.6 feet (or 0.186 ounce Au over 9.4 feet) being recorded near the footwall of the South Harvey Fault in a trachyte tuff (W. Benham personal communications 1994). The tuff is altered to a green colour by chlorite giving it the look of Timiskaming wackes to the north but containing the tuff fragments. The best values are from hematized sections.

The Queenston Mining Inc. 1994 Third Quarter Report states that an eight-hole program tested the potential of the South Harvey Fault. Significant alteration and anomalous gold values were encountered. L. Cunningham suggests that the South Harvey Fault can be traced to the Upper Canada Mine in Gauthier Township. Eight of the 9 holes tested the South Harvey Fault while the ninth tested the Larder Lake Fault Zone to the south.

RECOMMENDATIONS FOR EXPLORATION

The Kirkland-Larder Gold Mining District occurs in a long and comparatively narrow belt of rocks of Timiskaming age. Gold mineralization is postulated to be structurally controlled and in the past appeared to be essentially confined within a general east-trending assemblage of sedimentary, volcanic and intrusive rocks. The Larder Lake Break was considered a significant structural component of the gold camp; however, gold mineralization appears to be related to splays off this break or to independent sub-parallel structures. Notable exceptions to the distribution of significant gold deposits outside this narrow belt are the Upper Beaver Mine (past producer) and the recently discovered Victoria Creek gold zone by Sudbury Contact Mines Limited, both located in Gauthier Township. The Upper Beaver Mine produced 140 000 ounce Au from 580 000 tons of ore and the new Victoria Creek gold discovery contains drill-indicated reserves of 4.72-million tons grading 0.132 ounce Au per ton. The deposit is open at depth. Both deposits, though in different volcanic lithologies, occur more than 2 km north of the Temiskaming sedimentary rocks. Considering their locations, it is now apparent that the areal extent for gold mineralization exists in a much wider than previously thought and is not restricted to the Timiskaming and Larder Lake sedimentary belt.

Due to the limited information available, it is not known whether the Victoria Creek zone is an isolated hydrothermal system, or if it is associated with a much larger structure north of and parallel or sub-parallel to the Temiskaming sedimentary belt. The distribution of felsic intrusions north of the Timiskaming sedimentary belt may be important. In McVittie Township, more than 10 km to the east, these intrusions measure up to 5 by 1.5 km. Intrusions in Gauthier, Lebel and Morrisette townships are comparatively small with a maximum dimension of 2.0 by 0.7 km. These small intrusions may be associated with larger intrusive bodies at depth that may have been the heat source for hydrothermal activity in the general Victoria Creek discovery area.

Follow-up exploration on strike and in the general vicinity of a significant new discovery such as the Victoria Creek discovery is a common exploration strategy. Several "barren" hydrothermal alteration zones occur on strike and on parallel or sub-parallel structures to the Victoria Creek zone. Such alteration zones often extend for considerable distance beyond gold mineralization. Thus they need to be further explored on strike and down dip for possible gold association. Once the geochemistry of such alteration zones is better understood, enrichment or depletion of key elements may provide a guide for follow-up exploration.

To the west-northwest, several sericite-carbonate alteration zones occur in Morrisette Township and appear to align more or less with the Victoria Creek Zone. The predominant schistosity at one of these alteration zones trends to the south-southwest, suggesting that it may be associated with a different structure. Still further to the west-northwest several gold mineralized zones occur in Benoit and Black townships. It is not known if these deposits are associated with the Victoria Creek trend. To the east, an alteration zone approximately 2 km east-southeast of the Upper Beaver Mine also aligns approximately with this trend. Compilation of hydrothermal alteration zones in the northern sector of Lebel Township suggests that several other alteration zones align and have a west trend near the northern contact of the Timiskaming sedimentary rocks.

Perhaps one of the most promising alteration zones for further exploration is a major sericite-carbonate alteration zone located on and immediately north of the Kidston property (Meyer et. al. 1993). This alteration zone is likely parallel or subparallel to the Victoria Creek zone and occurs several hundred metres to the south of it. One sample of this material was analysed by Activation Laboratories Limited for 49 elements. A comparison with analytical results for similar material from the Lightning Zone suggests that a similarity exists between certain key elements between the 2 zones.

Another hydrothermal alteration zone which stands out as an attractive exploration target is located in the Nettie Lake area, Morrisette Township (for more detail see section on Nettie Lake area). Here a lapilli crystal tuff and feldspar porphyry intrusions have undergone extensive hydrothermal alteration. Prospecting the outcrops within the alteration zone may locate zones of intense alteration which could then be further explored. The contacts of the altered lapilli crystal tuff with adjoining unaltered volcanic rocks are not exposed. Two fault zones have been interpreted to occur along the northern and southern contact of the hydrothermal alteration zone. East of the

alteration zone a short section of the northern fault zone has been mapped by R.J. Rupert and H.L. Lovell (1970) as a carbonatized shear zone. The unexposed contact zones, assumed to be fault contacts, should be explored by I.P. surveys to search for possible disseminated sulphide mineralization with possible attendant gold.

ONTARIO GEOLOGICAL SURVEY ACTIVITIES

R.P. Sage continued a study of kimberlite occurrences in Ontario.

R.V. Zalnierunas and R.P. Sage began a kimberlite map project which consists of the compilation of known kimberlites in Ontario. The project is running in conjunction with R.P. Sage's project above.

R.G. Jackson continued a multimedia geochemical study of tailings dispersion from several abandoned tailings sites found in the Kirkland Lake and Matachewan areas.

R.G. Jackson and D.M. Stephenson initiated a multimedia geochemical study over mineralized sites, covered by thick sequences of glaciolacustrine or glaciofluvial sediments, to determine if groundwater dispersion of elements can create a detectable anomaly in surface or shallow groundwater, organic-rich media in drainage pathways and A- and B-horizon soils.

For further information on any of these projects, please refer to Summary of Field Work and Other Activities, Ontario Geological Survey, Miscellaneous Paper 163.

GOVERNMENT FUNDED RESEARCH

P.G. Killeen, C.J. Mwenifumbo, K.A. Pflug and B.E. Elliott continued a NODA funded project determining geophysical signatures for the boreholes into kimberlite pipes in the Kirkland Lake area as well as other properties.

M.B. McClenaghan and R.N.W. Diablo continued a NODA funded study of drift prospecting techniques for kimberlite.

RESEARCH BY OTHER AGENCIES

Queens University

R. Guy and R. Mason began a study on the Holloway Joint Venture Lightning Zone.

RESIDENT GEOLOGIST'S STAFF ACTIVITIES

Permanent staff of the Kirkland Lake Resident Geologist's office include: G. Meyer, Resident Geologist, D.L. Guindon, Staff Geologist and F.M. Boucher, Administrative Assistant.

L. Morash, Geological Assistant, was employed under the Summer Experience '94 program and later provided general office assistance on a contract basis.

D.C. Bettiol, Junior Field Assistant, was hired on at short-term contract, to provide field and technical services to all staff.

Futures work placements under the co-ordination of F.M. Boucher included L. Lavric, C. Lauzon and K. Gabriel. They contributed clerical assistance and computerized data entry at various times throughout the year.

R.V. Zalnierunas, Contract Geologist, worked out of the Swastika Drill Core Library on a Kimberlite map project, under the direction of Ron Sage.

G. Meyer continued his research on hydrothermal alteration zones associated with gold mineralization.. D. Guindon, commenced a mineral deposits compilation augmented by field studies in Lebel Township.

Other staff activities included serving on several internal inter-ministerial committees. F.M. Boucher continued as Co-Chair, Health & Safety, on the Ministry Employee Relations Committee and is also a member of the Employment Equity Advisory Committee. D.L. Guindon was active on the Mines & Minerals Information Technology Committee and the ERLIS Mineral Deposits Inventory Steering Committee. G. Meyer participated in N.P.A. and C.I.M. (Kirkland Lake Branch) meetings.

All staff spent considerable time assisting OPAP/OMIP applicants with their submissions and the geological staff in follow-up field visits relating to projects funded through these programs..

This district continues to maintain a high level of exploration activity. Staff of the Resident Geologist's office provided assistance to over 2181 office visitors and handled 2217 telephone calls. The Swastika Core Library usage declined to 49 visits. In addition, a record-high 343 exploration data records were integrated into the assessment file system and 143 articles were added to the technical library.

Refer to Table 9 for a summary of the staff's activities in 1994.

REFERENCES

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- McLean, Geology of Lebel Township; Ontario Department of Mines, Bulletin 150, 63p.
- Meyer, G., Guindon, D., Boucher, F.M., Madon, Z. and Gaudreau, M. 1993. Kirkland Lake Resident Geologist District - 1992; *in* Report of Activities 1992, Resident Geologists, Ontario Geological Survey, Miscellaneous Paper 161, p.273-306.
- Rupert, R.J. and Lovell, H.L. 1970. Geology of Bernhardt and Morrisette townships; Ontario Department of Mines Geological Report 84, 27p.

Table 9. Summary of staff activities - 1994.

Event	Number
Office visits	2181
Office visits - Drill Core Library	49
Telephone inquiries	2217
Property visits/separate sites	35/31
Field trips attended	1
Field Trips given	1
Prospectors courses presented	1
Number of prospectors course students	12
Poster sessions	2
Talks given	1
Assessment files & donations processed	219
OPAP/OMIP reports processed	137
Titles added to library database	143

TIMMINS RESIDENT GEOLOGIST'S DISTRICT - 1994

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INTRODUCTION

The level of mining activity in the Timmins Resident Geologist's District held steady during 1994 with 7 producing underground gold mines, 1 underground base metals mine, and 1 industrial mineral producer. In addition, gold was also produced from 3 open pit operations and one tailings recovery project.

Although operations at St. Andrew Goldfields Ltd.'s Stock Township Mine were suspended in mid-1994, the opening of Royal Oak's Night Hawk Lake open pit, in Cody Township, slightly compensated for the loss.

Kinross Gold Corporation announced the discovery of a new ore zone at its Hoyle Pond Gold Mine. By the end of the year, a ramp was being driven to develop the zone and portions of it were being prepared for longhole mining.

Re-evaluations of both the Redstone nickel property by Black Hawk Mining Inc. and the Montcalm nickel deposit by Outokumpu Mines Ltd. took place during the year. Black Hawk has reported a number of significant intersections from their diamond drilling program. Outokumpu has recalculated the reserves at the Montcalm and estimates that there is a mineral resource of 7.434 million tonnes, at an average grade of 1.58% Ni and 0.71% Cu.

Exploration activity in the Timmins District remains high, with a noticeable increase in activity over 1993. Highlights of the exploration activity are detailed in the *Exploration Activity* section.

Prospectors and exploration companies working in the area continued to make good use of funding provided by the Ontario Prospector's Assistance Plan (OPAP) and the Ontario Mineral Incentives Program (OMIP). In 1994, there were 14 projects designated through OMIP for a total potential expenditure of \$645 770. Expenditures for OPAP projects could potentially reach \$330 000, with 31 approved summer projects and 2 approved winter projects.

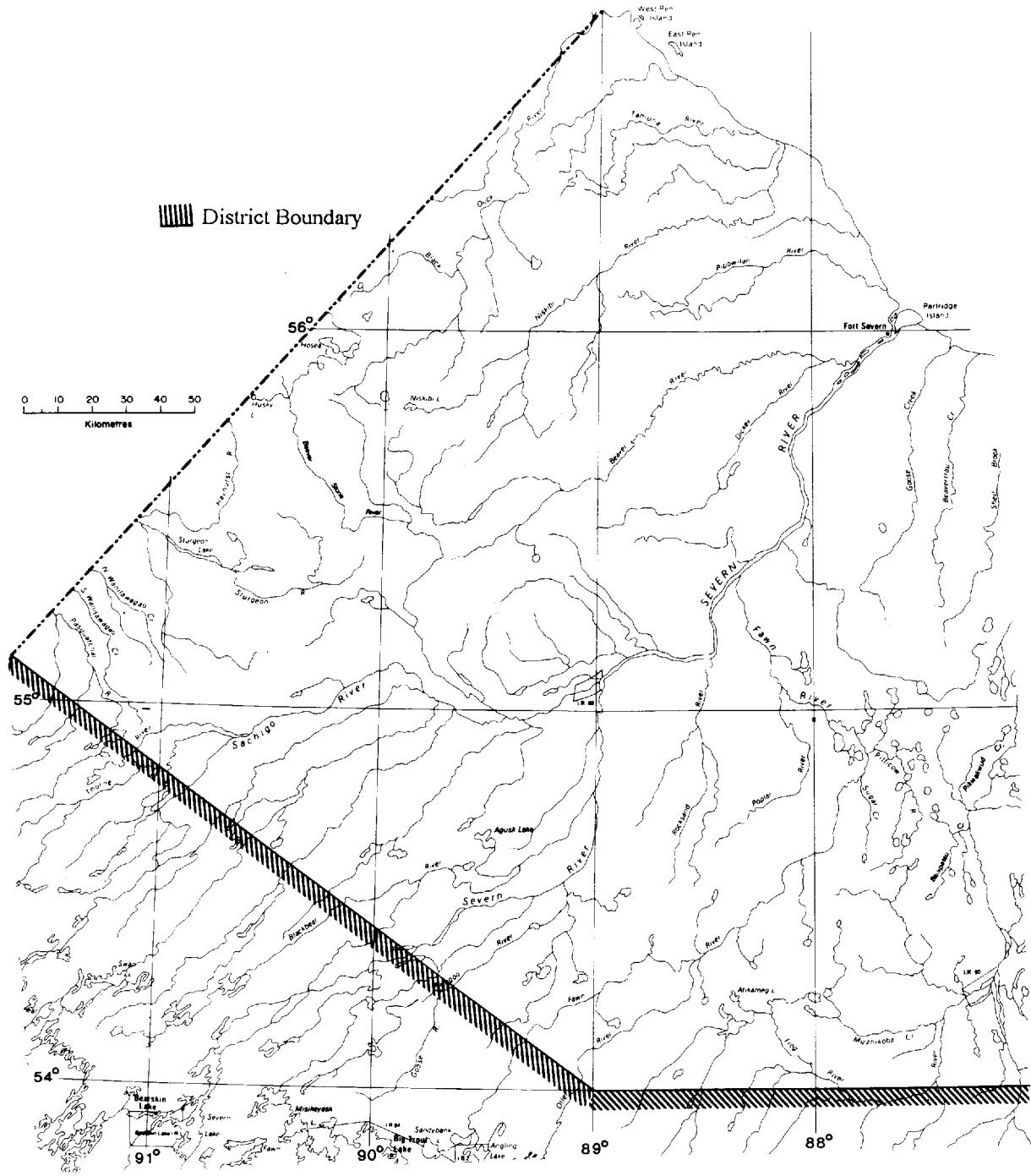
A total of 19 738, 16-hectare claim units were recorded from January 1994 to December 31, 1994. This is almost triple the number of claims recorded in 1993. The largest number of claims staked was in the area south of the Attawapiskat River. Other areas where there was significant staking activity were Reeves, Sewell, Penhorwood and Mallard townships. As of January 1, 1995, there were 47 497 active 16-hectare claim units in the Porcupine Mining Division (Table 1, Figures 1b - 1e).

Table 1. Summary of claims recorded and assessment work credit to 1994, Timmins Resident Geologist's District

YEAR	CLAIM UNITS RECORDED	CLAIM UNITS CANCELLED	CLAIM UNITS ACTIVE	DIAMOND DRILLING	GEOTECHNICAL GEOPHYSICAL	SURVEY GEOLOGICAL	TOTAL WORK VALUE
1994	19 738	6 689	47 497	\$ 1 577 945	\$ 1 561 792		\$ 3 186 244
1993	7 852	3 191	34 779	\$ 2 016 974	\$ 1 439 217		\$ 4 437 645
1992	10 474	2 248	28 987	\$ 807 799	\$ 756 454	\$ 395 934	\$ 2 323 218
1991*	4 682	4 367	19 879	62 409	199 836	8 140	279 806
				\$ 624 764	\$ 104 667	\$ 76 540	\$ 1 067 217
1990	4 864	10 431	19 472	130 847	112 881	20 638	313 085

Unless indicated otherwise (\$), the assessment work credit is given in "man days".

Figure 1a. Timmins Resident Geologist's District (northwest portion)
No activity



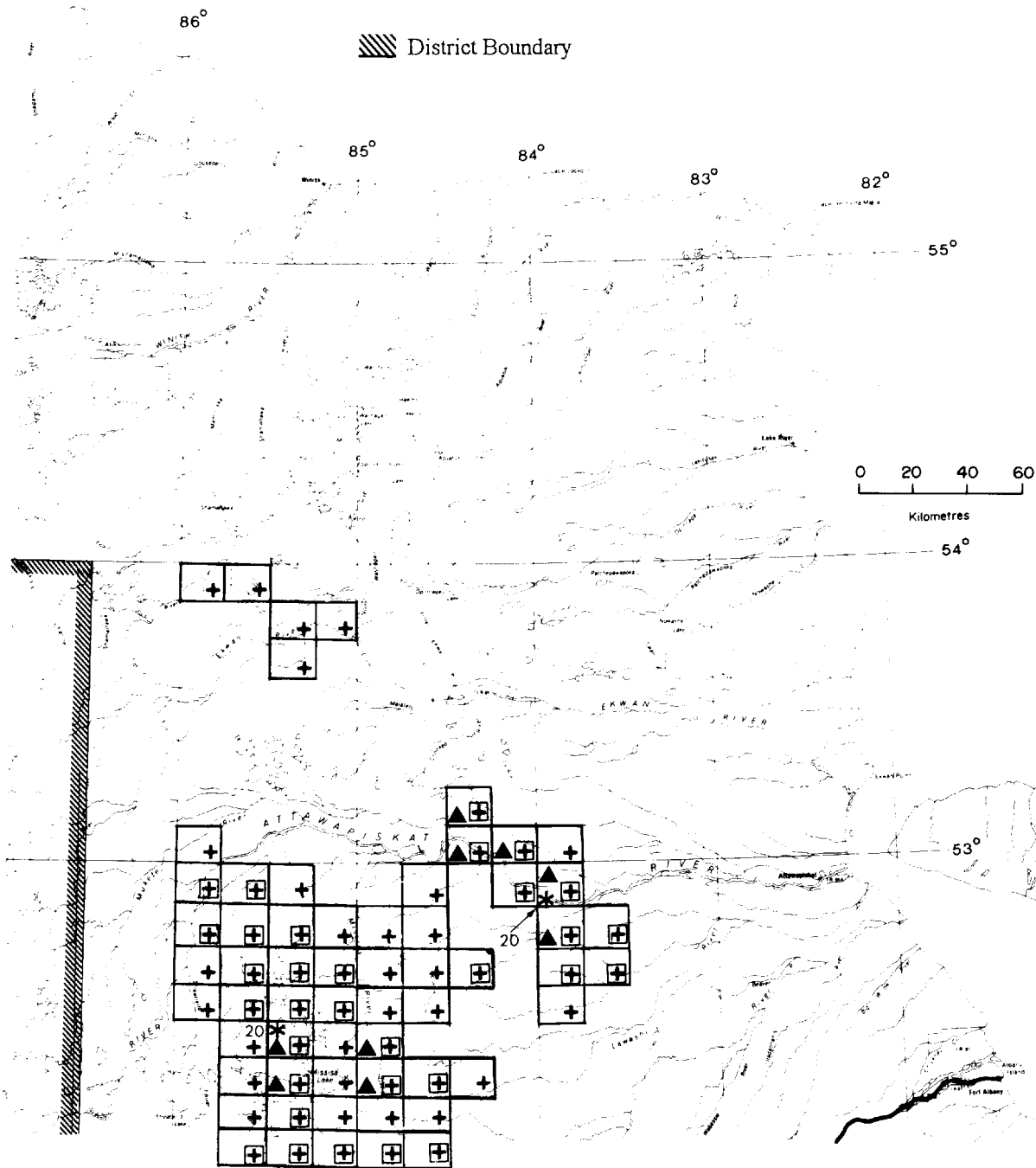


Figure 1b. Timmins Resident Geologist's District (northeast portion)

EXPLANATION

- ▲ Township/Area for which exploration data was received - 1994
- + Township/Area in which claims were staked - 1994 (less than 100 16-ha units)
- ⊕ Township/Area in which claims were staked - 1994 (more than 100 16-ha units)
- * Exploration Activity - 1994 (keyed to Table 4)

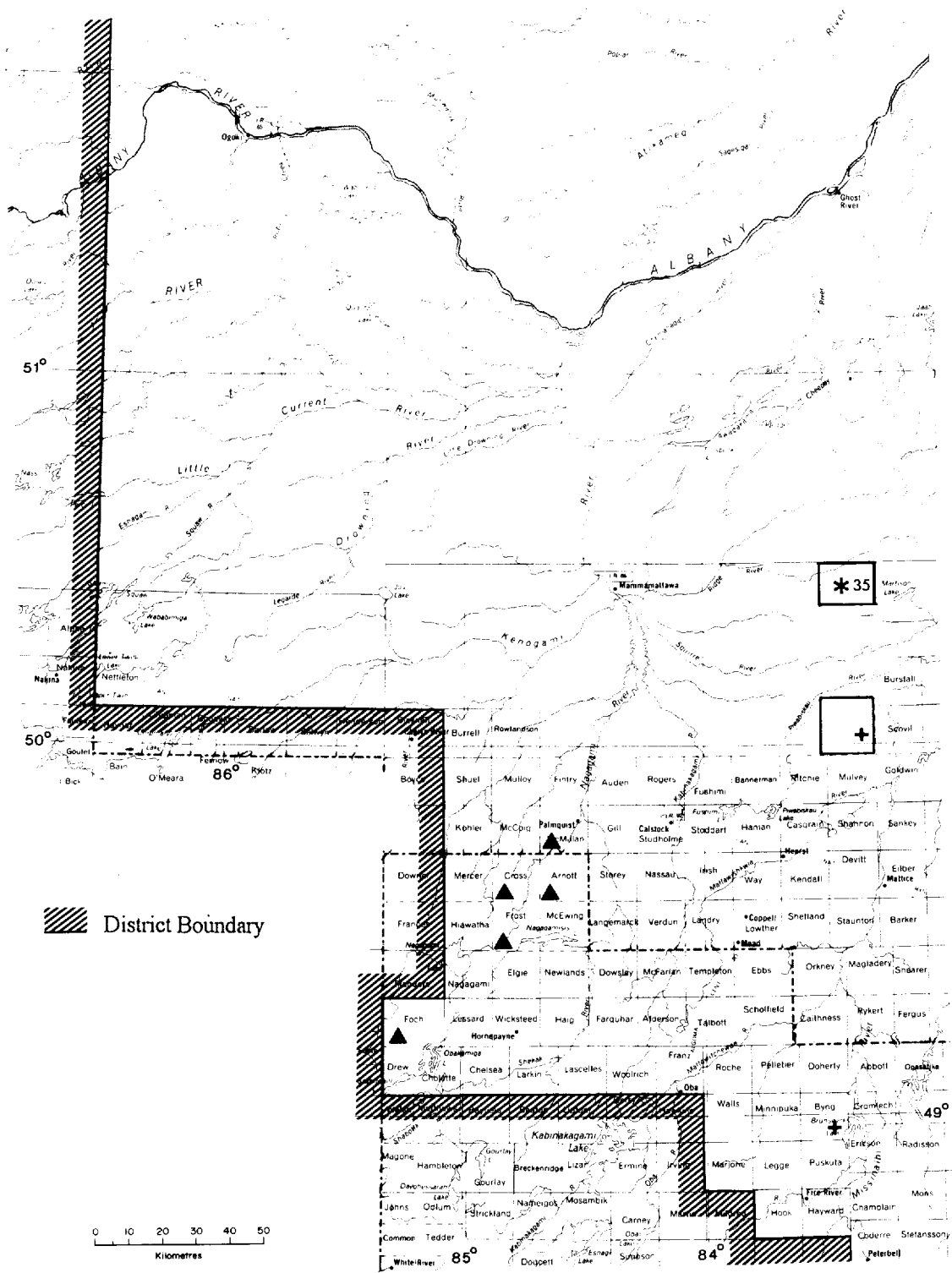


Figure 1c. Timmins Resident Geologist's District (west-central portion)

EXPLANATION

- ▲ Township/Area for which exploration data was received - 1994
- + Township/Area in which claims were staked - 1994 (less than 100 16-ha units)
- * Exploration Activity (keyed to table 4)

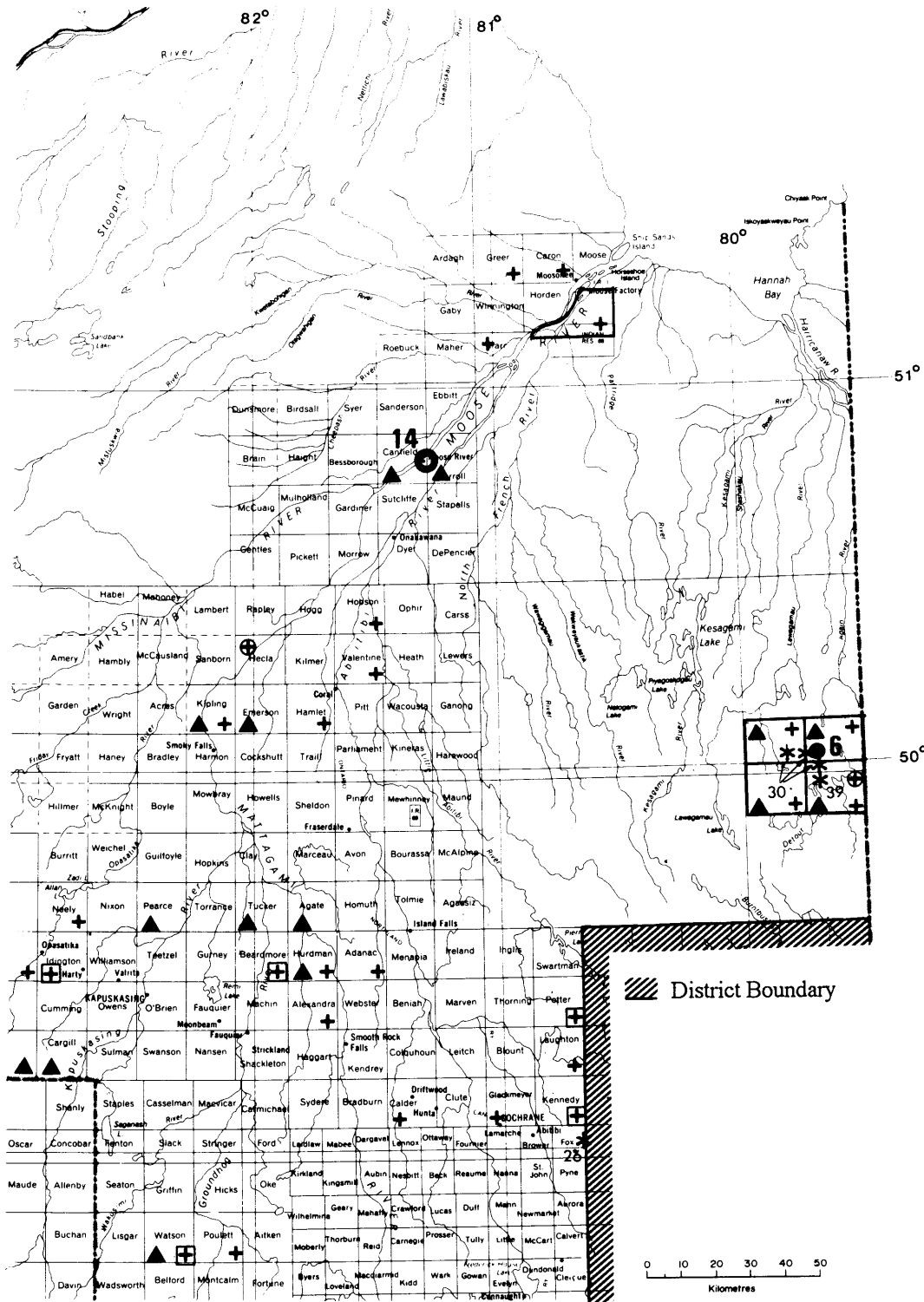
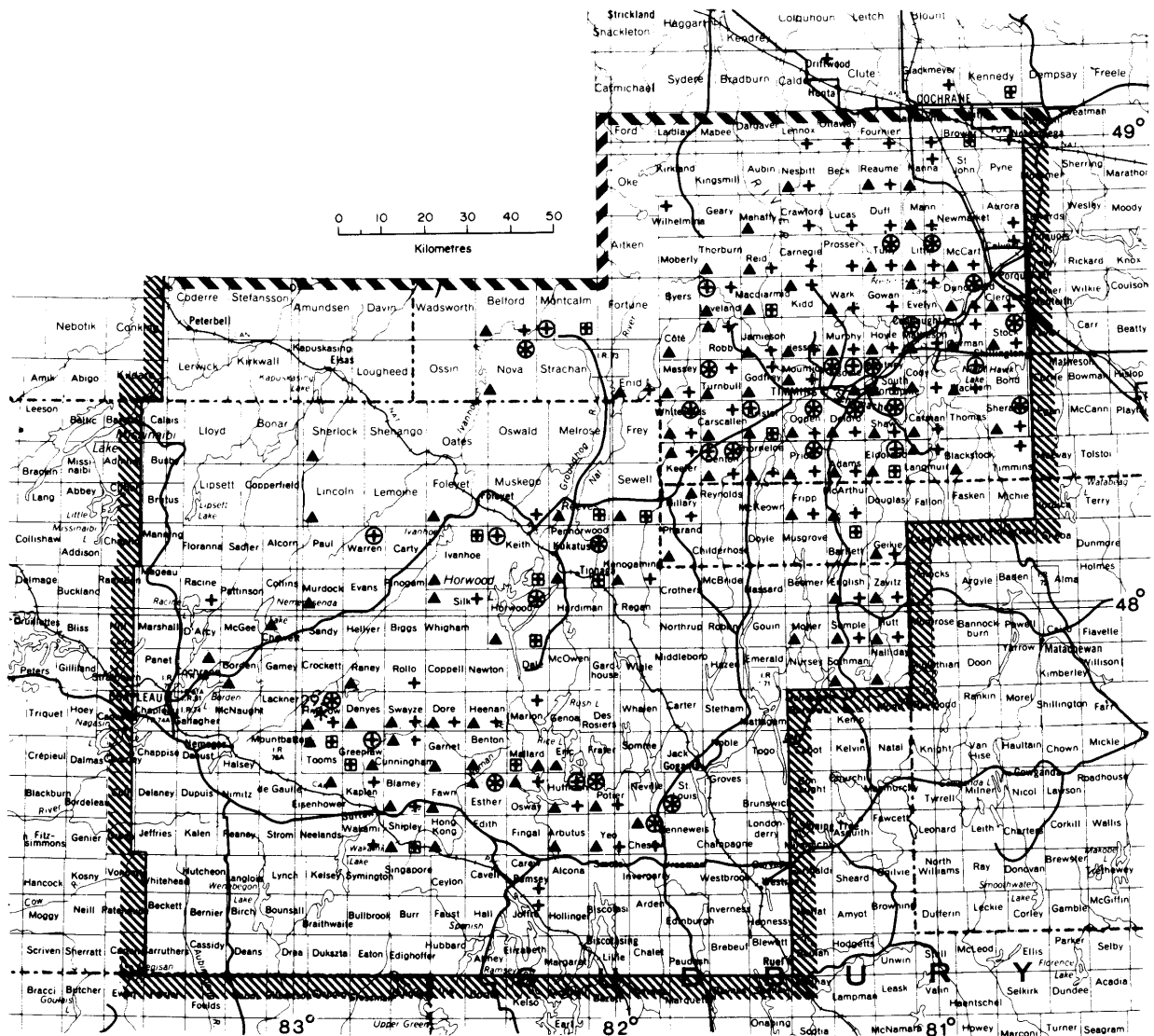


Figure 1d. Timmins Resident Geologist's District (east-central portion)

EXPLANATION

- ▲ Township/Area for which exploration data was received - 1994
- ✚ Township/Area in which claims were staked - 1994 (less than 100 16-ha units)
- ▣ Township/Area in which claims were staked - 1994 (more than 100 16-ha units)
- * Exploration Activity (keyed to Table 4)
- Producing Mine - 1994 (keyed to Explanation for Figure 2)
- ⊙ Property Evaluation & Development Project - 1994 (keyed to Explanation for Figure 2)
- ⊕ Township/Area where 1994 OMP-funded project was in progress




 District Boundary

Figure 1c. Timmins Resident Geologist's District (south portion)

EXPLANATION

- ▲ Township/Area for which exploration data was received - 1994
- + Township/Area in which claims were staked - 1994 (less than 100 16-ha units)
- ⊞ Township/Area in which claims were staked - 1994 (more than 100 16-ha units)
- * Exploration activity (keyed to table 4)
- ⊕ Township where 1994 OPAP-funded project was in progress
- ⊕ Township where 1994 OMIP-funded project was in progress

MINING ACTIVITY

Base Metal Mines

A summary of total base metal production within the Timmins Resident Geologist's District is provided in Table 2.

Falconbridge Limited - Kidd Creek Mine

Production in 1994 at the Kidd Creek Mine, owned by Falconbridge Limited, was 3.322 million tonnes milled @2.59% Cu, 4.07% Zn, 43 g/t Ag and 0.09% Pb. Total metals produced were: 86 200 tonnes Cu, 135 310 tonnes Zn and 143 700 kg Ag. Of the total production, approximately 61% was produced by the No. 1 Mine, 21% by the No. 2 Mine and 18% by the No. 3 Mine. The company expects to maintain similar production levels throughout 1995, however, more emphasis will be given to production from the No. 3 Mine. It should be noted that in 1994 the first production blasts were made on the 60-level, located approximately 6000 feet below surface (S. Kaczmarek, Falconbridge Limited, written communication, 1995).

In 1993, the mine produced 3.557 million tonnes @3.3% Cu, 3.8% Zn, 0.11% Pb and 49 g/t Ag. Total production at the mine, from 1966 to the end of 1993, was just over 100 million tonnes @2.2% Cu, 6.8% Zn and 0.28% Pb. Reserves at the mine, as of December 31, 1993, were 34 858 000 tonnes @2.8% Cu, 5.9% Zn, 0.21% Pb and 72 g/t Ag.

In late 1993, Falconbridge confirmed that significant extensions to the Kidd Creek ore body had been discovered to a depth of at least 7400 feet below surface (Luhta et al. 1994). This year, the company continued exploration by conducting underground diamond drilling from the 5200-foot and 6100-foot levels, as well as from 2 stations on the 6800-foot level (Falconbridge Limited, personal communication, 1994). Published results from 4 underground diamond-drill holes have shown intersections between 7735 feet (2380 m) and 9750 feet (3000 m) below surface that average 3% Cu, 4.8% Zn, 0.85% Pb and 180 g/t Ag, over an average horizontal width of 50 m. An additional 50 m of lower-grade mineralization also was intersected (*The Northern Miner*, October 31, 1994). A new development heading was begun on the 6800-foot level, in late 1994, to cross cut towards the structural hanging wall (stratigraphic footwall) of the ore body. A hanging wall exploration drive will be driven from there to provide drill stations to further outline mineralization above and below the level.

A total of 57 364 m of underground diamond drilling was completed at the Kidd Creek Mine in 1994. Of this total, 50% was for exploration below 6000 feet. The remaining 50% of the drilling was completed for delineation purposes and to explore for additional ore in the upper levels. No surface diamond drilling was done.

The total number of employees at the Kidd Creek operations of Falconbridge Limited at the end of 1994, was 1880 (Falconbridge Limited, personal communication, 1995).

Precious Metal Mines

Gold production values for the Timmins Resident Geologist's District are summarized in Table 3.

Kinross Gold Corporation - Hoyle Pond Mine

Projected production at the mine in 1994 is 61 000 recovered ounces of gold, up from 47 092 ounces gold in 1993. Actual production figures were not available at time of writing. Since 1985, this mine has produced approximately 500 000 ounces of gold. The average mine grade for 1994 was 14.5 g/t Au.

In early 1994, a new ore zone, called the 1060-Zone, located 400 to 500 m south of the main Hoyle Pond gold zone, was discovered after an extensive diamond drilling program. The 1060-Zone includes the "A" horizon and the "B" horizon. The "A" horizon strikes north-northeast and has at least 3 additional subparallel veins branching off. The "B" horizon strikes just north of east and lies to the south of the "A" horizon. It is composed of at least 3 parallel lenses, referred to as the B1, B2 and the B3 horizons. The 1060-Zone is hosted within carbonatized, tholeiitic mafic metavolcanic rocks which lie south of a carbonatized ultramafic body. Veins within the main Hoyle Pond Mine horizon also are hosted by carbonatized tholeiites, but are located north of the ultramafic body, and south of a sheared, graphitic argillite. This graphitic argillite.

Table 2. Base Metal Production, Timmins Resident Geologist's District to the end of 1994

MINE	TOWNSHIP	DATES	ORE MILLED	GRADES
Alexo	Dundonald	1912-19 1943-44	51 857 tons 4 923 tons	4.5% Ni, 0.5% Cu
Canadian Jamieson	Godfrey	1966-71	816 173 tons	2.44% Cu, 4.22% Zn
Jameland	Jamieson	1969-72	509 356 tons	0.99% Cu, 0.88% Zn
Kam Kotia	Robb	1943-44 1961-72	6.6 Mtons	1.1% Cu, 1.17% Zn, 0.10 oz/T Ag
Kidd Creek	Kidd	1966-	104.3 Mtons	2.34% Cu, 6.94% Zn, 0.28% Pb, 90.7 g/t Ag
Langmuir #2	Langmuir	1972-78	1.1 Mtons	1.43% Ni
Langmuir #1	Langmuir	1990-91	111 502 tons	1.74% Ni
McIntyre	Tisdale	1963-82	10 Mtons	0.67% Cu
Redstone	Eldorado	1989-92	294 895 tons	2.4% Ni
United Obalski	Godfrey	1966	Produced 240 tons	Cu concentrate

separates the main ore zone (tholeiites) from the metasedimentary rocks that lie to the north.

Surface diamond drilling, completed in 1994, detailed the 1060-Zone to the 125-metre level and extensive diamond drilling from the 200-metre level detailed the zone between 125 and 300 m below the surface.

The 1060 "A" horizon is an irregularly shaped, boudinaged, quartz-carbonate-tourmaline vein. It ranges in width from 10 cm to 1 m and dips vertically. Minor, fine pyrite and traces of arsenopyrite are disseminated throughout. At the north end of the zone, fuchsite is found within both the vein and the wall rock. At the south end, fine graphitic material occurs as stringers throughout the vein. Coarse, cubic pyrite is scattered throughout the wall rock. Although the wall rock appears to be barren, assays from the vein returned high-grade gold values.

The "B" horizon of the 1060-Zone has an average width of 2.5 m. At the 200-metre level, the B1 and B2 horizons come together and have an average aggregate width of 5 m. These two ore horizons dip vertically and diverge both above and below this level. This ore consists of irregularly shaped, quartz-carbonate-tourmaline veins and stringers within a sericitized and somewhat silicified shear zone. The shear zone contains abundant (up to 5%) disseminated pyrite and a minor amount of arsenopyrite. At the west side, sheared graphitic argillite occurs to the north of the B1 and B2 horizons. Unlike the "A" horizon, the pyritized wall rock within the B1 and B2 horizons contain gold. The B3 horizon is similar to the "A" horizon in that it, too, consists of an irregular, fuchsite-bearing, quartz-carbonate vein. Very little pyrite is contained within the wall rock on the east side, however where it does occur, the wall rock contains gold.

During exploratory diamond drilling, a porphyry body was discovered to the southeast of the B3 horizon. A gold-bearing, quartz stockwork occurs along its east side.

A 400-metre long crosscut has been driven south from the 200-metre level of the main workings of the Hoyle Pond Mine into the 1060-Zone. Drifting along the "A" horizon was completed and preparation for shrinkage mining of the vein, was being done in late 1994. In late summer, an 870-tonne bulk sample taken from a 20 m length of the "A" horizon had a mill grade average of 11.6 g/t Au. Drifting on the B1 and B2 horizons, at the point where the two zones are joined, was done for approximately 15 m west and 10 m east of the crosscut. A 2416-tonne bulk sample from this area averaged 11.0 g/t Au. Drifting east and west of the crosscut also was done on the B3 horizon. A ramp is being driven down to the 240-metre level on the crosscut halfway between the "A" and "B" horizons. A ramp is also being driven upwards to surface, with levels cut every 40 m. Late in 1994, drifting was in process on the porphyry zone to the

east, and the west part of the B3 horizon was being developed for longhole mining.

During the year, both surface and underground diamond drilling programs were done to evaluate the 950-Zone that lies 650 m west, and along strike of the 1060-Zone. This quartz vein structure, which begins at 200 m below surface, will need to be further evaluated by underground development. The 350-Zone that lies 600 m west of the 950-Zone also was explored by surface diamond drilling. The 350-Zone was discovered in 1969. More surface diamond drilling is planned to further evaluate this zone.

Underground diamond drilling from the new development on the 1060-Zone, was started in late 1994 to explore for the downdip extension of the main ore lenses at the Hoyle Pond Mine.

A total of 70 000 m of both surface and underground diamond drilling was completed by Kinross at the mine during 1994.

A pilot hole for shaft sinking was drilled in late 1994 and the sinking of a shaft to 780 m below surface will commence in early 1995.

Ore from the Hoyle Pond Mine is processed at the mill at the Bell Creek Mine. A new 3 km long road linking the two operations was completed in late 1994. Before the construction of this road, the hauling distance for the ore was 20 km.

The total number of employees at Kinross Gold's Timmins operations, to the end of 1994, was 165 (Kinross Gold Corporation, personal communication, 1994; L. Luhta, personal observation, 1994).

Kinross Gold Corporation - Bell Creek Mine

During the first 3 months of 1994, 6659 ounces of gold were recovered from 30 509 tonnes, which graded 7.10 g/t Au. Thirty diamond-drill holes (5000 m) were drilled to trace the "North A" ore zone below the 300-metre level. A reserve of 100 000 tons, grading 8.0 g/t Au was outlined by the drilling (Kinross Gold Corporation, personal communication, 1994).

Moneta Porcupine Mines Inc.

The company conducted a gold recovery project on its tailings property in Tisdale Township. Previous studies indicated that 50 000 tonnes of tailings had an average gold grade of 0.209 ounce Au per ton. In 1994, 20 000 tons of tailings, with an average head grade of 0.20 ounce Au per ton were shipped to the Home Smelter in Noranda, Quebec.

Placer Dome Inc. - Dome Mine

Production at the Dome Mine, in Tisdale Township in 1994 was 175 002 ounces of gold from 1 691 000 tons milled, at an average head grade of 0.108 ounce Au per ton (1 534 412 tonnes @3.711 g/t Au). Mill recovery was 95.6%. Approximately 20% of the mill feed came from the open pit (average grade 0.075 ounce Au per ton) and 80% was mined from underground, with an average grade of 0.137 ounce Au per ton.

Underground mining is being gradually shifted to longhole methods and 70% of the ore was extracted by that method in 1994. The remaining ore was mined by mechanized cut and fill and shrinkage mining. Underground proven and probable ore reserves, at the end of 1994, were 10 541 745 tons at a grade of 0.131 ounce Au per ton. A total of 90 000 feet of underground diamond drilling was completed during the year. Underground exploration and ore definition will be accelerated and 160 00 feet of underground diamond drilling are planned for 1995.

Development at the "super pit", which began in March 1994, is continuing and mill expansion, which will increase production from 4000 to 11 000 tons per day, will be completed by April 1995. At that time, the pit will be in full production. Proven and probable reserves for the "super pit" are 25 638 000 tons, at a grade of 0.067 ounce Au per ton, to a depth of 950 feet. Waste rock, totalling 174 million tons, will be removed while open pit mining is in progress. The pit life is expected to be 11 years. Capital cost for the pit expansion is \$150 million.

Initially, the pit will supply the mill with 60% of the ore and underground mining will supply the remaining 40%.

However, production from underground will be expanded and 50% of the ore will eventually be produced from there.

At the end of 1994, there were 440 people permanently employed at the Dome Mine (Placer Dome Inc., personal communication, 1994).

Placer Dome Inc. - Detour Lake Mine

Gold production at the Detour Lake Mine in 1994 was 124 500 ounces, down 22% from the forecast of 160 00 ounces. This loss of production was due to freezing at the mill as a result of extremely cold temperatures in early 1994. Underground production also was down due to a delay in the construction of the new conveyor system. Some of the shortfall in tonnage was made up by milling some of the low-grade stockpile material (grading 1.5 g/t Au) which had previously been mined from the open pit. Tonnes milled were 895 000 with an average grade of 4.74 g/t Au. The mill recovery was 90.4%, also down from a targeted recovery rate of 93%.

An exploration drift was driven 700 m westward on the 330-metre level within the tholeiitic rocks lying to the north of the main ore zone. Underground diamond drilling was done southward, through the quartz zones in the tholeiites and through the upward projection of the main ore zone. This drilling identified extensions of known quartz zones that occupy the upper levels of the mine. Another horizon of the main zone, at the ultramafic-mafic rock contact, also was discovered. This new zone, called the "Main 3 Zone" has an average width of 5 to 6 m, appears to be continuous and is still open along strike.

A total of 50 000 m of underground diamond drilling and 4000 m of surface diamond drilling was done at the Detour Lake Mine in 1994. For 1995, the company is forecasting the completion of 75 000 m of underground diamond drilling.

A mine and mill expansion study was completed which could bring the production at Detour Lake up to 200 000 ounces within 2 years. The cost of the expansion is estimated to be \$20 million. A decision should be made shortly (Placer Dome Inc., Detour Lake Mine, personal communication, 1994).

Royal Oak Mines Inc. - Timmins Operations

A total of 90 000 ounces of gold is forecasted to be mined from the Timmins operations of Royal Oak Mines Inc. in 1994. The actual production figures were not available at the time of writing. Mining occurred at 5 sites: the Pamour No.1 (underground); the Pamour No. 3 (open pit); the Hoyle Property (underground); a site just to the east of the Hoyle Property; and the No. 2 open pit. A surface diamond drilling program was conducted to the east and west of the No. 3 Pit in an attempt to increase the reserves.

Production at the Night Hawk Lake open pit in Cody Township, began in June 1994. The ore is being trucked and milled at the Pamour No. 1 mill. A total of 126 000 tons, at a grade of 0.09 ounce Au per ton initially was planned to be mined, however actual production was below forecast. Mining at the site was completed in December. The total number of employees at Royal Oak's Timmins operations were 341 at the end of 1994 (Royal Oak Mines Inc., personal communication, 1994).

St. Andrew Goldfields Ltd. - Stock Township Mine

Production at the mine, for 1994, totalled 3352 ounces of gold recovered from 22 792 tons, grading 0.155 ounce Au per ton. Mining operations were suspended at the mine in July. The Stock Mine had operated continuously since 1989, with a total of 123 354 ounces of gold recovered from 806 305 tons, at an average grade of 0.162 ounce Au per ton. The on-site mill continued to operate with 550 tons of ore per day being supplied by the Hislop Mine (Kirkland Lake Resident Geologist's District).

The company is seeking additional financing in order to conduct a major exploration and development program at the Stock Township Mine (St. Andrew Goldfields, personal communication, 1994).

Table 3. Gold Production from the Timmins Resident Geologist District (to end of 1994)

MINE NAME	TOWNSHIP	YEARS OF PRODUCTION	TONS MILLED	OZ. PRODUCED	GRADE
Ankerite	Deloro	1926-53, -78	4 993 929	957 292	0.19
Ankerite/March	Deloro	1926-1935	317 769	61 039	0.19
Aquarius	Macklem	1984, 1988-89	139 634	27 117	0.19
Aunor (Pamour No. 3)	Deloro	1940-1984			
Banner	Whitney	1927-28, -33, -35	315	670	0.13
Bell Creek	Hoyle	1987-1991	622 227*	111 988*	0.18
		1992 -			
Bonetal	Whitney	1941-1951	352 254	51 510	0.15
Bonwhit	Whitney	1951-1954	200 555	67 940	0.34
Broulan	Whitney	1939-1953	1 146 059	243 757	0.21
Cincinnati	Deloro	1914, 1922-1924	3 200	736	0.23
Concordia	Deloro	1935	230	16	0.07
Coniaurum/Carium	Tisdale	1913-1918	4 464 006	1 109 574	0.25
		1928-1961			
Crown	Tisdale	1913-1921	226 180	138 330	0.61
Davidson	Tisdale	1918-1920	9371	2 438	0.26
		1988	43 850	7 301	
Delnite	Deloro	1937-1964	3 847 364	920 404	0.20
(open pit)	Deloro	1987-1988	59 067	3 602	0.77
DeSantis	Ogden	1933, 39-42	196 928	35 842	0.18
		1961-1964			
DeSantis	Turnbull	1926		13	
Detour Lake Mine	Sunday Lake	1983-	9 285 300	1 063 097	0.11
Dome Mine	Tisdale	1910-	52 660 667	12 191 865	0.23
Faymar	Deloro	1940-1942	119 181	21 851	0.18
Fuller	Tisdale	1940-1944	44 028	6 566	0.15
Gillies Lake	Tisdale	1929-31, 35-37	54 502	15 278	0.28
Goldhawk	Cody	1947	636	53	0.08
Goldhawk (open pit)	Cody	1980	40 000	3 967	0.10
Halcrow-Swayze	Halcrow	1935	211	40	0.19
Hallnor (Pamour No. 2)	Whitney	1938-68, -81			
Hollinger-Schumacher	Tisdale	1915-1918	112 124	27 182	0.24
Hollinger	Tisdale	1910-1968,	65 778 234	19 327 691	0.29
(Pamour Timmins Prop.)		1976-1988	2 615 866	182 058	0.07
Hoyle	Whitney	1941-44, 46-49	725 494	71 843	0.10
Hoyle Pond	Hoyle	1985-	737 018*	384 827*	0.60
Hugh-Pam	Whitney	1926, 48-65	636 751	119 604	0.19
Jerome	Osway	1941-43, 56	335 060	56 893	0.17
Joburke	Keith	1973-75, 79-81	440 117	43 571	0.10
Kingbridge/Gomak	Chester	1935-1936	10387	98	0.07
McIntyre	Tisdale	1912-1988	37 634 691	10 751 941	0.29
(Pamour Schumacher)					
McLaren	Deloro	1933-1937	876	201	0.23
Moneta	Tisdale	1938-1943	314 829	149 250	0.47
Naybob	Ogden	1932-1964	304 100	50 731	0.17
Owl Creek	Hoyle	1981-1989	1 789 247	(head grade)	0.14
Pamour No. 1 (includes pits 3 & 4 & heap leach)	Whitney	1936-	47 662 056*	4 414 053*	0.09
Paymaster	Tisdale	1915-1966	5 607 402	1 192 206	0.21
Porcupine Lake/Hunter	Whitney	1937-1940, 44	10 821	1 369	0.13
Porcupine Peninsular	Cody	1924-27, -40, -47	99 688	27 354	0.27
Preston	Tisdale	1938-1968	6 284 405	1 539 355	0.24
Preston N Y	Tisdale	1933	2 800	153	0.05
Preston/Porcupine Pet	Deloro	1914-1915		314	
Preston/Porphry Hill	Deloro	1913-1915	46	312	6.78
Reef Mine	Whitney	1915-1965	2 144 507	498 932	0.23
St. Andrew Goldfields	Stock	1989-1994	591 736	95 032	0.16
Tionaga/Smith-Thorne	Horwood	1938-1939	6 653	2 236	0.35
Tisdale Ankerite	Tisdale	1952	14 655	14	0.15
Tommy Burns/Arcadia	Shaw	1917	21	414 367	0.28
Vipond	Tisdale	1911-1941	1 565 218		0.26

N.B. ERG Resources Inc. produced 18,260 oz. Au from treatment of 2 549 189 tons of tailings from March 1988 to June 1989.

* does not include 1994 production

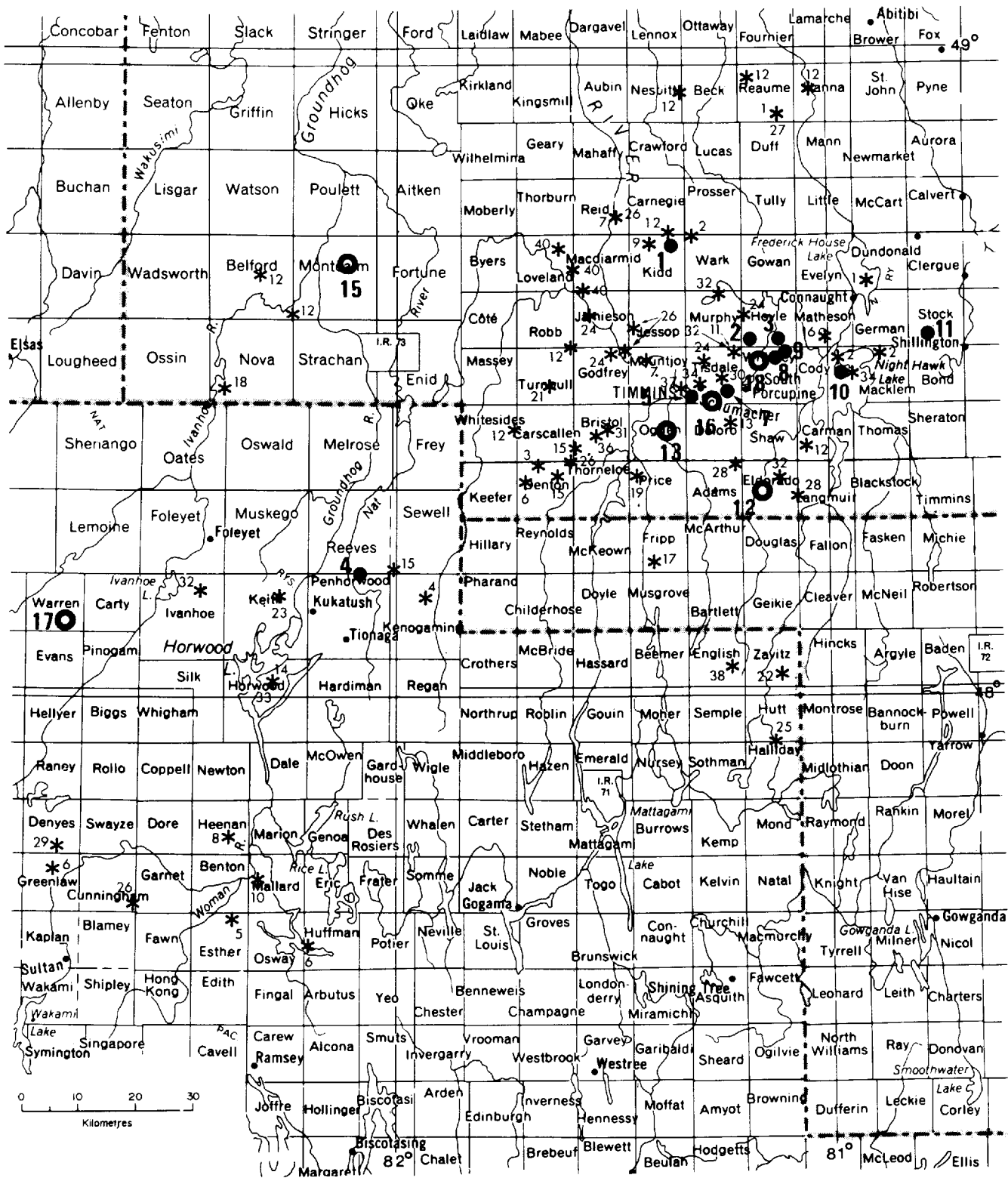


Figure 2. Timmins Resident Geologist's District - Mining and Exploration Activity, 1994

Figure 2. Timmins Resident Geologist's District - Mining and Exploration Activity

EXPLANATION

- * Exploration activity - 1994 (keyed to Table 4)

- Producing Mines - 1994
 1. Falconbridge Limited, Kidd Creek Mine Cu, Zn, Ag, Pb, Cd, Sn, In
 2. Kinross Gold Corporation, Bell Creek Mine Au
 3. Kinross Gold Corporation, Hoyle Pond Mine Au
 4. Luzenac Incorporated, Penhorwood Mine talc
 5. Moneta Porcupine Mines Inc., Tailings Recovery Project Au
 6. Placer Dome Inc., Detour Lake Mine Au
 7. Placer Dome Inc., Dome Mine Au, Ag
 8. Royal Oak Mines Inc., Pamour No. 1 Mine Au
 - Royal Oak Mines Inc., No. 2 Open Pit Au
 - Royal Oak Mines Inc., No. 3 Open Pit Au
 9. Royal Oak Mines Inc., Hoyle Mine Au
 10. Royal Oak Mines Inc., Night Hawk Lake Pit Au
 11. St Andrew Goldfields Ltd., Stock Township Mine Au

- Advanced Exploration, Property Evaluation and Development Projects - 1994
 12. Black Hawk Mining Inc. Ni
 13. Bianchi Quarries Ltd. decorative stone
 14. James Bay Development Group gypsum
 3. Kinross Gold Corporation, 1060 - Zone Au
 15. Outokumpu Mines Ltd., Montcalm Project Ni, Cu
 16. Placer Dome Inc., Paymaster Project Au
 7. Placer Dome Inc., Dome Super Pit Au
 17. Purechem Limited anorthosite
 18. Royal Oak Mine Inc., Hallnor Mine Au

Industrial Minerals

Luzenac Incorporated

In 1994, Luzenac produced 34 800 tonnes of talc. This is an increase of approximately 6000 tonnes over last year. Ore is mined by open pit method and concentrated on-site in Penhorwood Township and is micronized at its facility in Timmins. The company employs 50 people in its combined operations (Luzenac Incorporated, personal communication, 1994).

ADVANCED EXPLORATION AND DEVELOPMENT

Placer Dome Inc. - Paymaster Mine

Placer Dome Inc. will bring the old Paymaster Mine, adjacent to its Dome Mine in Tisdale Township, back into production in early 1995. The property contains a resource of 917 941 tons @0.250 ounce Au per ton. Included in this value is a reserve of 475 515 tons @0.250 ounce Au per ton. Most of the ore will be mined from between 6025 and 6500 feet below the surface. Underground re-evaluation of this mine began in 1989.

In 1994, 2 sub-drifts were driven into the ore at the 5975- and 5375-foot levels. The internal shaft (winze) was deepened from 6025 feet to 6625 feet below surface. A drive on the 6600-foot level is being developed, as well as ore and waste passes. The Dome Mine and the Paymaster Mine were joined 4000 feet below surface in order to provide an emergency escape-way. Ore will be hoisted to surface at a rate of 500 tons per day and will be trucked to the mill at the Dome Mine.

Underground diamond drilling, in 1994, totalled 5000 feet and defined the main ore structure (No. 36 vein) between 5400 and 6000 feet below surface. Forecast underground diamond drilling for 1995 is 35 00 feet (Placer Dome Inc., personal communication, 1995).

Contractors are presently working at the site preparing it for development. A total of 65 people are expected to be employed at the site when it is in full production.

PROPERTY EVALUATION AND DEVELOPMENT PROJECTS

Black Hawk Mining Inc.

In mid-November, Black Hawk Mining Inc. commenced a 15- to 16-hole diamond drill program on the Redstone nickel property in Eldorado Township. The program was designed to test the downdip extension of the known ore zone between the 700- and 1100-foot levels. At the time the mine shut down in mid-1992, the 700-foot level was the lowest working level. If the continuity of the ore zone to the 1100-foot level has been confirmed, it is estimated that it will provide approximately 2 years of mill feed at a rate of 300 tons per day (Black Hawk Mining Inc., press release, December 5, 1994).

Several significant intersections resulted from the drilling program. Hole BH 94-1 intersected the ore zone at a vertical depth of 890 feet and averaged 12.9% Ni across 4.1 feet, over the interval from 1008.2 to 1012.3 feet. Grades of 16.84% Ni across 5.9 feet, over the interval 860.1 feet to 866 feet, also were returned from BH 94-3. This diamond-drill hole intersected the ore zone at a vertical depth of 830 feet below surface. The average weighted grade of the first 4 diamond-drill holes was 6.67% Ni over an average intercept of 7.8 feet. The company estimates that the average true width of these first 4 drill holes is approximately 6 feet (Black Hawk Mining Inc., press release, December 5, 1994).

The Redstone Mine began production in 1989 and by the end of May 1992, it had produced 254 000 tonnes averaging 2.55% Ni. At the time of closure, the estimated developed ore reserves, to the 800-foot level, were 36 000 tonnes averaging 2.6% Ni.

Bianchi Quarries Ltd.

A 10-tonne sample of carbonatized komatiitic rock was taken from the company's Ogden Township property for marketing as a decorative interior stone.

James Bay Development Group

The company conducted a small surface diamond-drill project to evaluate its gypsum deposit in Canfield and Carroll

townships.

Outokumpu Mines Ltd.

In 1993, Outokumpu Mine Ltd. of Finland optioned the Montcalm nickel deposit in Montcalm Township, from the Dighem Syndicate. Since then, Outokumpu has completed a total of 68 surface diamond-drill holes (28 127 m). The diamond drilling program was originally designed to infill gaps from earlier drilling programs, to improve the confidence of previous ore reserve estimates, and to check the possible extension of the deposit from approximately 200 to 300 m below surface.

The deposit is hosted by the Montcalm Gabbroic Complex, which is a large (85 km²), subvertical, crudely layered intrusion. Mafic metavolcanic rocks occur to the west and felsic plutonic rocks outcrop to the south and east of the intrusion. The Complex has been subdivided into 4 zones: pyroxenite, gabbro, anorthositic gabbro and ferroan gabbro. Four dike suites (peridotite, pyroxenite, gabbro and granite) cross cut the Complex. All lithologies have been altered to some extent. The Montcalm nickel deposit is located at the extreme northern end of the Complex and has previously been described as consisting of two north-striking, almost vertically dipping sulphide lenses within the gabbroic zone. These lenses are separated by a north-striking, subvertical felsic dike (Barrie et al. 1990).

Outokumpu completed down-hole E. M. surveying on some of its drill holes. Surveying of the company's No. 7 drill hole revealed the presence of a large conductor at depth, and to the south. Subsequent diamond drilling in the area of the conductor intersected a new copper-nickel lens, which is still open along strike and at depth.

Examination of the drill core intersecting this new lens, by the resident geologist, showed that the mineralization consists dominantly of massive pyrrhotite. The pyrrhotite contains clots of pyrite, fine veinlets of chalcopyrite and euhedral grains of pentlandite. The sulphides are hosted by porphyritic gabbro that contains altered feldspar phenocrysts. Ultramafic dikes, granitic porphyry dikes and fine-grained felsic porphyry dikes cut across the gabbro. There are no disseminated or net-textured sulphides observed in the gabbro. This sulphide lens is interpreted as having been remobilized and injected into its present position.

The Montcalm nickel deposit was discovered in 1976 by a consortium of mining companies while drill testing an airborne electromagnetic anomaly. A total of 60 diamond-drill holes (17 000 m) was completed on the property and the deposit was estimated to contain 4.2 million tons (3.8 million tonnes) grading 1.4% Ni and 0.7% Cu. Recent calculations for the size and grade of the deposit are: 7.434 million tonnes at an average grade of 1.58% Ni and 0.71% Cu (Outokumpu Mines, personal communication, 1994).

Purechem Ltd.

A 25-tonne bulk sample of anorthosite was taken from the company's claims in Warren Township. The material is being evaluated for its potential as poly-aluminum chloride and amorphous silica.

Royal Oak Mines Inc.

Hallnor Property

In 1994, Royal Oak Mines Inc. dewatered and refurbished the shaft at the old Hallnor Mine in Whitney Township. The 17th level (2611 feet below surface) was reached. The purpose of this program was to establish underground diamond drill stations for the exploration of the down plunge continuation of vein structures into the old Broulan Mine property located to the west of the Hallnor. The diamond drilling also tested the down plunge extent of previously mined vein structures within the Hallnor Mine itself. A total of 20 383 feet of underground diamond drilling (22 holes) was done mostly from the 14th level of the mine, located 2159 feet below surface. A technical report on the results and an engineering study are presently being completed by the company on the project (Royal Oak Mines Inc., personal communication, 1994).

EXPLORATION ACTIVITY

A summary of the exploration activity conducted in the Timmins Resident Geologist's District in 1994 can be found in Table 4. Locations for exploration activity described below can be found on Figures 1b - 1e and Figure 2.

Table 4. Exploration activity during 1994, Timmins Resident Geologist's District

Abbreviations			
AEM	Airborne electromagnetic survey	IP	Induced polarization
AMag	Airborne magnetic survey	lc	Linecutting
DD.....	Diamond Drilling	Mag	Ground magnetic survey
Expl. Act	See "Exploration Activity", this report	OVD.....	Overburden drilling
GC	Geochemical survey	Rtr.....	Trenching
Gl.....	Geological survey	Samp	Sampling
GP	Geophysical survey	Str	Stripping
GR	Gravity survey	TEM	Transient electromagnetic survey
HLEM	Horizontal loop electromagnetic survey	VLF	Very low frequency electromagnetic survey

NO.	COMPANY/PROPERTY	TOWNSHIP/AREA	ACTIVITY	REMARKS
1	Arista Resources	Dundonald, Reaume	AEM	gold exploration
2	Asarco Exploration Asarco Exploration Asarco Exploration	Cody Macklem Wark	Mag, HLEM, DD-3 DD-12 lc, Mag, HLEM	Expln. Act. Expln. Act. base metal exploration
3	Boa, N.	Denton	Mag, VLF	gold exploration
4	Braddock, C. J.	Kenogaming	IP	gold exploration
5	Burton, M. L.	Esther	DD-2 (186 m)	gold exploration
6	Cameco Corporation Cameco Corporation Cameco Corporation	Denton Greenlaw Huffman	DD-9 (2100 m) DD-6 (700 m) DD-7 (1200 m), IP	Expln. Act. Expln. Act. Expln. Act.
7	Comstate Resources Comstate Resources	Mountjoy Reid	Gl, GC DD-3 (912 m)	gold exploration gold exploration
8	Conquest Yellowknife Res.	Heenan	Str	gold exploration
9	Copperquest Inc.	Kidd	DD-1 (1800 ft.)	base metal exploration
10	Crichton, R.	Mallard	Mag, VLF, Prospecting	gold exploration
11	Davidson Tisdale	Tisdale	Gl, GC, Assays	gold exploration
12	Falconbridge Limited Falconbridge Limited Falconbridge Limited Falconbridge Limited Falconbridge Limited Falconbridge Limited Falconbridge Limited Falconbridge Limited Falconbridge Limited	Belford Carman Carscallen, Whitesides Hanna Jamieson, Robb, Godfrey, Turnbull Kidd, Carnegie Montcalm Nesbitt, Beck Reaume	DD-3 (591 m), Mag, HLEM DD-1 (425 m) Mag, HLEM Mag, HLEM DD-45 (18 988 m) DD-11 (3825 m) Mag, HLEM DD-78 (14 766 m) Mag, HLEM	base metal exploration gold exploration base metal exploration base metal exploration Expln. Act. Expln. Act. base metal exploration Expln. Act. base metal exploration
13	Grant-Collin Property	Deloro	Gl, Mag, VLF, Str, Rtr	gold exploration
14	Haddington Resources	Horwood	lc, Mag, HLEM, VLF, Gl, GC	gold exploration
15	Hemlo Gold Mines Ltd. Hemlo Gold Mines Ltd. Hemlo Gold Mines Ltd.	Bristol Denton Sewell Reeves	DD-1 (302m) DD-5 (1200 m) DD-12 (4075 m)	Expln. Act. Expln. Act. Expln. Act.
16	International Larder Minerals	Matheson	DD	Expln. Act.

NO.	COMPANY	TOWNSHIP/AREA	ACTIVITY	REMARKS
17	Jones & Filo Property	Fripp	DD-1(52 m), IPAssay	base metal exploration
18	Jones, Filo & Kean Property	Nova	HLEM, Prospecting	base metal exploration
19	Kangas-Croxall Property	Price	DD-4 (549 m), Assays	gold exploration
20	KWG Resources/Spider Resources	Areas 524-825, 528-834	DD	Expln. Act.
21	Lapierre, K.	Turnbull	Mag, VLF, IP	gold & base metal exploration
22	Lashex Ltd.	Zavitz	Mag, VLF	gold & base metal exploration
23	Marshall Minerals Corporation	Keith	DD-15 (7280 ft)	Expln. Act.
24	Moneta Porcupine Mines Moneta Porcupine Mines Moneta Porcupine Mines Moneta Porcupine Mines	Hoyle Godfrey Jamieson Tisdale	IP lc, IP, DD-2 lc, VLF DD-4	Expln. Act. Expln. Act. Expln. Act. Expln. Act.
25	Mullen, D. V.	Halliday, Hutt	GI, Mag, VLF	base metal exploration
26	Noranda Exploration Noranda Exploration Noranda Exploration Noranda Exploration Noranda Exploration	Bristol, Carscallen, Thorneloe, Denton Cunningham, Garnet Fox, Stimson Godfrey, Jessop Reid	Mag, IP, DD-1 (302 m) DD-3 (406 m) DD-14 (3700 m) DD-14 (3700 m) DD-2 (505 m)	gold exploration; Croxall/Band-Ore property Expln. Act. Expln. Act. Expln. Act. base metal exploration
27	Norman, Meikle & Anderson	Reaume	Mag, IP, VLF, HLEM	base metal exploration
28	Outokumpu Mines Outokumpu Mines	Adams, Eldorado, Deloro Langmuir	Mag, HLEM Str	base metal exploration base metal exploration
29	Patrie Property Patrie Property	Denyes Halcrow	IP GI	gold exploration gold exploration
30	Placer Dome Canada Limited Placer Dome Canada Limited Placer Dome Canada Limited Placer Dome Canada Limited	Lower Detour Lake Sunday Lake West of Sunday Lake Tisdale	DD-3 (819 m), AEM, Amag DD-23 (7285 m) DD-7 (2525 m), IP DD-41 (6801 m)	Expln. Act. Expln. Act. Expln. Act. Expln. Act.; Paymaster property
31	Poirier, R. J.	Bristol	Rtr	gold exploration
32	Pyke, D. R. Pyke, D. R. Pyke, D. R. Pyke, D. R.	Eldorado Ivanhoe Murphy, Wark Tisdale	GI GI GI Mag, VLF	base metal exploration gold & base metal exploration gold & base metal exploration gold exploration
33	Ross, G.	Horwood	Str, Rtr, Assays	gold exploration
34	Royal Oak Mines Royal Oak Mines Royal Oak Mines	Cody Tisdale Whitney	DD-37 (3353 ft.) DD-13 (1500 ft.) DD-10 (10 850 ft.)	Expln. Act. Expln. Act. Expln. Act.; adjacent to Pamour # 1 Mine site (not plotted)
35	Strike Minerals	Ridge Lake Area	Mag	diamond exploration
36	Teck Corporation	Bristol	IP	Expln. Act.
37	Timginn Syndicate	Tisdale	DD-12 (4200 m)	Expln. Act.
38	Tri Origin Exploration	English	IP	gold exploration
39	Westmorland Resources	Lower Detour Lake	OVD	gold exploration
40	WMC International	Loveland, Jamieson, Macdiarmid	GI, GC, Mag, TEM	base metal exploration

Asarco Exploration Co. of Canada Ltd.

Asarco Exploration Co. of Canada Ltd., completed a 9-hole diamond drill program on their Aquarius Mine property in Macklem Township. The drill program was designed to test the extension of the mine's auriferous, carbonate-altered ultramafic horizon. A few erratic gold values were intersected.

The company also completed a 3-hole diamond drill program on the northern part of the Night Hawk Lake peninsula, in Cody Township. No significant gold values were returned from the sequence of metasedimentary and talc-altered ultramafic rocks that were intersected (Asarco Exploration Co. of Canada Ltd., personal communication, 1994).

Cameco Corporation

Cameco Corporation has completed a 7-hole surface diamond drilling program, totalling 1200 m, on its property in Huffman Township. This property is located along strike from the old Jerome Gold Mine and has been optioned from E. Kirkwood. The drilling was done along a 1 km stretch of the metasedimentary-porphyry contact. A few anomalous gold values were obtained and additional drilling may be conducted in 1995. Prior to drilling, the company completed an I. P. survey over the property (Cameco Corporation, personal communication, 1994).

A 6-hole diamond drilling program, totalling 700 m, also was completed for the company in the Ridout Lake area in Greenlaw Township. No significant intersections have been reported from this gold exploration program (Cameco Corporation, personal communication, 1994).

In late 1994, the company initiated a 9-hole (2100 m) surface diamond drilling program on its Wakemac claims, located in the western part of Denton Township. The claims were optioned from Band-Ore Ltd. who had recently acquired them from Torogold Resources Inc. and Homestake Mineral Development Co. (Cameco Corporation, personal communication, 1994).

Falconbridge Limited

Falconbridge Exploration concentrated all of its efforts in the exploration for base metals in the Timmins area in 1994. The company conducted exploration projects in 4 separate geographic areas.

In the Kidd Creek Project area, which includes Kidd, Prosser, Wark and Carnegie townships, the company completed 3825 m of surface diamond drilling (11 holes). These holes were drilled in Kidd and Carnegie townships. A major core re-logging operation for this same area also began in May of 1994, and is expected to continue until September, 1995. Core from 750 surface diamond drill holes, including the company's own drill core, as well as core stored at the Ministry of Northern Development and Mines' Drill Core Library, in Timmins. Other, additional drill core also is being re-logged in order to locate targets for further exploratory drilling. Falconbridge will also be using information obtained during a 4-year joint research project conducted by the Geological Survey of Canada, Laurentian University and Falconbridge to look for additional exploration targets in and around the Kidd Creek Mine site.

In the Kamiscotia Project area, which includes Robb, Jamieson, Godfrey and Turnbull townships, the company completed 45 surface diamond-drill holes (totalling 18 988 m). This drill program included 27 holes (10 157 m) that were drilled on the old Kam-Kotia Mine property, on which the company has an Exploratory Licence of Occupation.

Falconbridge also completed 3 surface diamond drill holes in Belford Township.

Falconbridge drilled 78 surface diamond-drill holes, totalling 14 766 m, in Nesbitt, Beck, Lucas and Crawford townships, under the framework of an exploration program referred to as the Kidd North Project area. All drilling was completed early in 1994 and the work was concentrated in Nesbitt and Beck townships. A narrow (few m) intersection of 0.7% Ni, occurring at the contact between an ultramafic rock and a graphitic argillite, was reported from an undisclosed location. A less extensive diamond drill program (approximately 8000 m) is scheduled to start in the same area early in 1995 (Falconbridge Limited, personal communication, 1994).

Hemlo Gold Mines Ltd.

Hemlo Gold Mines Ltd. conducted a 5-hole (1200 m) surface diamond drill program on their "Cripple Creek" gold

property in Denton Township. These claims were optioned from Gowest Amalgamated Resources Ltd. and host the old Halpenny gold occurrence. The 1994 drill program was a follow-up to the company's 1993 exploration program on the same property (Luhta et al. 1994).

Hemlo Gold also completed one diamond-drill hole for assessment purposes on their "Mahoney Creek" gold property. The "Mahoney Creek" property was optioned from Band-Ore Resources Ltd. and is located in Bristol Township.

On the company's "West Porcupine" claims, located in Sewell and Reeves townships, Hemlo Gold completed 4075 m of surface diamond drilling (12 holes). This property is under option from Glen Auden Resources Limited and Canadian Golden Dragon Resources Ltd. A gold-bearing, siliceous alteration zone, containing disseminated pyrite, was intersected in an area of sheared ultramafic rocks, porphyry and carbonatized basalts. This area is being considered as a possible extension of the Destor-Porcupine Fault. One hole intersected a 1.3 metre wide quartz vein that assayed 21 g/t Au (0.6 ounce Au per ton). A second diamond drill hole, drilled 400 m east of the first, returned assays along a 70 m section of core of 6.65 g/t Au over 2 m, 3.14 g/t Au over 1.4 m, 43.44 g/t Au over 1.5 m and 3.14 g/t Au over 1 metre. The last three assays were obtained in a continuous section. Two other holes drilled in the same area also intersected highly anomalous gold values. Six km to the west, 2 surface diamond-drill holes were drilled as part of the same exploration program. Anomalous gold values ranging between 90 and 1130 ppb were intersected for 20 m in one of these holes (Hemlo Gold Mines, personal communication, 1994; Canadian Gold Dragon Resources Ltd., press release, December 12, 1994).

International Larder Minerals

In late 1994, International Larder Minerals started an exploration drill program on an optioned property in Matheson Township. The company is searching for gold mineralization within a geologically favourable greenstone horizon located approximately 6 km east of Kinross Gold's producing mine at Hoyle Pond. International Larder will systematically drill-test two promising geophysical targets. The drill project is expected to be completed during the winter of 1995 (International Larder Minerals, personal communication, 1994).

Marshall Minerals Corp.

Marshall Minerals Corp. has recently announced the results of a 15-hole (7280 feet) diamond drill program on their 251-claim Sangold Property, located in Keith Township. The best drill results from the Patricia Zone include 0.34 ounce Au per ton across 5.6 feet, 0.69 ounce Au per ton over 6.9 feet and 0.46 ounce Au per ton over 9.6 feet (*The Northern Miner*, January 16, 1995).

Based on the current drill results, the company geologists have concluded that the mineralization of the Patricia Zone is fault controlled and is associated with anastomosing quartz-carbonate-sulphide veining. The veining is hosted within a sheared, carbonatized deformation zone associated with the regional contact between felsic and mafic metavolcanic rocks. The eastern 2 miles (3.2 km) of this deformation zone hosts Marshall's 135-Zone, the Patricia Zone and the former Joburke Mine. Favourable geology continues to the southwest of the Joburke property for an additional 4.8 km on Marshall's property, for a total strike length of approximately 7.2 km (Marshall Minerals Corp., press release, January 5, 1995).

Additional drilling on the company's 135-zone showing, approximately 0.8 km to the east of the Patricia Zone, confirmed the presence of an eastward plunging carbonitized shear zone with highly anomalous gold values. The company is planning detailed geophysical surveys and additional drilling to further evaluate the current zones, and extensive additional work to explore the remaining 6.4 km of strike length (*The Northern Miner*, January 16, 1995).

The prospect was originally uncovered by prospector G. Sanford who obtained impressive assays from surface channel samples. The best assays from this project included: 0.78 ounce Au per ton over 15 feet containing 6.6 feet @1.62 ounce Au per ton; 0.20 ounce Au per ton over 15 feet; 0.19 ounce Au per ton over 10 feet and 0.17 ounce Au per ton over 10 feet. Diamond drilling completed over 1988-89 indicated the presence of additional and parallel lenses both to the north and west of the mineralization below the initial surface showing (Marshall Minerals Corp., press release, January 9, 1995).

Moneta Porcupine Mines Inc.

The company drilled one 400-m surface diamond-drill hole on their property in Godfrey Township. The program was

designed to replicate 1983 assay results that returned values of 10% Zn over 3 m. No significant intersections were obtained from the 1994 diamond drilling program. A second diamond-drill hole also was completed in the northeast corner of the township.

Line-cutting and geophysical surveys were conducted on their property in Jamieson Township and on two additional properties in Godfrey Township. The company also completed an I. P. survey on their property located in the western part of Hoyle Township. A diamond drilling program will begin on this property in 1995. In addition, the company completed a 4-hole diamond drill program on their Kayorum gold property in Tisdale Township (Moneta Porcupine Mines Inc., personal communication, 1994).

Noranda Exploration Company Limited.

As a follow-up to their successful 1993 exploration program in Fox (Porcupine Mining Division) and Stimson townships (Larder Lake Mining Division), the company acquired additional property both to the east and west of their original claims. The 1993 drill program intersected low-grade zinc mineralization in felsic rocks adjacent to graphitic argillite (Luhta et al. 1994). In early 1994, Noranda Exploration completed 14 surface diamond-drill holes, totalling 3700 m. Some of these holes were drilled to test a previous intersection of 3.8% Zn and 2.54% Pb over 6.8 m. Other diamond-drill holes tested geophysical anomalies. This program is being carried out as part of a joint venture with Cross Lake Minerals Ltd. (Cross Lake Minerals Ltd., press release, February 14, 17 and 24, 1994).

In a separate base metals exploration program, located at the intersection of Jamieson, Jessop, Mountjoy and Godfrey townships, Noranda Exploration drilled 14 diamond-drill holes, for a total of 3700 m. This project was testing the local stratigraphy which had successfully been traced using induced polarization surveys.

Noranda Exploration also drilled 3 holes (totalling 400 m) while exploring for base metals in Cunningham Township. Cunningham Township is located in the Swayze Greenstone Belt.

A reorganization has taken place between Noranda Exploration Company Limited and Hemlo Gold Mines Ltd. As a result of this reorganization, all of the employees in Noranda's former Timmins office will now be working for Hemlo Gold Mines, with a focus on gold exploration. Noranda's base metals exploration programs in the Timmins area will be conducted from their Noranda, Quebec office (Noranda Exploration Company Limited, personal communication, 1994).

Pentland Firth Ventures Ltd.

Pentland Firth Ventures Ltd., a newly incorporated company, has acquired 13 non-producing properties from Kinross Gold Corporation, as well as a participating interest in 10 other properties that Kinross holds under option from Falconbridge Ltd. In consideration for these properties, Kinross received 3.6 million shares in Pentland Firth Ventures Ltd. Kinross retains the right to be the operator of any deposits discovered. Pentland Firth is completing a prospectus and will be raising funds to finance exploration projects on the properties. The properties are near, but not contiguous with the producing properties of Kinross Gold Corporation in Hoyle Township (Pentland Firth Ventures Ltd. and Kinross Gold Corporation, personal communication 1994; *The Northern Miner*, August 22, 1994).

Placer Dome Canada Limited

Placer Dome Canada Limited carried out exploration work in both the Detour Lake area and the Timmins area over the course of the year. Most of the exploration budget was spent in close proximity to the Detour Lake Mine and the Dome Mine as part of the company's Minex Program. This program was initiated to locate additional ore at the company's producing mines and is totally funded and managed by the exploration department with technical advice provided by the mines' geological staff.

At the Detour Lake Mine, 23 surface diamond drill holes totalling 7285 m were drilled. One-third of these holes were drilled to the west of the open pit (up to 4 km away) in an effort to intersect the main ore horizon to the west. The main ore horizon is a siliceous (cherty) contact zone between ultramafic rocks, to the south, and tholeiitic rocks to the north (Luhta et al. 1992). Drilling in this area also was expected to locate additional, stacked ore lenses in the tholeiitic rocks lying to the north. The other two-thirds of the Minex drilling was done just to the east and south of the open pit. A gabbro intrusion occurs to the east of the pit, and this drill program was designed to explore for near surface ore in the tholeiitic rocks and the gabbro, as well as at the contact between the two.

Placer Dome's other exploration programs in the area included: the drilling of one surface diamond-drill hole (440 m) on the Pelangio-Larder Mines Ltd. option, northwest of the Detour Mine property; and the completion of 3 diamond-drill holes (804 m) on the McAlpine option (on the old Gowest Amalgamated Resources ground), just west of the Pelangio-Larder ground.

In a joint venture with Destor Resources Ltd., Placer Dome completed a 3-hole (819 m) diamond drilling program on their South Detour property. This property is located along the south limb of the anticline, in rocks similar to those that host the Detour Lake Mine, on the north limb of the anticline. These joint venture partners also completed 20 km of I. P. surveys in the Hopper Creek East area.

Placer Dome completed 1100 km of airborne EM and magnetics over ground optioned from Westmin Resources Limited in the South Detour area.

As part of their Minex program in the Timmins area, Placer Dome, completed a 38-hole (3828 m) diamond drill program on the Paymaster Mine property located adjacent to the Dome Mine in Tisdale Township. This program was conducted southwest of the newly activated No. 5 Paymaster Shaft and was designed to evaluate this area for near surface ore.

In another Minex program, Placer Dome drilled 3 deep surface diamond-drill holes, totalling 2973 m, on the old Foley-O'Brien property, located approximately 2.5 km northeast of the Dome open pit. These holes were drilled to explore at depth an area of metavolcanic rocks located just to the east of the Burrows-Benedict Fault. These metavolcanic rocks may be the up-faulted extension of the northeast-plunging "Greenstone Nose". The "Greenstone Nose" is the area at the Dome Mine in which a significant amount of gold is found to occur along a north-south contact between metavolcanic and metasedimentary rocks occurs. This structure hosts a significant amount of ore at the Dome Mine.

Royal Oak Mines Inc.

Royal Oak Mines Inc. conducted a winter, surface diamond drill program early in 1994 on Night Hawk Lake in Cody Township. A total of 21 000 feet, in 23 holes was drilled to test the Night Hawk Break along strike in proximity to the Porcupine Peninsular gold deposit. Additional drilling is scheduled in early 1995.

A total of 1253 feet, in 14 surface diamond drill holes was completed, in early 1994, as part of a program to evaluate a gold zone on the Night Hawk Peninsula in Cody Township.

A program of 13 diamond-drill holes (1500 feet) was drilled to evaluate an area for a small open pit in the northern part of the old McIntyre Mine property in Tisdale Township.

Royal Oak also completed 10 surface diamond-drill holes, totalling 10 850 feet, south of their Hoyle Mine property adjacent to the Pamour No. 1 Mine. This program was designed to explore the metasedimentary rock package for economic gold mineralization (Royal Oak Mines Inc., personal communication, 1994).

Teck Corporation

In early 1994, Teck Corporation signed an agreement with Band-Ore Resources Ltd. in to acquire a 51% interest in Band-Ore's 41-unit property in Bristol Township. Teck can earn its interest in the property by spending \$800 000 on exploration over the next four years and by making a cash payment of \$105 000 (Band-Ore Resources Ltd., press release, March 29, 1994). Teck also optioned an adjacent parcel of ground from Placer Dome Inc. Both Band-Ore and Placer Dome's interest in the area was generated by the 1991 Recommendations for Exploration (Luhta et al. 1994).

By the end of 1994, Teck had completed a \$130 000 I. P. survey on the entire property and is planning to start a surface diamond drill program in early 1995 (Teck Corporation, personal communication, 1994).

Timginn Syndicate

The Timginn Syndicate began another surface diamond drill program adjacent to the old Hollinger and McIntyre gold mines in Tisdale Township in late 1994. A total of 12 holes (4200 m) will be drilled, concentrating on the western or up-plunge extension of the west end of the Northern Porphyry. The company has completed 2 previous surface diamond drill programs on the property (18 holes, 6500 m) and has obtained anomalous geochemical values in this area (R. Ginn,

Timginn Syndicate, personal communication, 1994).

Diamond Discoveries

The Spider Resources Inc./KWG Resources Inc. joint venture was successful in discovering 3 diamondiferous kimberlitic bodies in the Attawapiskat River area. The MacFadyen No. 1 pipe returned 2 macro and 7 micro diamonds in 163.6 kg of drill core samples and the MacFadyen No. 2 pipe, 380 m northeast of the MacFadyen No. 1, returned 3 micro diamonds from 145 kg of core samples. These two pipes may be connected. The third discovery was the Kyle Lake Pipe, located 160 km away, which returned 25 macro diamonds and 70 micro diamonds from a 106.6 kg sample. Funding for further exploration and possible development of these pipes will be done by Ashton Mining of Canada Inc. under the terms of a previous agreement.

A total of 210 000 ha has been staked by the Spider Resources/KWG Resources joint venture partners. Geophysical surveys and exploratory drilling of other targets were completed by the joint venture in 1994 (Spider Resources, personal communication, 1994).

RESIDENT GEOLOGIST'S STAFF AND ACTIVITIES

During 1994, the Timmins Resident Geologist's office was staffed by: Lorne Luhta, Resident Geologist; Pamela Sangster, Staff Geologist; Diane Draper, Data Geologist; and Diane Egerland, Secretary. In November, Ann Wilson, Staff Geologist, London, was seconded to the Timmins office as replacement for Pamela Sangster, who has been seconded to the ERLIS project. At various times during the year, D. Farrow and T. Bedard provided technical and administrative support on a short term, contract basis. P. Kangas and J. Hughes were summer students who both made valuable contributions to the Resident's program.

As usual, client service remained the number one priority. Over 2456 client visits to the Resident's office were logged, and some 6800 telephone requests for information from external client groups were made.

Core library access is now provided by the Resident and Staff Geologist by appointment only. Approximately 97 industry geologists used the premises in 1994.

The Resident's assessment file and technical library continued to expand with 123 assessment files and 63 OPAP/OMIP submissions being incorporated into the database. A list of all assessment file and OPAP/OMIP submissions incorporated into the files in 1994 is provided in Table 5. Additional information from Homestake, not previously submitted for assessment and which was donated when this company closed their Timmins office, is being integrated into the Resident Geologist's assessment file library. At the time of writing, 256 additions to the files had been made as a result of this processing. Approximately 85% of the total data submission has been processed.

On April 19 and 20, 1994, the Timmins Resident Geologist's office again hosted the Northeastern Ontario Mines and Minerals Symposium. Close to 300 registered delegates and 50 college students attended the event.

In cooperation with the Porcupine Prospectors and Developers Association, the Timmins Resident Geologist's office sponsored an art/essay contest for local elementary schools as part of the Mining Awareness Week festivities. Entries were displayed at the Underground Gold Mine Tour Gallery from May 14 to 22.

The 25 Mining Education kits, created in 1993 in cooperation with the Porcupine Prospectors and Developers Association, were upgraded and again distributed to local elementary schools.

A 10-week, basic prospecting course was organized and offered through the Porcupine Campus of Northern College. The course culminated in 2, full day field trips that highlighted both the local geology and prospecting techniques.

Lorne Luhta presented a poster session on the Mining Activity in the Timmins District in 1994, at the annual provincial Mines and Minerals Symposium, in December.

Unpublished reports produced in 1994 by the Resident Geologist's office included: Properties for Sale, Joint Venture or Option in the Timmins Resident Geologist's District.

Table 5. Assessment Files Received Timmins Resident Geologist's Office - 1994

Abbreviations			
DD.....	Diamond drilling	OVD.....	Overburden drilling
GC.....	Geochemical survey	OVT.....	Overburden trenching
GI.....	Geological survey	Prosp.....	Prospecting
GP.....	Geophysical survey	Rad.....	Radiometric survey
Grav.....	Gravity survey	Rept.....	Report
HLEM.....	Horizontal loop electromagnetic survey	Rtr.....	Trenching
IP.....	Induced Polarization	Samp.....	Sampling
Mag.....	Ground magnetic survey	Str.....	Stripping

Township or Area	Company Name	Year	Type of Work	AFRO Number	Timmins File Number
Adams, Eldorado, Deloro	Outokumpu Mines	1994	Mag, HLEM	2.15681	T-3658
Agate, Tucker	Inco Exploration	1993	DD, GC		T-3555
Belford	Falconbridge Ltd.	1994	DD 3 holes (591m)		T3642
Belford	Falconbridge Ltd.	1994	Mag, HLEM	2.15499	T-3642
Belford, Watson	Noranda Exploration	1992	DD 1 hole (353m)		T-3449
Blackstock	Falconbridge Ltd./Veracruz	1993	Mag	2.15207	T-3592
Borden, Chewett	Hygrade Corrugated	1977	GI, Mag, Rad, Rtr	donated	T-3671
Bristol	R. Crawley	1992	GI, VLF, Mag, HLEM	OP92-291	T-3656
Bristol	Croxall-Anderson/Band-Ore Resources	1994	DD 1 hole (302m)	2.15645	T-3616
Bristol	J. Croxall (Band-Ore Resources)	1994	Mag	2.15431	T-2913
Bristol	McKinley, Daley	23-25	Samp, Assays	donation	T-3584
Bristol	R. J. Poirier	93-94	Rtr		T-3468
Bristol, Carscallen	J. Croxall	1994	Mag	2.15325	T-3616
Bristol, Denton	Band-Ore Resources	1994	Mag	2.15746	T-3246
Carscallen, Thorneloe					
Bristol, Carscallen, Thorneloe, Denton	Noranda	1994	Mag, IP	2.15565	T-3246
Cargill, Ecclestone	Hollinger Mines		GI, Mag	donation	T-3632
Carman	F. Dodds	1960	Dip needle, Assays	donation	T-3579
Carman	F. Kavanagh	1927		donation	T-3578
Carman	Timmins Nickel	1991	Prosp	OM91-098	T-3410
Carman, Langmuir	Filo and Kearn	1992	Prosp, Samp	2.15541	T-2974
Carman, Shaw	Falconbridge Ltd.	1994	DD 1 hole (42.5m)		T-3320
Carroll, Canfield	Mark Kean	1993	Test pit	2.15293	T-3543
Carscallen	R. Barnes	1992	GC, Assays		T-2795
Carscallen	BHP Minerals	92-93	GC, DDH	donation	T-3595
Carscallen	Hurst-Beanland Clms	25-33	Rept	donation	T-3596
Carscallen	Moleski/Canning	27-28	GI, Assays	2.15107	T-3598
Carscallen	Noranda Exploration	1990	DD 1 hole (170m)	donation	T-3246
Carscallen, Bristol	T. Villeneuve	35-38	GI, Assays	2.15589	T-3597
Carscallen, Whitesides	Falconbridge	1994	Mag, HLEM		T-3644
Chapleau area (26 twp)	W. Kerr	1991	Str, Prosp	OP91-94	T-3660
Chester	E. L. Speetman	1993	OVT, Str		T-3469
Clergue	E. Burke	1939		donation	T-3601
Cochrane	M. Tremblay	1991	VLF, VLEM, Str	OP91-548	T-3451
Cochrane	M. Tremblay	1992	VLF, Prosp, VLEM, Str, GC	OP92-610	T-3451
Cody	Asarco Exploration	93-94	Mag, HLEM	2.15459	T-3638
Cody, Macklem	Royal Oak Mines	1993	DD 13 holes (722.07m)		T-1573
Cunningham	Kirkton/Phelps Dodge	1992	DD, Deep EM	OM92-20	T-3358
Cunningham, Garnet	Noranda Exploration	1994	DD 3 holes (406.1m)	2.15640	T-3572

Township or Area	Company Name	Year	Type of Work	AFRO Number	Timmins File Number
Cunningham, Garnet, Blamey, Fawn	Noranda Exploration	1992	GC	2.15175	T-3572
Deloro	Asarco Exploration	1993	DD 4 holes (961.8m)		T-3602
Deloro	R. Collins	92-93	Mag, VLF, HLEM, GI	2.15197	T-3624
Deloro	Grant, Collins	1993	Rtr, VLF, GI, Mag	2.15599	T-3672
Deloro	Collins/Grant/Lapierre	1991	Str, GI, Assays, Mag, VLF, IP	OM91-170	T-3417
Deloro	Collins/Lapierre	1992	Str, Samp, Assays		T-3671
Deloro	Grant-Collins	1992	Str, GI, Assays	OP92-68,69	T-3672
Deloro	Grant/Collins	1994	GI, Mag, VLF, Str	2.15637	T-3673
Deloro	Exsils 944389 Ont.	1992	GI, IP, Mag, VLF	2.15199	T-3625
Deloro	Syndicate 92	1992	GI, Mag, VLF, Str	OP92-165,166	T-3654
Deloro	Young, W.	36-39	Repts	donation	T-3617
Denyes	Noranda/Hemlo Gold Mines	1992	DD 7 holes (1582.9m)		T-3634
Denyes	Patrie	93-94	IP	2.15582	T-3318
Denyes	J. Patrie	1993	IP	2.15270	T-3318
Denyes	J. Patrie	1992	Str, Rtr		T-3318
Denyes	L. Salo	1991	GI, Rtr	OP91-509	T-3665
Denyes	Hemlo Gold Mines/Noranda J. V.	92-93	GC, Assays, GI, IP, DDH		T-3634
Denton	Gowest Am. Resources	1992	Mag	2.15644	T-2738
Denton	Gowest Am. Resources	1993	DD 4 holes (1489.8m)		T-2738
Denton	Nolan Boa	1994	VLF, EM, Mag	2.15564	T-3647
Dore	C. Mortimer	1992	Str, Rtr		T-3486
Dore, Heenan, Garnet, Benton, Mallard, Osway Dundonald	G. Archibald	1991	GI, Evaluation, Samp, Assays	OP91-607	T-3661
	O'Connor	1923	Rept	donation	T-3622
Eisenhower	Anaconda Canada.	1967	GI	donation	T-3639
Eldorado	G. Henderson	1938	Samp, Assays	donation	T-3577
Eldorado	.Granges Inc	1991	Mag, IP	OM91-5	T-3363
Eldorado	D. R. Pyke	93-94	GI	2.15493	T-3643
Eldorado	R. Rousseau Prop	1991	GI, DD	OP91-243	T-3662
English	GRQ Syndicate	1993	DD 2 holes (246.8m)		T-3679
English	Ludwig-Harvey	1991	DD	OP91-14;699	T-3663
Enid, Cote	R. Hopson	1992	Prosp	OP92-171	T-3650
Esther	M. Burton	1992	DD	OP92-023	T-1920
Esther	M. L. Burton	1994	DD 2 holes (185.9m)		T-1920
Esther, Benton	M. Burton	1991	DD, Assays	OP91-125	T-1920
Evelyn, Dundonald	Hutteri, Sproule, Korba	92-93	Mag, HLEM	2.15360	T-3627
Foch	Phelps Dodge	1993	Mag, VLF, HLEM	2.15648	T-3631
Foch	Phelps Dodge	1993	Mag, VLF, HLEM	2.15361	T-3631
Foleyet	Noranda Exploration	1993	DD 6holes(1686.4m)		T-3537
Fripp	D. Jones/K. Filo	1994	DD, IP, Assays	2.15491	T-3538
Frost, Cross, Arnot, McMillan	R. M. Kuehnbaum	1992	Prosp, CR, GC	OP92-859	T-3677
German	A. J. Salo	1992	DD, Assays	OP92-43	T-3074
Godfrey	A. Graham	1945	Rept.	donation	T-3620
Godfrey	Greenland Prop	1926	Rept	donation	T-3603
Godfrey	Hocken Prop	1939	Rept	donation	T-3604
Godfrey	M. Guiho	1992	VLF, Prosp	OP92-536	T-3668
Godfrey	D. LaForest et al.	1991	Mag, VLF	OP92-014	T-3666
Godfrey	R. Mathieu	1993	Prosp	2.15374	T-3515
Godfrey	Moneta Porc. Mines	93-94	IP	2.15324	T-3546
Godfrey	Moneta Porc. Mines	1993	DD 2 holes (502.42m)		T-3546
Godfrey, Jamieson	Moneta Porc. Mines	1993	Mag, VLF	2.15171	T-3546
Greenlaw	Cameco Exploration	1993	Mag, VLF, GI	2.15494	T-3641
Greenlaw	McDonough	1991	GI	OP91-425;426	T-3415
Greenlaw	McDonough	1992	GI, Mag	OP92-114,115	T-3415
Greenlaw	M. Tremblay	1992	VLF, GC, GI	OP92-610	T-3312

Township or Area	Company Name	Year	Type of Work	AFRO Number	Timmins File Number
G-3849, G-3850, G-3881 etc	KWG Resources	1992	Mag	2.15628	T-3659
Halcrow	Alcanex Ltd.	1992	Gl, Rtr, Samp		T-3594
Halcrow	J. Patrie	1994	Gl	2.15214	T-3648
Halcrow	J. Patrie	1993	Gl, GC	2.15583	T-3318
Halliday	D. V. Mullen	1992	Prosp, Assays	2.15172	T-3440
Halliday, Hutt	D. V. Mullen	1994	Gl, Mag, VLF	OP92-237	T-3440
Hanna	Falconbridge				T-3440
Hillary	F. Ross	1994	Mag, HLEM	2.15753	T-3640
Horwood	Elcajun Resources	1993	Assays		T-3630
Horwood	G. Ross	1991	Rtr	2.15375	T-3001
Hoyle	J. P. Bergeron	1994	Str, Assays		T-3630
Hoyle	Canamax Resources	1993	Prosp	2.15353	T-3421
Hoyle	Canamax Resources	1991	U/G Devel & DD	OM91-112	T-2787
Hoyle	Hoyle Expn'n/Hollinger	1991	U/G Devel & DD	OM91-107	T-2787
Hoyle	Johnston Prop	1941	DD		T-3580
Hoyle, Matheson	Norhoy Claims	36,52	Gl, Assays	donation	T-3587
Huffman, Osway,	Lalonde, Barnes, Firth	1938	Gl, DDH	donation	T-3588
Mallard, Eric, Potier,		1992	VLF, GC	OP92-193-195	T-3558
Arbutus, Yeo					
Hurdman	Noront Resources	1992	DD 5 holes (737.3m)		T-3178
Hurdman	Noront Resources	1991	DD 4 holes (455m)		T-3178
Ivanhoe	D. R. Pyke	93-94	Gl	2.15429	T-3636
Jamieson	Moneta Porcupine	1994	VLF	2.15752	T-3563
Jamieson, Robb	Falconbridge Ltd.	1994	DD 1 hole (270m)		T-3189
Loveland					
Jessop	Birce-Heard Clms	35-36	Gl	donation	T-3586
Jessop	Lefebvre Claims	35-36	Rept	donation	T-3585
Keefer	F. Galata	1991	Rtr, Str, Assays	OP91-240	T-1556
Kenogaming	C. J. Braddock	1994	IP	2.15465	T-3633
Kenogaming	Timmins Nickel	1991	Assays, OVD, Gl	OM91-098	T-2726
Kidd	Hollinger/Homestake		GP maps	donation	T-3646
Kipling	Great Lakes Kaolin	1992	OVD (225.9m)		T-3282
Kipling	Great Lakes Kaolin	92-93	OVD, Assays		T-3282
Kipling	Mineral Research	1992	DD, Rept	OM92-72	T-3282
Kipling, Emerson	Great Lakes Kaolin	89-93	GC, Assays	2.15373	T-3282
Langmuir	Outokumpu Mines	1994	Str	2.15682	T-3657
Langmuir	Shonewigwam Grp.	1927	Rept, Assays	donation	T-3618
Langmuir, Carman	McKean Prop.	1992	DD, Prosp	OP92-575	T-2974
Langmuir, Eldorado	Timmins Nickel	1991	DD U/G, OVD, Rtr	OM91-098	T-3547
Lincoln, Murdock,	Kerr-Cohoon	1992	Mag, DD, Samp, Assays	OP92-269,270	T-3495
Sherlock					
Loveland	D. Meunier	1992	UTEM	2.15268	T-3381
Loveland	Placer Dome	1992	Mag, IP	2.15269	T-3607
Loveland, Robb	D. Meunier	1992	BH UTEM	OP92-45,46,47	T-3381
Loveland, Jamieson,	WMC International	93-94	Gl, GC, Mag, TEM	2.15597	T-3674
Macdiarmid					
Loveland, Thorburn,	Noranda Exploration	90-91	DD 5 holes (1130.4m)		T-3236
Reid					
Lower Detour Lake	Placer Dome	1989	DD 6 holes (3673.6m)		T-3436
Macklem	Asarco	1992	DD	OM92-13	T-1959
Mahaffy, Nesbitt	D. R. Pyke	92-93	Mag, VLF, HLEM	2.15355	T-3234
Mallard	R. Crichton	1994	Mag, VLF, Prosp	2.15436	T-3637
Mallard	(Morin) Denommee	1991	Samp, Assays	OM91-167	T-3562
Mann	R. Westhauer	1992	Mag, IP	OP92-216	T-3653
Matheson	A. T. Bisson	34,36	Rept	donation	T-3629
Matheson	Gauthier Prop		Rept, DDH	donation	T-3589
Matheson	Hoyle-Martin Claims		DD	donation	T-3591
Matheson	Theriault Holdings	1941	Rept	donation	T-3590
Mc Arthur, Giekie	BHP Minerals	1992	Mag, VLF, HLEM	OM92-11	T-3480

Township or Area	Company Name	Year	Type of Work	AFRO Number	Timmins File Number
McCart	K. Cunnisan	1991	GI, Mag, VLF	OP91-495,96,97	T-3438
Mc Cart	Pyke, Cunnison	92-93	GI, GC	2.15377	T-3438
Michie	M. Guiho	1992	VLF, Prosp	OP92-536	T-3667
Mountjoy	D. D. Caron	1993	Mag, HLEM	2.15267	T-3608
Mountjoy	Comstate Resources	93-94	GI, GC	2.15492	T-2526
Murphy	J. P. Bergeron	1994	recut borders		T-3676
Murphy	M. Guiho	1992	VLF, Prosp	OP92-536	T-3556
Murphy, Wark	D. R. Pyke	93-94	GI	2.15461	T-3422
Nova	Jones-Filo	1994	HLEM	2.15646	T-3559
Nova	D. J. Jones	1991	AGEophys	2.15202	T-3559
Nova	D. V. Jones	1994	Prosp, Assays	2.15475	T-3559
Nova	Noranda Exploration	1992	DD 1 hole (191m)	OP91-167	T-3462
Nova	Noranda Exploration	1992	DD 2 holes (355.8m)	donation	T-3462
Ogden	E. C. Charters/Joly Prop.	1993	Str, Man. Labour		T-3675
Ogden	White Claims	1927	GI, Assays		T-3619
Pearce	J. R. Lill	1991	Rept (DD)	2.15230	T-2326
Penhorwood, Sewell, Kenogaming	Noranda Exploration	1993	Mag		T-3489
Pharand	E. Mord		Str/Rtr	2.15432	T-3501
Pharand	E. Mord	92-93	VLF, Assays	2.15747	
Price	M. Kangas/Croxall	1994	DD 3holes (259.6m)	donation	T-3086
Price	F. Latimer	1953	Assays		T-3612
Raney	J. Salo	1991	Development	OP91-508	T-3568
Reaume	S. Anderson/N. Meikle	93-94	IP, Mag, VLF, HLEM	2.15356	T-3626
Reaume	Falconbridge Ltd.	1993	Mag, HLEM	2.15460	T-3640
Reaume	Falconbridge Ltd.	1994	DD 3 holes (823m)		T-3640
Reaume, Hanna	Falconbridge Ltd.	1994	DD 2 holes (551.77m)		T-3640
Reeves	Comstate Resources	1994	DD 3 holes (912m)		T-3154
Reid	Comstate Resources	1993	IP, Resistivity	2.15213	T-3628
Reid	Elcajun Resources	1992	Rtr, Assays, GC	2.15292	T-3236
Reid	Noranda Exploration	1994	DD 2 holes (505m)		T-3154
Robb	Meunier	1992	UTEM	OP-92-45,46,47	T-3519
Robb, Jamieson	Falconbridge	92-93	DD 8 holes (3259.1m)		T-3189
Robb, Turnbull	R. Rousseau	1993	Mag	2.15174	T-3593
Semple, Moher	B. Polk	1992	Rtr, GI, Samp	OP92-843	T-3651
Shaw	Chinn-Diemert	1940		donation	T-3614
Shaw	Irsugo Cons Mns	1951		donation	T-3582
Shaw	Maher	1910	Rept	donation	T-3613
Shaw, Deloro	Agawa Porcupine	1934	Rept	donation	T-3581
Shaw, Deloro	Williamson G. M. L.	36-37	Repts, DD	donation	T-3615
Shepley, Hong Kong	M. Tremblay	1992	VLF, Prosp	OP92-610	T-3655
Sheraton	Demarchi/Kattwasser	1993	Prosp, Mag	2.15515	T-3488
Sheraton	Cross Lake Minerals	1993	DD 4 holes (702.32m)		T-3576
Silk	Jarvi-Hagen	1991	Samp, Assays	OP91-507	T-3536
Silk	Jarvi-Hagen	1992	EM, Samp, Assays	OP92-708	T-3536
Sothman	Falconbridge Ltd.	1993	Mag	2.15358	T-3362
Sothman	Falconbridge Ltd.	1993	Mag, HLEM	2.15359	T-3362
Stock	St. Andrew Goldfields	91-92	DD, U/G work	OM92-94	T-3088
				OM91-89	
Sunday, Hopper Lk	Placer Dome	1994	DD 3 holes (804m)		T-3437
Swayze	C. Mortimer	1993	Rtr, Str	2.15644	T-3376
Swayze	R. Crichton	1993	Mag, VLF, DD, Str	OP92-814	T-3678
Thorburn, Reid, Loveland	Noranda Exploration	1989	DD 4 holes (111.5m)	2.15428	T-3236
Tisdale	Davidson Tisdale	93-94	GI, GC, Assays		T-3181
Tisdale	Feldman Claims	1945	Rept	donation	T-3606
Tisdale	J. Jones Claims	1932	GI, Assays	donation	T-3605
Tisdale	D. R. Pyke	93-94	Mag, VLF	2.15354	T-2417

Township or Area	Company Name	Year	Type of Work	AFRO Number	Timmins File Number
Tisdale	South Dome Lake Mns		DD	donation	T-3583
Tisdale, Deloro	Cogema	91-92	Mag, VLF, HLEM, Grav	OM92-75	T-3526
Tisdale, Deloro	Cogema Canada	1991	Gl, IP, Grav	OM91- 123,156	T-3526
Tooms	Granges Inc.	1993	DD 2 holes (272.48m)		T-1940
Tooms	M. Tremblay	1991	Rept.	OP91-548	T-3312
Tully	Cyprus Gold	1991	DD, Mag, HLEM	OM91-062	T-3528
Tully	C. Dessan	1991	Rept.	OP91-389	T-3531
Tully	Homestake	1991	DD 8holes (1411m)		T-3338
Tully, Little	Cross Lake-Trade	1993	Mag	2.15598	T-3645
	Winds-Cathedral J.V.				
Turnbull	Collins	1991	Str, Gl	OP91-130,128	T-3669
Turnbull	Hollinger		Rept	donation	T-3621
Turnbull	K. Lapierre	1994	Mag, VLF, IP	2.15474	T-3500
Turnbull, Robb, Massey	Turnbull Staking Syndicate	1992	IP, PEM, Mag, Prosp	2.15433	T-3484
Wark	Asarco Exploration	1994	Mag, HLEM	2.15458	T-3670
Wark	Falconbridge Ltd.	1993	DD 1 hole (269m)		T-3288
West Sunday Lake	Placer Dome	1994	DD 3 hole(1281m)		T-3437
Whitesides	A. Dea	1993	Gl, GC, Assays	donation	T-3072
Whitesides	D. Lalonde	1993	DD 1 hole (86.87m)		T-3498
Whitesides	Warren Claims	1991	HLEM, Str, Rtr	OP91-603	T-3431
Whitesides	Warren Claims	1992	Assays, HLEM, VLF	OP92-705	T-3431
Whitesides	Warren Ferguson	1951		donation	T-3599
Whitesides, Carscallen	Warren	1991	Prosp	OP91-603	T-3664
Whitney	L. Alarie	92-93	Gl	2.15457	T-3635
Whitney	Brady-Campsall	36-37	Rept	donation	T-3611
Whitney	Cominco	76-77	Gl, DD	donation	T-3610
Whitney	Mohawk Porc.	1941	Rept, DD	donation	T-3609
Whitney	Royal Oak Mines	1992	DD (surface and U/G)	OM92-036	T-3649
Whitney	Smith Estate		Rept	donation	T-3608
Whitney, Shaw, Deloro	Brown-McDade	1979	Rept, DD	donation	T-3623
Zavitz	Lashbrook (Lashex)	1994	Mag, VLF	2.15376	T-3545
Zavitz	McBride Prop	1992	Mag, VLF, Prosp	OP92-376	T-3652

Staff of the Timmins Resident Geologist's office also spent considerable time assisting local explorationists with OPAP/OMIP applications and submissions. Staff of the Timmins Resident Geologist's office made 13 property visits during the year.

In 1994, when the first public release of the Earth Resources and Land Information System (ERLIS) was made, it was available only at Ministry of Northern Development and Mines offices in Toronto and Sudbury. Clients based in other centres of mineral exploration, mostly notably Timmins and Thunder Bay, had to travel to Sudbury or Toronto in order to use the system. In order to provide a "level playing field" to these regional centres, the Ministry will deploy ERLIS into the Timmins and Thunder Bay Resident Geologist's offices early in 1995.

L. Luhta, P. Sangster and D. Draper are members of the ERLIS Regional Deployment Steering Committee, a joint government and industry committee formed to supervise and direct the project.

PROPERTY EXAMINATIONS

Comstate Resources Ltd. - German Township

INTRODUCTION

In late 1994, the writer examined core from two surface diamond-drill holes drilled by Cominco Ltd., on property optioned from Comstate Resources Ltd. in the southwestern part of German Township. The holes were part of a 10-hole

(1222 m) exploration program completed in 1985-86. This program outlined a sequence of altered tholeiitic rocks, flanked to the north and south by metasedimentary rocks with graphitic argillite at the contact. Assays from one of the diamond drill holes examined returned a value of 11 000 ppb gold (0.321 ounce Au per ton).

Cominco Ltd. has since given up the option on the property and Comstate Resources has re-optioned the property to Westley Technologies Ltd. A surface diamond drilling program will be initiated on the property in early 1995.

LOCATION AND ACCESS

The property consists of 61 claims in parts of Lots 7 to 11, Concessions II and III, German Township. Most of the 1985-86 drilling took place in the south half of Lot 11, Concession III. The core examined by the author was taken from this area.

The latitude is 48° 34' and the longitude is 80° 56'. The property lies within the municipality of the City of Timmins, 30 km east of the city centre. Highway 101 passes 1 km south of and highway 67 traverses the eastern portion of the claim group.

REGIONAL GEOLOGY

Thurston et al. (1991) show the Comstate Resources Ltd. claims as occurring within the Hoyle assemblage. The Hoyle assemblage is dominated by wackes interlayered with minor conglomerate and metavolcanic rocks. It is bounded to the north by the Kidd-Munro assemblage that consists of komatiite, tholeiite, icelandite and thin units of high-silica rhyolite. Along the southern boundary, the Hoyle assemblage lies in contact with the komatiites and tholeiitic metavolcanic rocks of the Tisdale assemblage, as well as the clastic metasedimentary rocks of the Three Nations assemblage. This contact locally becomes the Porcupine-Destor Deformation Zone.

PROPERTY GEOLOGY

There is no outcrop on the claim group. The underlying geology has been interpreted as consisting of metasedimentary rocks, with the airborne magnetics supporting this interpretation (Pyke et al. 1973). Subsequent work, however, has outlined a band of altered tholeiitic basalts with a maximum thickness of 450 m, and an average thickness of 300 m. These rocks trend west-northwest and dip steeply to the north. Graphitic argillites define the metasedimentary-metavolcanic contacts to the north and to the south. A splay off of the Destor-Porcupine Fault Zone, striking N60°E, is interpreted to traverse the metavolcanic rocks in the eastern part of the property (Pyke 1993).

EXPLORATION HISTORY

Hollinger Consolidated Gold Mines Ltd. drilled two diamond-drill holes into metasedimentary rocks in the northeast corner of the claim group in the mid 1970's (assessment files, Timmins Resident Geologist's office).

In 1981, Comstate Resources Ltd. completed a combined airborne magnetic and INPUT survey over the southwest portion of German Township. The E. M. survey revealed a strong west-northwest-trending conductor. The magnetic signature of the area is dominantly flat. In 1982, Cominco Ltd. optioned the property from Comstate and between 1982 and 1985, completed 65 overburden drill holes, as well as 6 follow-up surface diamond-drill holes. No significant gold values were intersected and all holes passed through metasedimentary rocks (assessment files, Timmins Resident Geologist's office).

Between 1985 and 1987, Cominco conducted an HLEM survey over that portion of the property where the INPUT conductor had been located, and completed a 10-hole diamond drilling program that established the presence of the band of altered tholeiitic basalts (Pyke 1993).

In 1991, Comstate Resources conducted detailed magnetic, HLEM and I. P. surveys to more accurately trace the metavolcanic horizon (Pyke 1993).

INVESTIGATIONS

Core from 2 of Cominco's diamond-drill holes (SD-86-1 and SD-86-2) was examined by the author, as well as the diamond-drill logs for all of the other 10 holes drilled into the metavolcanic horizon. The core and diamond-drill logs were made available to the author by D. R. Pyke (consulting geologist, Comstate Resources Ltd.). This information had not previously been included in any material submitted to either the assessment files at the Timmins Resident Geologist's office, or the Timmins Drill Core Library.

Hole SD-86-1 was drilled due south, at a dip of -55° . It was collared in the northern metasedimentary rocks, passed through the graphitic argillites and ended in the tholeiitic metavolcanic rocks. Hole SD-86-2 was drilled 500 m south of SD-86-1, in a due south direction at a dip of -55° . It was collared in the tholeiitic rocks, passed through the graphitic argillite and ended in metasedimentary rocks.

The drill log for SD-86-1 indicates that the first 37 m of drilling passed through overburden. Between 37 and 73 m, the rocks are greywacke with narrow, argillaceous interbeds. Bedding is 60° to the core axis, and topping direction, from graded bedding, is up the hole, or to the north. A few narrow quartz stringers and a minor amount of pyrite cubes are visible throughout this section. Gold values of <10 ppb were obtained here. Black graphitic argillite containing a minor amount of quartz and up to 15% pyrite in blebs and bands occurs between 73 m and 80 m. This rock is sheared and the core is broken up, suggesting faulting. Assay values between 15 and 100 ppb Au were obtained from this section. Fine-grained argillite, intersected by fine, hairlike carbonate stringers and up to 1% fine pyrite, was logged between 80 and 82 m. From 82 m to the end of the hole (156 m) the rock is a pale yellow to light greenish-brown, pillowed, variolitic, tholeiitic basalt. Pillow selvages are evident throughout the section. This core contains lighter coloured varioles, smaller at the pillow rims and becoming larger and coalescing toward the centre of the pillows. The core is darker grey close to the graphitic argillite contact due to the presence of some contained carbon. This rock has been altered by extensive sericitization and carbonatization. Small, hairlike carbonate-filled fractures and fine pyrite, up to 1% are common throughout this section. Gold assays range between <10 to 35 ppb.

Hole SD-86-2 was collared in 19 m of overburden. The first 36 m of core (to 55 m) consists of pale yellow to light green-brown, sericitized and carbonatized, tholeiitic basalt. Narrow pillow selvages; hairlike fractures infilled with carbonate; and approximately 2% disseminated pyrite are characteristic of the tholeiites. Narrow, quartz-carbonate-tourmaline stringers occur throughout the core. The core is darker grey towards the tholeiite-graphitic argillite contact (at 55 m). Gold assays range between <10 to 30 ppb, with one assay returning a value of 180 ppb Au from a sample containing a quartz-carbonate stringer.

Graphitic argillite was intersected between 55 m and 70 m. It is black, thinly-bedded, sheared or brecciated in places and contains narrow quartz-carbonate stringers, as well as thin bands or layers of pyrite. One section, between 67.5 and 69 m, assayed 11 000 ppb Au. Siltstone and greywacke were logged from 72 m to the end of the hole (120 m). Directional indicators show tops to lie to the south, and bedding is at 70° to the core axis. A minor amount of pyrite is found within the metasedimentary rocks and the unit is cross cut by quartz-carbonate stringers. Assays from the metasedimentary rocks range between 10 to 43 ppb Au.

CONCLUSIONS

A surface diamond drill program conducted in 1986-87 established the presence of a sequence of carbonatized and sericitized tholeiitic basalts. Altered feldspar porphyry dikes also have been reported. A splay off the Destor-Porcupine fault is interpreted to cross cut the metavolcanic rocks in the eastern part of the property. Anomalous gold values also were obtained in the core, including one economically significant intersection. The property geology is in many ways similar to that of some known gold deposits in the Timmins area.

Miller-Collins Molybdenite Occurrence - Lizar Township

INTRODUCTION

On June 25, 1994, the author visited a molybdenum occurrence on claims staked by Peter Miller and George Collins south of Hornepayne, in Lizar Township. The two prospectors had previously sent a sample to the author in order to identify a blue-grey, metallic mineral that was disseminated throughout a felsic rock. The mineral was identified as molybdenite and this was confirmed by the OGS laboratory in Sudbury. The sample was assayed and the results were 6630 ppm Mo (0.663%). A duplicate sample assayed 6584 ppm Mo (0.6584%). Gold and silver assays were <0.01 ppb and <0.10 ppb respectively.

LOCATION AND ACCESS

The occurrence is located approximately 43 km south-southeast of Hornepayne, close to the western boundary of Lizar Township, and approximately two-thirds of the way south of the north boundary of the township. The latitude and longitude (N48° 50.586' and W84° 35.341') were confirmed by GPS.

The occurrence was accessed by first driving south from Hornepayne along Highway 631 for 7.4 km and then turning

east along the Hagan forestry access road. At a junction 3.9 km along this road, a turn was made to the south. After travelling an additional 33.1 km down the Hagan road the road forks; the west (right) fork is the Breckenridge Road and the east (left) fork is the continuation of the Hagan road. The Hagan road was followed for another 11.5 km to the junction of a skidder road. The road was followed west for 400 m and then another skidder road was followed to the south for 200 m. The occurrence can then be accessed by foot by walking along this trail for 250 m. The occurrence is located approximately 20 m from the east side of the trail.

GENERAL GEOLOGY

The molybdenum occurrence is located on the north side of a northeast-striking, early Precambrian metavolcanic-metasedimentary belt that is 60 km long and varies in width from 8 km to 90 m (Kabinakagami Lake greenstone belt). Siragusa (1977) has described this belt as consisting of dominantly mafic to intermediate metavolcanic rocks, with sandstones derived from greywacke, quartz arenite and paragneiss flanking the southeast side of the metavolcanic series. Fragmental metavolcanic rocks are rare. Felsic metavolcanic rocks occur as thin (a few cm to 1 m) lens-shaped interbeds within the mafic metavolcanic units, and represent only 3 to 4% of the total volcanic package. Equigranular, medium-grained, massive, hornblende gabbro, hornblende pyroxenite and minor peridotite are locally found associated with the mafic metavolcanics rocks.

The mafic metavolcanic rocks are green to dark green, weather to grey and grey-green hues and are mostly fine-grained, but are locally medium- to coarse-grained. They are almost invariably foliated and were metamorphosed under amphibolite-facies conditions. Retrograde greenschist-facies metamorphism has locally developed in association with shearing. Whole rock chemical analyses of selected samples of these mafic rocks revealed them to be tholeiitic basalt. Irregularly shaped quartz veins and pods are commonly found in these rocks.

Biotite trondhjemite is the dominant felsic intrusive rock in the exposed contact zones of the felsic intrusives and the supracrustal rocks, whereas biotite granodiorite is dominant outside the contact zones.

The youngest Precambrian rocks are northwest-trending and minor northeast-trending diabase dikes.

The main structure of the Kabinakagami Lake greenstone belt appears to be a syncline with a northeast-trending axis. The northwest limb dips to the southeast and is essentially composed of metavolcanic rocks. The southeast limb dips to the northwest and is composed mostly of metasedimentary rocks interbedded with lesser metavolcanic rocks. In the metavolcanic rocks, the strike of the foliation parallels the trend of the greenstone belt. This structure also parallels the bedding in the metasedimentary rocks and the interbedded felsic metavolcanic rocks.

EXPLORATION HISTORY

Exploration work on the property has been sporadic. In 1974, the Keltic Mining Corporation Ltd. performed some sampling in the area, and Rio Tinto Canadian Exploration Ltd. conducted ground electromagnetic and magnetic surveys. A weak electromagnetic conductor was outlined south of Breckenridge Creek, which may correspond with the metavolcanic-intrusive contact. Tundra Gold Mines Ltd. conducted an airborne magnetic and electromagnetic survey over the area in 1983. The metavolcanic-intrusive contact was outlined by this survey.

All assessment work for this property is on file in the Sault Ste. Marie Resident Geologist's office.

INVESTIGATION

The molybdenum occurrence is located at the contact between felsic intrusive rocks to the northwest, and foliated mafic metavolcanic rocks to the southeast. The exposure is limited to an area of no more than 10 m² that had been mechanically stripped by Peter Miller while constructing the logging road. A minor amount of concussion blasting had been undertaken by the prospectors. There is limited rock exposure in the area, however, overburden cover is quite thin.

The felsic intrusive rock exposed in outcrop near the occurrence is a medium-grained, light grey hornblende tonalite, containing abundant quartz, minor plagioclase feldspar and approximately 5 to 10% hornblende. It is foliated at an azimuth of 050°. The mafic metavolcanic rocks exposed in the outcrop adjacent to the occurrence are fine-grained, dark- to olive-green, and are foliated at an azimuth of 050 to 060°. A few irregular, barren, glassy quartz veins cross cut the mafic metavolcanic rocks. Minor amounts of epidote also are found along the foliation planes. In places, the foliation is folded by small, isoclinal folds with their axes parallel to the foliation. A few, very small exposures of quartz-feldspar porphyry, presumably a dike or sill, also occur near the showing.

In the area blasted by the prospectors (approximately 2 m²), disseminated molybdenite, pyrite and minor chalcopyrite mineralization occur within mafic metavolcanic rocks, felsic intrusive rocks, quartz, and clinozoisite-bearing pegmatite. Four grab samples were taken and the assay results, in ppm, are listed below.

Table 6. Assay results Miller-Collins molybdenite occurrence (Luhta 1994)

Sample #	Au	Ag	Cu	Mo
1	nil	0.4	85	2390
2	nil	0.6	691	3380
3	nil	0.6	581	3090
4	nil	1.0	1310	736

CONCLUSIONS

The occurrence resulted from the contact metamorphic events of the felsic intrusion with the adjacent mafic metavolcanic rocks. The contact is relatively sharp with no alteration aureole and very little mineralogical change in the mafic metavolcanic rocks. The occurrence seems to be localized, however, additional stripping should be undertaken along the contact to try to locate possible higher grade and more extensive mineralization.

SECOND OCCURRENCE

A second mineral occurrence was visited the same day. This occurrence was reached by driving another kilometre south along the Hagan Road, to the junction of a westbound skidder road. The occurrence is located approximately .5 km along the skidder road.

This occurrence is a narrow (up to 20 cm) felsic interbed in mafic metavolcanic rocks containing minor iron oxide and up to 3% disseminated pyrite. It strikes at an azimuth of 050° and dips 060° to the south. Assay results from a grab sample were: nil Au, 0.4 ppm Ag, and 243 ppm Cu.

Fifty metres northeast, and along strike, quartz veins containing pyrite occur at the contact of a porphyry dike and mafic metavolcanic rocks. A grab sample returned an assay of: nil Au, 0.3 ppm Ag and 247 ppm Cu.

Outokumpu Mines Ltd. - Langmuir Township

INTRODUCTION

On September 14, 1994, the writer visited the Galata nickel property in the west-central part of Langmuir Township. Outokumpu Mines Ltd. holds the property and was conducting a stripping program there. The writer was accompanied by Paul Davis (project geologist, Outokumpu Mines) and Hannu Makkonen and Heikki Forss, visiting geologists from the Geological Survey of Finland.

LOCATION AND ACCESS

The property is located 0.8 km east of the Langmuir-Eldorado township boundary, and 5.0 km south of the Langmuir-Carman township boundary, latitude is 48°19'05" and longitude is 81°03'50". Access to the property is gained by travelling the Langmuir Road south-southeast from South Porcupine for 19 km, and then travelling south-southeast along a muskeg tractor road for 2.5 km.

PREVIOUS WORK

The first reference to the property in the assessment files at the Timmins Resident Geologist's office was in a 1964 prospectus by Chipman Mines Ltd. No assessment work was ever recorded by this company. In the latter part of 1964, and early 1965, 10 surface diamond-drill holes were completed on the property. Of these 10 holes, 6 were drilled underneath the occurrence. Nickel assays ranged from 0.03 to 0.99%, from core lengths of between 1.5 and 10 feet, in these 6 drill holes. In 1964, Hollinger Consolidated Gold Mines Ltd. conducted a geological inspection of the property, sampled the occurrence and reported an assay of 2.64% Ni and 0.44% Cu. E. Galata completed 4 surface diamond-drill holes (2000 feet) on the property in 1967. No assays are available from this work (assessment files, Timmins Resident Geologist's office). While mapping Langmuir Township for the Ontario Division of Mines, D. R. Pyke collected a sample of massive magnetite and associated sulphides and another sample of mineralized wall rock, which returned assays of 1.77% nickel and 1.25% nickel respectively (Pyke 1967). In 1969-70, Falconbridge Ltd. completed magnetic and electromagnetic surveys over the property, and drilled 7 surface diamond-drill holes. No assays were reported (assessment files, Timmins Resident Geologist's office).

GENERAL GEOLOGY

The Galata occurrence is located at the contact between the Eldorado assemblage to the north, and the Bowman assemblage to the south, south of the Shaw Dome (Thurston et al. 1991). The Eldorado assemblage consists of intermediate to felsic metavolcanic rocks, iron formation and associated metasedimentary rocks and ultramafic flows. Felsic metavolcanic rocks range in composition from dacitic to rhyolitic fragmental rocks. Clast sizes range from tuff to breccia. Iron formation is predominantly of oxide- and sulphide-facies, associated with minor chert, sandstone, siltstone and shale. Although ultramafic flows are included in the Eldorado assemblage, these flows probably represent the base of the Bowman assemblage that has been folded. The Bowman assemblage includes peridotitic and basaltic komatiites interlayered with komatiites and magnesium-rich basalt. This assemblage has a high aeromagnetic signature near the Shaw Dome, reflecting a high component of serpentinized ultramafic rocks. Ultramafic and mafic intrusions in the Eldorado assemblage may be feeders to the ultramafic flows of the Bowman assemblage. A 2705 million-year old granodiorite intrudes the Bowman assemblage and is located 400 m north of the Galata showing.

INVESTIGATIONS

At the time of the visit, the area around the occurrence was being stripped with two machines, a 1.5 cu. yd. backhoe and a muskeg tractor with a backhoe attachment. Outcrop washing also was being done. An area approximately 100 x 100 m had been cleared. From north to south, the stripped area has exposed peridotite to the north, in contact with a band of calc-alkalic dacitic rocks, then more peridotite, and finally more dacite at the extreme south edge. These rocks trend east-northeast. Tops, determined from a few exposures of spinifex and stratigraphic relationships, are to the south. A north-striking diabase dike occurs to the west. The nickel showing occurs at the north contact of the southern peridotite body and the dacite. Nickel mineralization occurs along this slightly sheared, rubbly contact for 40 to 50 m. Some narrow, interflow cherty material occurs along this contact, as well as along the peridotite's southern contact. The mineralization consists of finely disseminated magnetite, pyrrhotite and pentlandite within the peridotite, and up to a metre adjacent to the contact. There is one small section, up to 10 cm wide and extending for a few metres, that contains semi-massive magnetite, pyrrhotite, pentlandite and a minor amount of chalcopyrite. A narrow gossan zone, up to 1 metre wide, occurs in the peridotitic rock adjacent to this semi-massive mineralization. The highest assay obtained by Outokumpu, from this area was 4.8% nickel (P. Davis, Outokumpu Mines Ltd., personal communication, 1994).

The peridotite has been altered to talc chlorite and serpentine. Magnetite bands within the rock are common. In the northeast end, the peridotite has a knobby appearance due to contained pyroxene blebs. Both the north and south peridotites show nickel depletion (P. Davis, Outokumpu Mines Ltd., personal communication, 1994).

The northernmost dacitic rocks are siliceous, and contain approximately 59% silica (P. Davis, Outokumpu Mines Ltd., personal communication, 1994). At the east end, these rocks are aphanitic, hard and cherty in appearance.

CONCLUSIONS

The area has been recognized as having potential for komatiite-hosted nickel deposits. Detailed mapping of both the stripped area and the surrounding claims has been completed. Geophysical surveys also have been conducted over the area. Outokumpu Mines Ltd. is attempting to locate paleo-depressions in the rock directly below the peridotites, that could host significant nickel mineralization.

RECOMMENDATIONS FOR EXPLORATION

Prosser, Wark and Carnegie Townships

In 1964, during the Texas Gulf Rush, PCE Explorations intersected "red to pink granite with phenocrysts" in two surface diamond holes in the south half of Lot 12, Concession 1, Prosser Township (assessment file T-808, Timmins Resident Geologist's office). While examining a few specimens of this core, some of which is stored at the Timmins Drill Core Library, L.E. Luhta, Resident Geologist recognized that this "granite" is actually a porphyry with albite phenocrysts that has undergone hematite alteration and is similar to the porphyries found at many gold mines in the Archean including: the Ross Mine in Holtvre; the McIntyre Mine in Timmins; and the three mines at Hemlo. A model describing this association was described in the 1991 Report of Activities, Provincial Resident Geologists (L.E. Luhta, et al.). Further examination of other core stored at the core library and reference to the recently published map of Murphy and Wark Townships (Berger 1994) showed that tholeiitic rocks, some of which are variolitic and some of which exhibit carbonate and sericite alteration, as well as altered ultramafic rocks are in close proximity to the porphyry. All of these rocks occur just to the north of a band of metasedimentary rocks. On a 1:50 000 scale Total Field Magnetics Shadow Image Map with an illumination azimuth of 340° and an inclination of 40°, a fault structure, striking 30° north of west can be seen

passing through the southwest corner of Prosser Township, through the central part of Carnegie Township, into the northeast part of Reid Township and into the southern part of Mahaffey Township.

General characteristics of giant gold deposits hosted by predominantly metavolcanic rock assemblages include:

1. An association with komatiite and/or iron- or magnesium- rich variolitic basalts.
2. Spatial association with sedimentary rock assemblages which unconformably overlie volcanic rocks.
3. Association with felsic intrusions which are generally porphyritic.
4. Spatial association with second, or lower order, faults which have a preferred strike orientation of east-northeast and west-northwest.
5. Carbonatization and/or sericitization of the wall rocks surrounding the gold mineralization.
(Fyon 1994 and Hodgson et al. 1992)

All of these characteristics are shared by the gold deposits which exist in the Porcupine Camp. As previously mentioned (*see* Property Visits), these characteristics have been recognized in an area in Prosser, Wark and Carnegie Townships within four km of the Kidd Creek base metal deposit in Kidd Township. The area around the Kidd Creek base metal deposit has been explored for base metals for the last thirty years. The potential for gold has been ignored even though approximately twenty gold occurrences, three of which have a calculated mineral inventory, have been found in Tully Township adjacent to, and to the east of Prosser Township.

In conclusion, favourable geology for hosting giant gold deposits has been recognized within four km of one of the largest volcanogenic sulphide deposits in the world. An area along a fault structure in and around the south west corner of Prosser Township is suggested as an area with the potential for hosting gold mineralization of economic significance.

ONTARIO GEOLOGICAL SURVEY ACTIVITIES

T. L. Muir, of the Precambrian Geoscience Section, mapped the bedrock in Stock township as part of a continuing multi-year examination of the area to the north and east of Timmins.

B. R. Berger (Precambrian Geoscience Section) mapped the bedrock geology of Murphy and Wark townships which lie to the north-northeast of Timmins.

R. P. Sage of the Mineral Deposits and Field Services Section, continued a multi-year investigation of the kimberlites of Ontario.

D. K. Armstrong (Sedimentary and Environmental Geoscience Section) participated in a project investigating the Devonian biostratigraphy of the Moose River Basin.

R. I. Kelly and D. K. Armstrong (Sedimentary and Environmental Geoscience Section) participated in a co-operative project jointly sponsored by the Ontario Ministry of Natural Resources and the Ontario Ministry of Transportation to evaluate the aggregate resources of the Fort Albany, Kashechewan and Attawaspiskat areas.

More detailed information on each of these projects can be found by referring to the 1994 Summary of Field Work and Other Activities, Ontario Geological Survey, Miscellaneous Paper 163.

NORTHERN ONTARIO DEVELOPMENT AGREEMENT PROJECTS

A. D. MacTavish (Precambrian Geoscience Section) mapped the bedrock geology of Belford and Montcalm townships in the Montcalm greenstone belt, which is located approximately 70 km northwest of Timmins.

S. L. Fumerton and K. A. Houle (Timmins Resident Geologist's office, Mineral Deposits and Field Services Section) completed a 3-year project to digitally document mineral prospects in the Swayze greenstone belt. An open file report detailing the results of the study will be published in early 1995.

M. A. Bernier, of the Sedimentary and Environmental Geoscience Section, continued his 4-year project to map the quaternary geology and to sample the surface till over the eastern Swayze greenstone belt. In 1994, work was concentrated in the Rush Lake and Opeepeesway Lake map areas

R. G. Jackson and D. M. Stephenson (Sedimentary and Environmental Geoscience Section) initiated a multimedia geochemical study at several sites in the Abitibi greenstone belt. The project is designed to test the detection of blind mineralization in clay belts.

K. B. Heather of the GSC, continued a multi-year geological mapping project in the Swayze greenstone belt.

PUBLICATIONS RECEIVED

A summary of all Ontario government publications received at the office that pertain to the Timmins District are listed in Table 7.

Table 7. Publications, Timmins Resident Geologist's District

TITLE	AUTHOR	TYPE OF PUBLICATION/YEAR
Precambrian geology, Keith township, northern Swayze greenstone belt	Ayer, J.A.	OGS Preliminary Map P.3272, 1994
Precambrian geology, Muskego township, northern Swayze greenstone belt	Ayer, J.A.	OGS, Preliminary Map P.3273, 1994
Geology of Keith and Muskego townships, northern Swayze greenstone belt	Ayer, J.A.	OGS-OFR 5901, 1994
Precambrian geology, Matheson and Evelyn townships, District of Cochrane	Berger, B.R.	OGS, Preliminary Map P.3271, 1994
Geology of Matheson and Evelyn townships, District of Cochrane	Berger, B.R.	OGS-OFR 5900, 1994
Precambrian geology, Murphy and Wark townships	Berger, B.R.	OGS, Map P.3305, 1994
Precambrian geology, McNeil and Robertson townships	Jensen, L.S.	OGS Preliminary Map P.3246, 1994
Precambrian geology, Bedford township	MacTavish, A.D. and Henderson I.G.	OGS Preliminary Map P.3307, 1994
Precambrian geology, Montcalm township	MacTavish, A.D. and Henderson I.G.	OGS Preliminary Map P.3308, 1994
Results of overburden sampling for kimberlite heavy mineral indicators and gold grains, Michipicoten River-Wawa area, northeastern Ontario	Morris, T.F., Murray, C. and Crabtree, D.	OGS-OFR 5908, 1994
Mineralization in the Stock and Taylor townships area and Penhorwood township, Abitibi greenstone belt	Siragusa, G.M.	OGS-OFR 5905, 1994

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PRECAMBRIAN GEOSCIENCE SECTION

COBALT RESIDENT GEOLOGIST'S DISTRICT - 1994

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INTRODUCTION

Increased exploration activities directed towards base metals, precious metals, diamonds and industrial minerals were noted in the Cobalt Resident Geologist district during 1994. Volcanogenic massive sulphide potential is being evaluated in the Temagami, Cobalt and South Shining Tree areas. Several gold exploration programs are active in the Shining Tree and Elk Lake areas. Considerable interest in the numerous Copper-Nickel-PGE occurrences north and east of Temagami; in Strathy, Best, Eldridge and South Lorrain townships, reflects the current higher market value and demand for these commodities. Cobalt prices in the US\$26-US\$27 per pound range have re-kindled interest in the Cobalt and Silver Center mining camps. Evaluation of numerous past-producing and developed silver-cobalt properties for in situ reserves, waste dumps and tailings, is ongoing throughout the district. Aggressive building stone and industrial minerals exploration was noted in the Mattawa, North Bay and Earleton areas. Exploration for diamonds associated with kimberlite is focused along a 50km - 80km wide corridor extending northwest along both sides of the Timiskaming graben structure.

Land Use issues occupied over 30 percent of staff time during 1994. Staff responded to 57 requests, relating to approximately 370 km², for comments and concerns pertaining to proposed Natural Heritage preserves and candidate Areas of Natural and Scientific Interest (ANSI's). This is in response to the provincial government's "Keep It Wild" initiative. Staff at the Cobalt Resident Geologist office became directly involved in the Temagami Comprehensive Planning Program, representing the interests of the Ministry of Northern Development and Mines and the mineral exploration industry. The goal of the planning exercise is the development of a comprehensive resource management strategy for a 717,400 hectare area centred on lake Temagami. Land Use issues will continue to draw heavily from the Resident Geologist office's resources in 1995.

MINING ACTIVITY

Central Ontario Natural Stone Company Limited (J.Pilger)

Central Ontario Natural Stone Company Limited continued extraction in the Clarkson Township quarry. The quarry is located on a single claim 700 m south of the northern township boundary and 6 km west-northwest of the village of Thorne. The property is accessed by way of the McConnell Lake Forest Access Road north from Highway 63 East.

A total of approximately 120 tonnes, an amount similar to similar to 1993, of a multi-coloured muscovitic quartzite gneiss were removed and trucked to Orillia for processing. The material is marketed as a rough building and landscaping stone. The predominant colour of the multi-coloured gneiss is green and the product is said to be similar in part to that of McLaren's Bay Mica Stone Quarries. The stone is relatively fissile, which allows it to be

readily split to variable thicknesses. The stone will be used primarily as a masonry facing stone. The company has applied for and is awaiting permits to begin further work on additional claims in McAuslan Township. Road development work has been completed and some stripping activity has taken place. Extraction is expected to begin in 1995.

(R. Lashbrook, Lashex Limited and J. Pilger, Central Ontario Natural Stone Company Limited, personal communications, 1995)

McLaren's Bay Mica Stone Company (G.Boughner)

The McLaren's Bay Mica Stone quarries are located in southwestern McAuslan Township, just north of Reynold's Lake. The site is accessed via the McConnell Lake access road north from Highway 63 East. The operation is seasonal and produces a white and green or red banded gneiss which is composed of white, high silica quartzite intercalated with either green or red coloured muscovite-rich bands and pegmatite. A satiny stone, with a high muscovite content, is generally produced at this quarry. Due to low demand, the stone is not extracted at the current time. Products are used as masonry and landscaping stone. Coarse, highly reflective emerald green and red muscovite varieties are currently being evaluated as an additive in automobile paint.

The year 1994 proved to be comparable to 1993 for the company; poor for business, with only an estimated 600 tons extracted.

(G. Boughner, owner, McLaren's Bay Mica Stone Company, personal communications, 1994.)

Miller Minerals (a division of Miller Paving Limited)

Bucke Quarry Lime Kiln

The vertical shaft lime kiln at Miller Minerals' Bucke quarry site operated at 50% capacity during 1994, its second full year of production. Approximately 12,000 tonnes of high CaO kiln feed was obtained from the Breault quarry, in Dymond Township. A large quantity from this source has been stockpiled at the kiln site. A total of 18,000 tonnes of quicklime was produced in 1994. Miller Minerals is currently evaluating potential markets and has supplied lime for mine reclamation projects.

Bucke Quarry

The Bucke quarry, located approximately 3km west of the town of Haileybury in Bucke Township, produces a high-Ca limestone used primarily in the production of agricultural lime and metallurgical flux. Further development will be done in 1995 to determine the benefits of using this stone as kiln feed. The demand for all products including aggregates was very strong during the year with a total of 72,000 tonnes being quarried.

Breault Quarry

The Breault quarry is located in the extreme northwest corner of Dymond Township, approximately 10 km north of New Liskeard. It is a prime supplier of high calcium limestone to the company's vertical shaft lime kiln in Bucke Township. Feed is crushed on site before trucking to the kiln site.

A diamond drill program was initiated in 1994 to determine the the region of high CaO best suited to supply the lime kiln and to determine the reserves. Geochemical analysis was the primary tool to ore definition, followed by detailed core logging. The program is to continue into 1995 with both diamond drilling, air track drilling and geochemical analysis.

The agreement between Miller Minerals and Tundra Granite and Marble Incorporated, which permitted Tundra Granite and Marble Limited to extract large block limestone for building stone, was terminated at the end of 1993. The agreement may be re-nued at some point in the future, when less fractured limestone is identified as the quarry expands.

(Gary Bell, Miller Minerals, personal communications, 1994)

Thorne Brilliant Stone Quarry, (P. Pharand)

The Thorne Brilliant Stone quarry is located in Poitras Township, at the top of the ski hill, 1 km south of Thorne. The site produces, on a seasonal basis, a white and red flagstone and masonry stone from a fine- to medium-grained quartz-muscovite gneiss. Red coloration is due to hematite staining of the mica flakes. A recently discovered black gneiss is now being extracted and sold as a "black granite".

The Thorne quarry did not extract any additional stone this year. Stone stockpiled from 1993 production was used to fill any contracts. Stone was sold to local communities and private home owners. Several tons of the "black granite" were shipped to various suppliers as a promotional venture.

The property owners have been actively expanding the known extent of marketable material and staked new claims. Recent work has uncovered a small zone of an as-yet unidentified high-magnesium marble. This will be further explored next spring.

(P. Pharand, owner, personal communication, 1994)

Table CO- 1. Mines/Quarries Active in 1994.

Company Name ("A" refer to Fig. CO-1)	Mine/Quarry Name	Location	Commodity
Central Ontario Natural Stone (A)	Clarkson Tp. Quarry	Clarkson Tp.	Landscaping stone
Cobatec/Ego Resources	Pan Mine	Bucke Tp.	Cobalt (Silver)
McLaren's Bay Mica Stone Co. (B)	Reynold's Lake Quarries	McAuslan Tp.	Masonry Stone, Landscaping stone
Miller Minerals	Bucke Lime Kiln	Bucke Tp.	Lime
Miller Minerals (C)	Bucke Quarry	Bucke Tp.	Limestone, Aggregate
Miller Minerals (D)	Breault Quarry	Dymond Tp.	Limestone, Aggregate
Thorne Brilliant Stone Quarry (E)	Thorne Quarry	Poitras Tp.	Masonry stone, Flagstone

ADVANCED EXPLORATION AND DEVELOPMENT

Cobatec Limited / Ego Resources Limited

Cobalt Recovery Plant

Cobatec Limited, a wholly-owned subsidiary of EGO Resources Limited, began construction of a cobalt metal recovery facility in Lorrain Township early in 1994. By year's end, plant construction was nearing completion with much of the custom equipment installed or on-site awaiting installation. The plant is designed to process cobalt ore at the rate of 100 tons per day. Plant start up is currently scheduled for early spring, 1995.

The plant will process and extract cobalt and nickel metal using an oxygenated, pressure-leach, hydrometallurgical process. The cobalt metal will then be processed into high-quality, value-added compounds such as Cobalt Acetate, Cobalt Carbonate, Cobalt Chloride, Cobalt Nitrate, Cobalt Sulphate and Cobalt Oxide. Cobatec Ltd. is confident there is ready market for its products.

Initial feed for the processing facility will come primarily from waste piles at former producing silver mines and

previously developed properties that encountered cobalt veins containing sub-economic silver. During 1994, Cobatec Ltd. acquired several properties in the Cobalt and Silver Center mining camps. Waste piles were systematically trenched and sampled and the higher-grade portions of the piles were delineated. Approximately 10,000 tons of material averaging 0.5 percent cobalt has been transported to the plant site to be used for tuning the mill at start up. Additional material will be transported in 1995.

Pan Silver (Cobalt) Mine

As part of Cobatec Limited's long term strategy to provide mill feed to the processing facility, the Pan Silver mine, a past-producing property located approximately 1 km north of the plant in Bucke Township, was acquired. The shaft was dewatered and rehabilitated to the bottom level at 290 feet, the hoist and headframe were re-commissioned and detailed sampling of the vein systems is currently ongoing on the 290, 240 and 190 foot levels. Most of the productive silver veins have significant "haloes" of cobalt-rich, silver-poor vein material that was never mined. Cobatec Limited expects the mine to be a small tonnage, high grade cobalt producer, using selective mining methods to provide blending material for grade control. Pre-production development work is scheduled for early 1995.

Cobatec Limited has acquired several properties in the Cobalt and Silver Center mining camps. Many are significant past-producing silver mines with substantial cobalt reserves in broken rock on surface. Other properties have indicated cobalt reserves in situ in silver-poor veins. These in situ reserves are more speculative. The grade of many of the cobalt veins is unknown due to lack of assay data. Previous workers assayed only for silver, often only mentioning the presence of cobalt mineralization in drill logs and on geological maps and level plans. On some properties, the only clue to the presence of cobalt is its presence on the dumps. In some cases, Cobatec Limited has sought information from miners who once worked the properties. Ultimately, the only method of determining in situ reserves will be through standard exploration methods. The current price of Cobalt has provided Cobatec Limited with the incentive to do that at the Pan mine.

(Cobatec Limited, EGO Resources Limited, personal communications, 1994)

Vera Cruz Minerals Corporation

Early in 1994, Vera Cruz Minerals Corporation acquired an option on several claims and farm patents in Bucke Township for the purpose of diamond exploration. The primary target was a circular magnetic high straddling the boundary of Lots 5 and 6, Concession 5, rumoured to have been diamond drilled by Falconbridge Limited in 1989. The Falconbridge Limited claim covered the west edge of the magnetic anomaly, while the bulk of the anomaly is located on the Gravel Farm patents. Subsequent discussions with Falconbridge Limited confirmed the presence of an untested kimberlite pipe on the property. Two additional diamond drill targets, located in Lots 7 and 8, Concession 6 (Ross North) and in Lot 7, Concession 3 (Ross South), were also identified.

On the Gravel property, a total of 6 vertical, large diameter HQ diamond drill holes totalling 743 m were completed and a 4100 kg bulk sample was extracted for testing. Overburden depths ranged from 9 m to 20 m. Three samples representing three distinct kimberlite phases: Diatreme Facies tuffisitic kimberlite breccia, Crater Facies pyroclastic kimberlite and Hypabyssal kimberlitic breccia, were sent to Lakefield Research for caustic dissolution treatment. One macro diamond, a clear, white fragment, 0.8mm x 0.34mm x 0.2mm in size, and three micro diamonds, one of which is a clear white octahedron, were recovered from the 275 kg of kimberlite.

The remainder of the core, approximately 3850 kg, was shipped to Aurora Research's mechanical processing plant in Virginiatown. The Aurora system screens out and eliminates all material smaller than 1mm. No diamonds greater than 1mm in size were recovered.

Two BQ diamond drill holes totalling 150 m were completed on the Ross North property to test a positive circular magnetic anomaly. No kimberlite was encountered. One BQ diamond drill hole totalling 68 m was completed to test

a positive magnetic anomaly on the Ross South property. No kimberlite was encountered.

Vera Cruz Minerals Corporation subsequently dropped the option on the Gravel kimberlite pipe.

(Vera Cruz Minerals Corporation, personal communications, 1994)

Arriscraft Corporation

Arriscraft Corporation acquired land in Armstrong Township early this year to follow up on some diamond drilling by the Ministry Northern Development and Mines (Lake Temiskaming Paleozoic outlier study). A massive buff-coloured limestone was found at the base of the hole. The nature and colour of the stone were the key features making it attractive to the company.

Arriscraft representatives began work this fall on the Armstrong Township property. Approximately 5-6metres of clay overburden was removed from a small area to remove approximately 125 tons in large blocks. These blocks were subsequently trucked south to the company's cutting plant for evaluation.

Initial opinion was positive and structural tests are ongoing. At this point, no further results are available.

(E.B.Ratcliffe, Quarry Superintendent, Adair Marble Quarries, Arriscraft Corporation, Personal Communication, 1994)

EXPLORATION ACTIVITIES

Exploration activities in the Cobalt Resident Geologist District were mixed in 1994. There were 41 companies and individuals active in the area working on 78 different projects. Lower numbers are attributable to fewer Ontario Prospectors Assistance Program (OPAP) designations in the Cobalt district, 10 in 1994 compared to 25 in 1993. Although the numbers appear negative, 7 properties worked in 1993 under OPAP designation were optioned in 1994, reflecting the effectiveness of the OPAP program. Several of the 1993 OPAP applicants had additional properties optioned, which left them without projects to work on in 1994. A major reason for lower numbers is the lack of open ground currently available. In 1994, nine claim units were staked for each unit cancelled. Many 1993 OPAP recipients have had to go elsewhere to pick up prospective ground.

One of the more active companies in the Cobalt district was Falconbridge Limited, working in the Temagami, Cobalt and Shining Tree areas. In Temagami, Falconbridge Limited is exploring for base metals. A total of 7112m in 13 holes were diamond drilled in the Temagami area in 1994. In the Shining Tree area, Falconbridge Limited optioned a large claims package covering the southwest extension of the Shining Tree greenstone belt. An airborne geophysical survey covering parts of Sheard, Amyot, Browning and Ogilvie Townships was completed and ground follow-up is continuing.

EGO Resources Limited/Cobatec Limited is in the advanced stages of construction of a cobalt recovery plant in the Cobalt area. Underground rehabilitation of the Pan mine in Bucke Township was completed in 1994 and mining is scheduled to commence in 1995. EGO Resources Limited/Cobatec Limited acquired several past-producing silver properties in the Cobalt and Silver Center mining camps and evaluated waste dumps for their cobalt content. Sampling, sorting and hauling of cobalt ore from waste dumps began in 1994 and will continue in 1995. The process is seasonal.

A summary of 1994 exploration activities in the Cobalt Resident Geologist District is available in Table CO - 3.

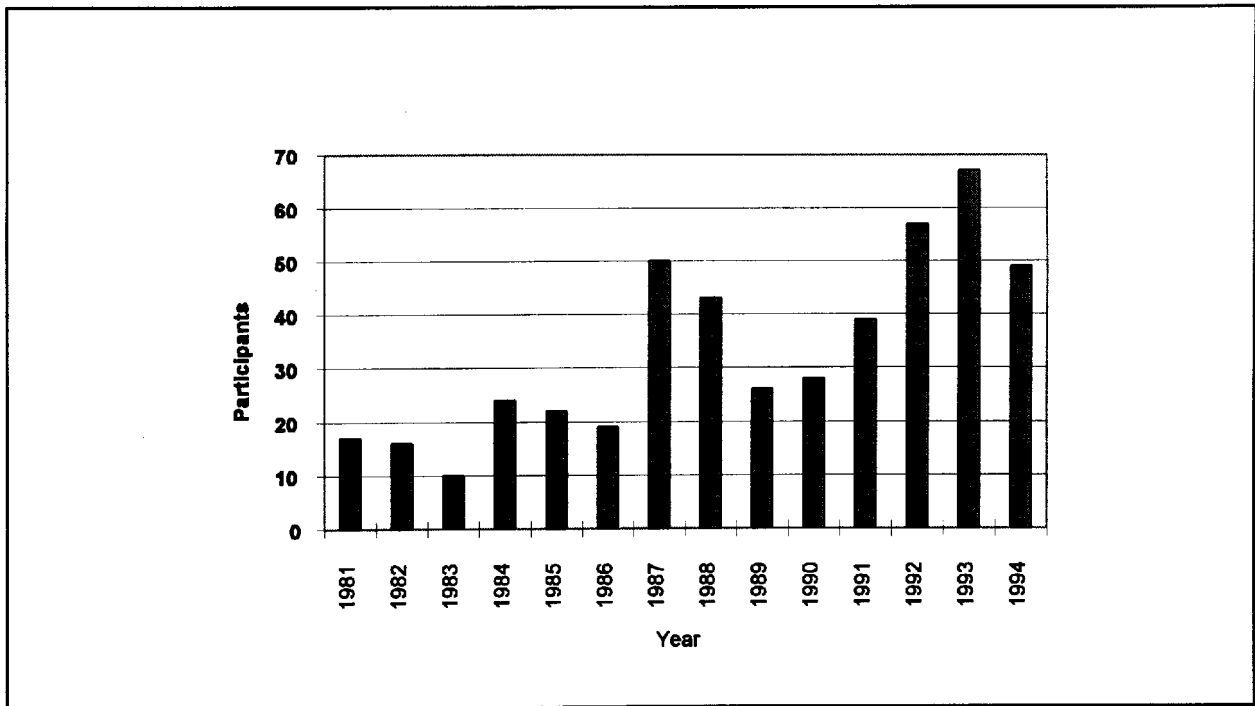


Fig. CO-2 Exploration activity in the Cobalt Resident Geologist's District 1994

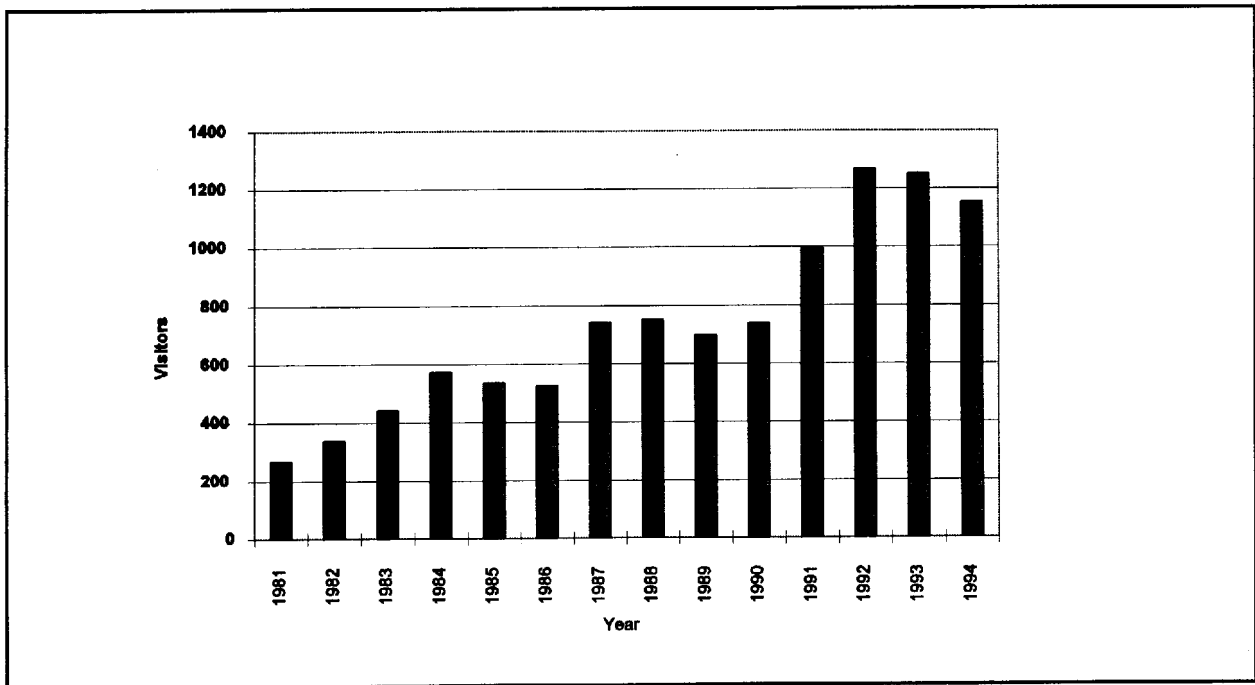


Fig. CO-3 Client services - Number of visitors to the Cobalt Resident Geologist's office in 1994.

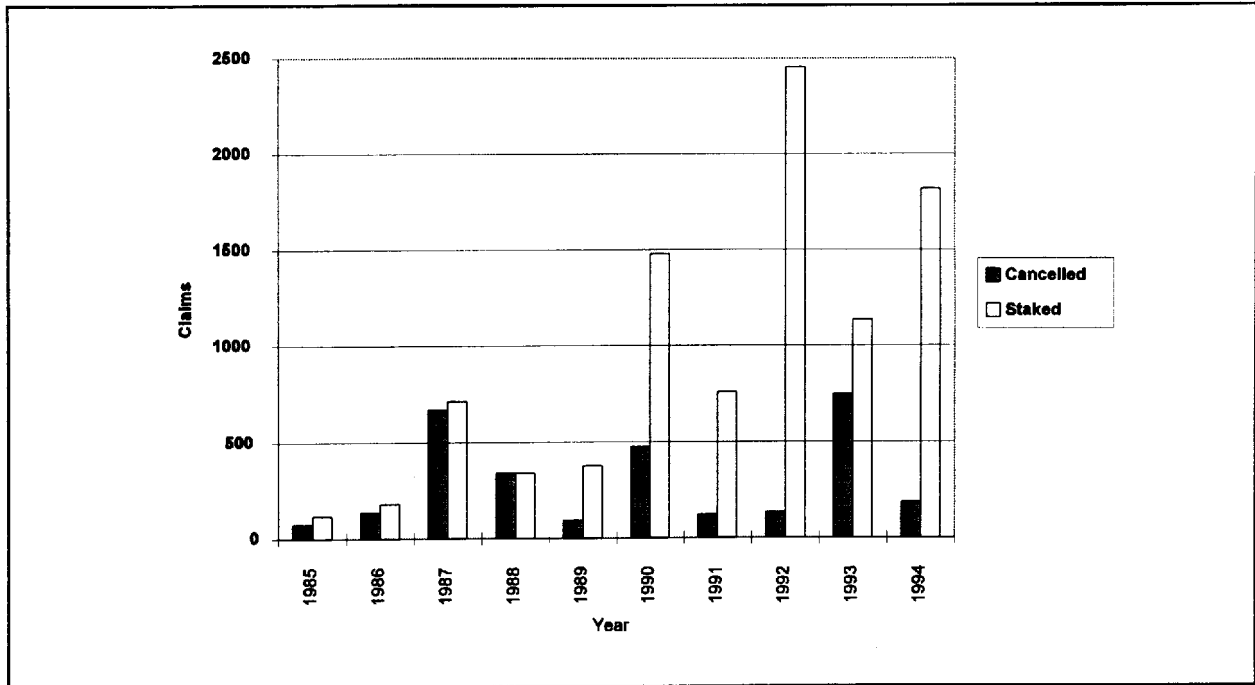


Fig. CO-4 Claim-staking activity in the Cobalt Resident Geologist District 1994.

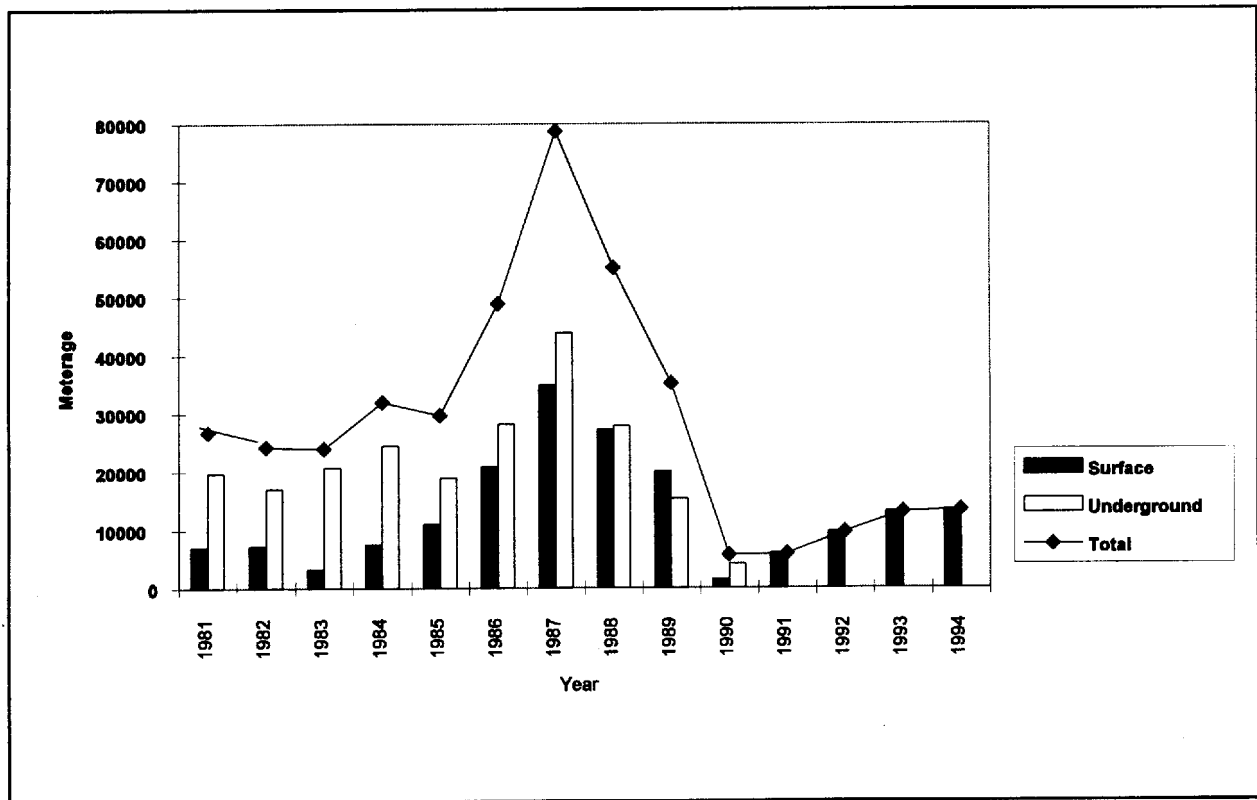


Fig. CO-5 Diamond Drilling in the Cobalt Resident Geologists District 1994.

Table CO-2 . Claims Staked and Cancelled in the Cobalt Resident Geologist's District - 1994

DATE	CLAIMS STK'D	UNITS STK'D	CLAIMS CANC'D	UNITS CANC'D	TOWNSHIP 1	TOWNSHIP 2	CLAIM NO.'S	CLAIM HOLDER	TRANSFERRED TO
NOV/94	1	1			ASQUITH		1200737	ANNETT,R.	
NOV/94	1	2			ASQUITH		1201038	ANNETT,R.	
FEB/94			1	1	ASQUITH		919027	ASQUITH,RES.INC.	
AUG/94	1	1			ASQUITH		1203328	BUSICH,D.	
DEC/93	8	15			ASQUITH		1201398 et al	CARON,M./BERGERON,J.	
FEB/94	2	6			ASQUITH		1201435	CARON,M.	BERGERON,J.
NOV/94	1	1			ASQUITH		1205583	CRICHTON,R.	ANNETT,R.
NOV/94	1	2			ASQUITH		1205548	GAGNE,G.	
DEC/93	1	1			ASQUITH		1200859	GAGNE,G.	SKEAD HOLDINGS
DEC/93	1	15			ASQUITH		1197519	HARRINGTON,P.	MULLAN,G.
JUN/94	1	1			ASQUITH		1202786	McBRIDE,J.	
NOV/94	1	1			ASQUITH		1203483	MULLAN,M.	
FEB/94			1	1	ASQUITH		919027	NO NAME	
AUG/94	1	6			ASQUITH		1203379	RENAUD,V.	PREMIER EXPLORATIONS
DEC/93	1	1			ASQUITH		1193809	RENAUDAT,F./FOURNIER, G.	
JUN/94	1	1			ASQUITH		1204693	RENAUDAT,F.	FOURNIER,G.
SEPT/94	1	2			ASQUITH		1203416	SADOQUIS,G.	
APR/94	2	16			AULD		1204434-435	KORBA, E.	DUNN, G.
MAR/94	1	4			AULD		1204433	KORBA,E.	DUNN, G.
MAR/94	2	16			AULD		1204434 et al	KORBA, E.	DUNN, G.
APR/94	1	4			AULD		1204433	KORBA, E.	DUNN, G.
APR/94	1	8			BEAUCHAMP		1193471	KORBA ,E.	DUNN, G.
MAR/94	1	8			BEAUCHAMP		1193471	KORBA, E.	DUNN, G.
JAN/93			1	1	BEST		1165462		
JAN/93			1	12	BEST		1165459		
JAN/93			1	2	BEST		1165460		
FEB/94	1	2			BEST		1118465	CHITARONI,G.	
FEB/94	1	2			BEST		1118557	CHITARONI,G.	
FEB/94	1	4			BEST		1118558	CHITARONI,G.	
FEB/94	1	1			BEST		1118561	CHITARONI,G.	
FEB/94	1	8			BEST		1118566	CHITARONI,G.	
JUL/94	3	3			BEST		1197741-743	CHITARONI,G.	
FEB/94			1	3	BEST		1118431	NO NAME	
FEB/94			1	10	BEST		1118518	NO NAME	
FEB/94			1	10	BEST		1118520	NO NAME	
FEB/94			1	3	BEST		1118521	NO NAME	
APR/94			1	9	BEST		1118437	NO NAME	
APR/94			2	4	BEST		1191011-012	NO NAME	
AUG/94			1	2	BEST		1118528	UNKNOWN	
AUG/94	1	4			BRETHOUR		1198670	McBRIDE,L.	KWG RESOURCES LTD.
AUG/94	1	4			BRETHOUR		1198669	McBRIDE,L.	KWG RESOURCES LTD.
APR/94	1	2			BRETHOUR		1198551	McBRIDE, G.	KWG RESOURCES INC.
APR/94	2	8			BRETHOUR		1198548-549	McBRIDE, G.	KWG RESOURCES
AUG/94	4	16			BRETHOUR		1198665-668	POLSON,D.	KWG RESOURCES
FEB/94			10	10	BRIGGS		427487	NO NAME	
MAY/94	3	3			BRYCE		1202648 et al	BLACKNED,E. .	EWANCHUK ,J.
FEB/94	1	4			BRYCE		1193665	CORBA,E.	DUNN,G.
NOV/94	1	1			BRYCE		1198716	DUNN,G.	ARISTA RESOURCES
MAY/94	1	1			BRYCE		1198569	EWANCHUK, J.	
NOV/94	1	2			BRYCE		1198588	EWANCHUK,J.	
FEB/94	1	4			BRYCE		1179389	GEREGHTY,G.	
MAR/94	5	30			BRYCE		1202529 et al	KORBA, E.	DUNN, G.
MAR/94	1	16			BRYCE		1193475	KORBA, E.	DUNN, G.
MAR/94	1	4			BRYCE		1202528	KORBA, E.	DUNN, G.
APR/94	4	44			BRYCE		1202574 et al	KORBA ,E.	DUNN, G.
MAY/94	2	4			BRYCE		1202652 et al	McBRIDE, G.	EWANCHUK, J.
NOV/94	1	4			BUCKE		1198681	EWANCHUK,J.	
NOV/94	1	4			BUCKE		1198681	MCBRIDE,G.	WESTIN,B.

DATE	CLAIMS STK'D	UNITS STK'D	CLAIMS CANC'D	UNITS CANC'D	TOWNSHIP 1	TOWNSHIP 2	CLAIM NO.'S	CLAIM HOLDER	TRANSFERRED TO
SEP/94	1	1			BUCKE		1198636	WESTIN,B./EWANCHUK,J.	
SEP/94	1	2			BUCKE		1198688	WESTIN,B./EWANCHUK,J.	
DEC/93	1	1			BUCKE		1179440	WESTIN,B.	VERA-CRUZ
JUN/94	1	4			BURROWS		1182414	BAIRD,D.	TITTLE,H.
JUN/94	1	2			BURROWS		1182413	BAIRD,D.	TITTLE,H.
MAR/94	1	2			BURROWS		924301	BAIRD, D.	TITTLE, H.
MAR/94	1	4			BURROWS		924304	BAIRD, D.	TITTLE, H.
MAR/94	2	8			BURROWS		119158et al	TITTLE,H.	
MAR/94	2	6			BURROWS		924302	TITTLE,H.	
MAR/94	1	4			BURROWS		924305	TITTLE, H.	
JUN/94	2	6			BURROWS		1191593et al	TITTLE,H.	
JUN/94	1	4			BURROWS		1191595	TITTLE,H.	
NOV/94	1	1	1	1	BUTTLER		1179652	ARDEN,KEITH,CRAIG	
APR/94	3	36			CANE		1202581et al	KORBA, E.	DUNN, G.
APR/94	3	24			CASEY		1198579et al	KORBA, E.	
APR/94	3	8			CASEY		1202586et al	KORBA, E.	
APR/94	1	2			CASEY		1198550	McBRIDE, G.	KWG RESOURCES INC.
FEB/94	2	2			CASSELLS		1198508-509	FALCONBRIDGE	
JAN/93			5	5	CASSELS		1189224-228		
JAN/93			5	5	CASSELS		1189230-234		
JAN/93			3	3	CASSELS		1189306-308		
JUNE/94	3	7			CASSELS		1198598et al	FALCONBRIDGE	
JUN/94	1	8			CASSELS		1198601	FALCONBRIDGE	
JUN/94	2	12			CASSELS		1198601et al	FALCONBRIDGE	
JUN/94	1	9			CASSELS		1198603	FALCONBRIDGE	
JUN/94	2	14			CASSELS		1198604et al	FALCONBRIDGE	
JUN/94	1	1			CASSELS		1198610	FALCONBRIDGE	
JUN/94	1	6			CASSELS		1198612	FALCONBRIDGE	
MAY/94			1	12	CASSELS		1186402	NO NAME	
JUN/94	3	9			CASSELS	STRATHY	1198607et al	FALCONBRIDGE	
MAR/94	1	4			CASSEY		1197572	CHITARONI, G.	
AUG/94	1	2			CHURCHILL		1203381	BARRETTE,M.	PREMIER EXPLORATIONS
DEC/93	2	24			CHURCHILL		1201392 et al	CARON,M./BERGERON,J.	
DEC/93	3	29			CHURCHILL		1201334 et al	CARON,M./BERGERON,J.	
DEC/93	3	26			CHURCHILL		1201333 et al	COLLIN,D.	CARON,M.
MAR/94	2	6			CHURCHILL		1202535	GAGNE,G.	SKEAD HOLDINGS
NOV/94	1	1			CHURCHILL		1203500	GAGNE,G.	SKEAD
MAR/94	1	1			CHURCHILL		1202534	GAGNE,G.	SKEAD HOLDINGS
FEB/94	3	3			CHURCHILL		1200861	GAGNE,G.	SKEAD HOLDINGS
NOV/94	1	1			CHURCHILL		1205547	GAGNE,G.	SKEAD
AUG/94	1	1			CHURCHILL		1203383	HARKIN,G.	PREMIER EXPLORATIONS
DEC/93	2	3			CHURCHILL		1197524 et al	HARKIN,G.	O'BRADOVICH,T.
FEB/94	3	3			CHURCHILL		1200801 et al	LACASSE,L.	SKEAD HOLDINGS
NOV/94	1	6			CHURCHILL		1205455	LACASSE,L.	SKEAD
DEC/93	1	2			CHURCHILL		1200860	LACASSE,L.	SKEAD HOLDINGS
NOV/94	1	1			CHURCHILL		1203489	MCBRIDE,G.	
DEC/93	1	2			CHURCHILL		1201464	RENAUDAT,F./FOURNIER, G.	
DEC/93	6	27			CHURCHILL		1193808 et al	RENAUDAT,F./FOURNIER, G.	
DEC/93	1	16			CHURCHILL		1201232	RENAUDAT,F./FOURNIER, G.	
JUN/94	1	1			CHURCHILL		1204686	RENAUDAT,F.	FOURNIER,G.
AUG/94	2	17			CHURCHILL		1203384-385	ROBERT,J.	PREMIER EXPLORATIONS
AUG/94	1	16			CHURCHILL		1203386	ROBERT,J.	PREMIER EXPLORATIONS
AUG/94	1	3			CHURCHILL		1203382	ROBERT,J.	PREMIER EXPLORATIONS
AUG/94	1	5			CHURCHILL		1203380	SALO,R.	PREMIER EXPLORATIONS
JAN/93			4	6	CHURCHILL		1185931	SKEAD HOLDINGS	
JUN/94	1	1			COLEMAN		1198627	BLACKNED,E.	EGO RESOURCES LTD.
JUL/94	1	1			COLEMAN		1203308	DUGUAY,J.	FALCONBRIDGE
MAY/94	1	1			COLEMAN		1198574	FALCONBRIDGE	
JUN/94	1	1			COLEMAN		1198626	FRASER,R.	EGO RESOURCES LTD.
JUN/94	1	1			COLEMAN		1198625	McBRIDE,L.	EGO RESOURCES LTD.
JUN/94	1	1			COLEMAN		1198629	McBRIDE,G.	EGO RESOURCES LTD.
APR/94	1	1			COLEMAN		1198574	McBRIDE,G.	FALCONBRIDGE LTD.

DATE	CLAIMS STK'D	UNITS STK'D	CLAIMS CANC'D	UNITS CANC'D	TOWNSHIP 1	TOWNSHIP 2	CLAIM NO.'S	CLAIM HOLDER	TRANSFERRED TO
JUN/94	1	1			COLEMAN		1198624	McLAREN,D.	EGO RESOURCES LTD.
MAY/94	1	1			COLEMAN		1198575	McLAREN,D.	EGO RESOURCES LTD.
APR/94	1	1			COLEMAN		1198575	McLAREN,D.	EGO RESOURCES LTD.
JUN/94	1	1			COLEMAN		1198628	POLSON,D.	EGO RESOURCES LTD.
MAR/94	1	4			ELDRIDGE		1165389	GODDARD, D.	
MAR/94	1	4			ELDRIDGE		1165390	GODDARD, D.	
JUL/94	1	3			ELDRIDGE		1165392	GODDARD,G.	
JUL/94	1	7			ELDRIDGE		1197544	GODDARD,G.	
APR/94	8	8			FARR		1202629 et al	MOREAU, L.	
JUN/94	1	1			FAWCETT		1201516	ELLIOTT,B.	MULLAN,G.
DEC/93	3	21			FAWCETT		1200818 et al	HARKIN,G.	RAVEN RES.
DEC/93	1	15			FAWCETT		1197527	HARRINGTON,P.	TANDEM RES.
DEC/93	1	16			FAWCETT		1197523	HARRINGTON,P.	TANDEM RES.
JUN/94	1	1			FAWCETT		1201515	JONES,D.	MULLAN,G.
NOV/94	4	33			FAWCETT		1129816-819	MORTSON,S.	CANOC RES. INC.
OCT/94	4	32			FIRSTBROOK		1198682-683	McBRIDE, L.	EWANCHUK,J./WESTIN,B.
JUN/94	2	20			FIRSTBROOK		1198556 et al	McBRIDE,G.	WESTIN,B./EWANCHUK,J.
JUN/94	2	20			FIRSTBROOK		1198578 et al	McBRIDE,L.	WESTIN,B./EWANCHUK,J.
JUN/94	3	21			FIRSTBROOK		1198558 et al	McBRIDE,G.	WESTIN,B./EWANCHUK,J.
JUNE94	2	20			FIRSTBROOK		1198584 et al	McLAREN,D.	WESTIN,B./EWANCHUK,J.
SEP/94	1	4			FIRSTBROOK		1198686	WESTIN,B./EWANCHUK,J.	
SEP/94	4	33			FIRSTBROOK		1198687 et al	WESTIN,B./EWANCHUK,J.	
MAR/94	1	1			GILLIESLIMIT		1186871	BLACKNED, E.	EGO RESOURCES
JUL/94	1	8			GILLIESLIMIT		1198634	EWANCHUK,J.	WESTIN,B.
DEC/93	1	4			GILLIESLIMIT		1200829	HEIKELA,L.;E.;R.;AND S.	
JUL/94	2	2			GILLIESLIMIT		1198641-642	McBRIDE,L.	EGO RESOURCES LTD.
JUL/94	1	1			GILLIESLIMIT		1198613	McBRIDE,G.	EGO RESOURC
JUN/94	1	1			GILLIESLIMIT		1198631	McBRIDE,L.	EGO RESOURCES
MAR/94	2	2			GILLIESLIMIT		1198512	McBRIDE, G.	EGO RESOURCES
MAR/94	3	4			GILLIESLIMIT		1118698 et al	McBRIDE, L.	EGO RESOURCES
JUL/94	1	1			GILLIESLIMIT		1198631	McBRIDE,L.	EGO RESOURCES
JUL/94	1	1			GILLIESLIMIT		1198638	McBRIDE,L.	EGO RESOURCES
JUL/94	3	4			GILLIESLIMIT		1198633 et al	McBRIDE,L.	EGO RESOURCES
APR/94	4	4			GILLIESLIMIT		1198570 et al	McLAREN, D.	EGO RESOURCES
JUL/94	1	1			GILLIESLIMIT		1198632	POLSON,D.	EGO RESOURCES
JUL/94	1	3			GILLIESLIMIT		1198630	POLSON,D.	EGO RESOURCES
MAR/94	1	4			HARRIS		1197573	CHITARONI ,G.	
MAR/94	3	13			HILLIARD		1204421 et al	KIRWAN, J.	ORME, M.
AUG/94	2	10			HILLIARD		1198649-650	McLAREN,D.	KWG RESOURCES
AUG/94	1	4			INGRAM		1198654	McBRIDE,L.	KWG RESOURCES
AUG/94	1	3			INGRAM		1198671	McLAREN,D.	KWG RESOURCES
AUG/94	2	6			INGRAM		1198655-656	McLAREN,D.	KWG RESOURCES
OCT/94	4	8			JAMES		1223201-204	McBRIDE ,G.	PLACIDO,C.
APR/94	1	1			JAMES		1118624	MORRIS, J.	PINKERTON, G.
FEB/94	1	4			JAMES		1202444	PINKERTON,G.	
FEB/94	1	1			JAMES		1202445	PINKERTON,G.	
APR/94	1	2			JAMES		1202552	PINKERTON, G.	
APR/94	1	2			JAMES		1202553	PINKERTON, G.	
APR/94	1	6			JAMES		1202554	PINKERTON, G.	
APR/94	1	1			JAMES		1202555	PINKERTON, G.	
MAY/94	1	6			JAMES		1198559	PINKERTON, G.	
NOV/94	1	1			JAMES		1118627	PINKERTON,G.	
NOV/94	1	9			JAMES		1223212	PINKERTON,G.	
NOV/94	2	6			KELVIN		1205456-457	LACASSE,L.	SKEAD
DEC/93	3	40			KELVIN		1201457	RENAUDAT,F./FOURNIER, G.	
AUG/94	1	1			KITTONSON		1185780	WATTS,H.	
FEB/94			1	1	LAW		501854	NO NAME	
OCT/94	1	6			LEONARD		1191310	ANNETT ,R.	
DEC/93	2	5			LEONARD		1200856	BURNHAM,B.	KNIES,E.
SEP/94	1	4			LEONARD		1203526	KIRBY,B.	
JUN/94	3	3			LEONARD		1200865 et al	LACARTE,A.	
JUN/94	2	9			LEONARD		1200210-211	McCALLUM,R.	
JUN/94	1	1			LORRAIN		1118629	.BEECHAM,A.	683648 ONT.
JUN/94	1	1			MacMURCHY		1202863	BARIETTE,M.	STRIKE MINERALS

DATE	CLAIMS STK'D	UNITS STK'D	CLAIMS CANC'D	UNITS CANC'D	TOWNSHIP 1	TOWNSHIP 2	CLAIM NO.'S	CLAIM HOLDER	TRANSFERRED TO
DEC/93	2	11			MacMURCHY		1201399 et al	CARON,M./BERGERON,J.	
JUN/94	1	1			MacMURCHY		1202791	COURT,D.	STRIKE MINERALS
MAR/94	1	4			MacMURCHY		1202537	GAGNE, G.	SKEAD HOLDINGS
DEC/93	2	18			MacMURCHY		1197517	HARKIN,G.	MID.NORTH
DEC/93	1	9			MacMURCHY		1197526	HARKIN,G.	MULLAN,G.
DEC/93	1	12			MacMURCHY		1197520	HARKIN,G.	MULLAN,G.
DEC/93	2	5			MacMURCHY		1200824 et al	HARKIN,G.	O'BRADOVICH,T.
DEC/93	1	2			MacMURCHY		1200167	HARKIN,G.	O'BRADOVICH,T.
JUN/94	2	8			MacMURCHY		1202795 et al	HARRINGTON,P.	STRIKE MINERALS
JUN/94	1	3			MacMURCHY		1202538	LACASSE,L.	SKEAD HOLDINGS
JUN/94	1	1			MacMURCHY		1200310	LESSY,D.	TOMAC,J.
JUN/94	1	1			MacMURCHY		1200312	LESSY,D.	TOMAC,J.
JUN/94	1	1			MacMURCHY		1186939	McDIARMID,O.	
JUN/94	1	1			MacMURCHY		1202866	MOYER,J.	STRIKE MINERALS
JUN/94	1	1			MacMURCHY		1202803	PAAVOLA,M.	STRIKE MINERALSS
JUN/94	1	1			MacMURCHY		1200309	PARRES,J.	TOMAC,J.
DEC/93	3	13			MacMURCHY		1200823	RENAUD,V.	GOLDHUNTER
DEC/93	1	12			MacMURCHY		1197516	RENAUD,V.	RAPSKI,J.
JUN/94	1	4			MacMURCHY		1204692	RENAUDAT,F.	FALCONBRIDGE
DEC/93	1	8			MacMURCHY		1200820	SADOQUIS,G.	O'BRADOVICH,T.
JUN/94	2	2			MacMURCHY		1202865 et al	SALO,L.	STRIKE MINERALS
JUN/94	3	19			MacMURCHY		1202796 et al	SALO,L.	STRIKE MINERALS
JUN/94	1	1			MacMURCHY		1200311	TOMAC,J.	
JUN/94	1	2			MacMURCHY		1200313	TOMAC,J.	
JUN/94	1	1			MacMURCHY		1202864	VISKOVICH,R.	STRIKE MINERALS
MAY/94	1	16			MacMURCHY		1185795	WATTS, H.	
DEC/93	1	2			MacMURCHY		1200862	ZABUDSKY,D.	
APR/94	1	1			MacMURCHY		1202562	BARRETTE, M.	OBRADOVICH, T.
NOV/94	3	5			MacMURCHY		1204265-267	JONES,D.	KRL RESOURCES
JUL/94	1	1			MacMURCHY		1203311	LESSY,D.	TOMAC,J.
JUL/94	1	1			MacMURCHY		1202787	McDIARMID,O.	
JUL/94	4	19			MacMURCHY		1198880 et al	MORGAN,C.	BARNES,R.
JUL/94	1	1			MacMURCHY		1203312	PARRES,B.	TOMAC,J.
APR/94	5	29			MacMURCHY		1204486 et al	RENAUDAT, F.	FALCONBRIDGE
SEP/94	1	2			MacMURCHY		1203314	TOMAC,J.	
SEP/94	1	1			MacMURCHY		1203313	TOMAC,J.	COPPERQUEST INC.
DEC/93			6	6	MARIA		608361-366	NORTH COAST IND	
JUN/94	1	2			MATTAWAN		1197394	KOMARECHKA,R.	
JUN/94			1	1	MATTAWAN		1165569	NO NAME	
JUN/94			1	1	McAUSLAN		1151068	NO NAME	
NOV/94	3	3			McAUSLAN		1197834-836	PILGER,J.	
OCT/94			2	3	McCAUSLAN		1179489-490	NO NAME	
MAY/94	1	1			N.WILLIAMS		1200736	ANNETT, R.	
DEC/93	1	12			N.WILLIAMS		1200735	TINDALE,J.	
FEB/94	2	26			NATAL		1201235 et al	FOURNIER,G.	FINDORE MIN
FEB/94	2	26			NATAL		1201237 et al	FOURNIER,G.	INT'L HOMESTEAD
JAN/93			1	2	NATAL		1185773	GARVEY,R.	
JAN/93			1	3	NATAL		1185947	GARVEY,R.	
DEC/93	1	16			NATAL		1193300	JONES,D.	
FEB/94	3	17			NATAL		1193301 et al	JONES,D.	
FEB/94	4	19			NATAL	KNIGHT	1193322 et al	JONES,D.	
DEC/93	2	30			OGILVIE		1197521	BARRETTE,M.	TANDEM RES.
AUG/94	3	18			PENSE		1198651-653	McLAREN,D.	KWG RESOURCES
NOV/94	1	1			POITRAS		1197393	KOMARECHKA,R.	
MAY/94	1	2			ROBILLARD		1202526	KOZY, G.	
OCT/94	1	2			S. LORRAIN		1203518	BARRETTE, M.	BISHOF, B.
MAR/94	1	12			S.LORRAIN		1118443	FREDERICK, B.	GODDARD,D.
FEB/94	2	3			S.LORRAIN		1118546	GORE,J.	
JUN/94	1	1			S.LORRAIN		1198564	GORE,J.	
JUL/94	1	3			S.LORRAIN		1202887	MADILL,B.	WRIGHT,B.
JUN/94	2	2			S.LORRAIN		1198615 et al	McBRIDE,L.	MOORE,H.
JUN/94	3	8			S.LORRAIN		1198622 et al	McBRIDE,L.	MOORE,H.
JUN/94	1	1			S.LORRAIN		1198614	MOORE,H.	
NOV/94	1	2			S.LORRAIN		1203524	SADOQUIS,G.	RAVEN RES.
MAR/94	1	6			S.LORRAIN	ELDRIGE	1118441	BLAKE, T.	GODDARD,D.

DATE	CLAIMS STK'D	UNITS STK'D	CLAIMS CANC'D	UNITS CANC'D	TOWNSHIP 1	TOWNSHIP 2	CLAIM NO.'S	CLAIM HOLDER	TRANSFERRED TO
FEB/94			2	2	STRATHCONA		473525-526	NO NAME	
FEB/94			25	25	STRATHCONA		473633 et al	NO NAME	
JAN/93			1	1	STRATHY		1182367	NO NAME	
JAN/93			2	2	STRATHY		1194559-560	NO NAME	
JAN/93			1	1	STRATHY		1182365	NO NAME	
JAN/93			1	1	STRATHY		1182361	NO NAME	
JAN/93			3	3	STRATHY		1189309-311	NO NAME	
JAN/93			1	1	STRATHY		1118496	NO NAME	
JAN/93			1	1	STRATHY		1189320	NO NAME	
JAN/93			1	1	STRATHY		1118495	NO NAME	
JAN/93			1	1	STRATHY			NO NAME	
JAN/93			2	2	STRATHY		1193960-961	NO NAME	
JAN/93			1	1	STRATHY		1189314	NO NAME	
FEB/94	13	13			STRATHY		1201590 et al	FALCONBRIDGE	
APR/94	1	1			STRATHY		1201588	FALCONBRIDGE	
APR/94	1	1			STRATHY		1201591	FALCONBRIDGE	
JUN/94	1	1			STRATHY		1198554	FALCONBRIDGE	
JUN/94	1	1			STRATHY		1198555	FALCONBRIDGE	
JUN/94	1	6			STRATHY		1198594	FALCONBRIDGE	
JUN/94	1	1			STRATHY		1198595	FALCONBRIDGE	
JUN/94	1	1			STRATHY		1198597	FALCONBRIDGE	
JUL/94	1	8			STRATHY		1197744	FALCONBRIDGE	
SEP/94	1	1			STRATHY		1184132	FALCONBRIDGE	
SEP/94	1	8			STRATHY		1184141	FALCONBRIDGE	
OCT/94	2	2			STRATHY		1184124-125	FALCONBRIDGE	
NOV/94	1	8			STRATHY		1184126	FALCONBRIDGE	
NOV/94	1	4			STRATHY		1184127	FALCONBRIDGE	
NOV/94	1	16			STRATHY		1184128	FALCONBRIDGE	
NOV/94	1	4			STRATHY		1184129	FALCONBRIDGE	
JAN/93			1	16	STRATHY		1189048	FILO,K.	
JAN/93			1	12	STRATHY		1189047	FILO,K.	
FEB/94	1	1			STRATHY		1193305	FILO,K.	
FEB/94	1	1			STRATHY		1193306	FILO,K.	
FEB/94	1	2			STRATHY		1193307	FILO,K.	
FEB/94	1	1			STRATHY		1193321	FILO,K.	
DEC/93	1	4			STRATHY		1197377	GUPPY,C.	
OCT/94	3	16			STRATHY		1201521-523	FILO,J.	
APR/94	1	1			STRATHY		1165530	LARONDE,D.	
SEP/94	1	1			STRATHY		1118484	LARONDE,D.	
SEP/94	1	1			STRATHY		1118490	LARONDE,D.	
JAN/93	1	1			STRATHY		1118559	WEBSTER,B.	
JAN/93	1	1			STRATHY		1118560	WEBSTER,B.	
FEB/94	4	4			STRATHY		111562 et al	WEBSTER,B.	
FEB/94	1	10			STRATHY		1118476	WEBSTER,B.	
JAN/93	2	2			STRATHY		1179441-442	WESTIN,B.	
JAN/93	1	1			STRATHY		1118588	WESTIN,B.	
JUN/94	2	2			TUDHOPE		1198637	EWANCHUK,J.	
APR/94	1	1			TUDHOPE		1200717	GONDOR, L.	
MAR/94	1	4			TUDHOPE		1202447	PINKERTON,G.	
MAR/94	1	3			TUDHOPE		1202446	PINKERTON,G.	
APR/94	1	1			TUDHOPE		1202448	PINKERTON,G.	
APR/94	1	2			TUDHOPE		1202551	PINKERTON,G.	
OCT/94	1	4			TUDHOPE		1118625	PINKERTON,G.	
JUN/94	1	2			TYRRELL		1198620	.BEECHAM,A.	HADDINGTON RES.
MAY/94	1	1			TYRRELL		1202615	KOZY, G.	
MAY/94	1	1			TYRRELL		1202616	KOZY, G.	
JUNE94	1	1			TYRRELL		1202739	KOZY,G.	
JUN/94	1	3			TYRRELL		1197546	LARONDE,D.	HADDINGTON RES.
TOTAL '94	426	1718	99	187					

Table CO-3. Exploration Activities in the Cobalt Resident Geologist's District - 1994

ABBREVIATIONS

AEM	Airborne electromagnetic survey	Man	Manual surface work
AGP	Airborne geophysical survey	Mag	Ground magnetometer survey
AGR	Airborne gravity survey	Met	Metallurgical testing
AMG	Airborne magnetic survey	Micro	Microscopic studies
ARA	Airborne radiometric survey	OC	Open cut
ARES	Airborne resistivity survey	OMIP	Ontario Mining Incentive Program
AVLF	Airborne VLF-EM survey	OPAP	Ontario Prospectors Assistance Program
Airphoto	Aerial imagery interpretation	P	Prospecting
AS	Assaying and analysis	PEM	Pulse electromagnetic survey
AD	Auger drilling in overburden	PD	Percussion drilling
Beep	Beep Mat survey	Pit	Pitting activities
Blast	Surface blasting	Rad	Ground radiometric survey
Bulk	Bulk sampling	R/C	Reverse circulation drilling
Comp	Compilation studies and reports	Rd	Road, trail or access construction
DD	Diamond drilling	Rehab	Rehabilitation work
DDH	Diamond drill hole	Remote	Remote imagery interpretation
DGP	Downhole geophysics	Res	Ground resistivity survey
DPEM	Downhole pulse EM survey	RS	Regional survey
Dewater	Dewatering of U/G workings	SA	Surface assaying
Dig	Digitization of base maps	Samp	Sampling
EM	Ground electromagnetic survey	SD	Sonic drilling
Env	Environmental studies	Seis	Seismic survey
GC	Geochemical survey	SP	Self potential survey
GL	Geological survey	S/S	Shaft sinking
GP	Geophysical survey	Str	Stripping activities
Grav	Ground gravity survey	Tr	Trenching activities
Grid	Control grid establishment	U/G	Underground development
HLEM	Horizontal-loop EM survey	U/WGP	Underwater geophysics
Ind	Industrial mineral testing & marketing	UTEM	University of Toronto EM survey
IP	Induced polarization survey	VLEM	Vertical-loop EM survey
Line	Linecutting activities	VLF	Very low frequency EM survey

NO.	AREA	COMPANY/INDIVIDUAL	TOWNSHIP(S)	EXPLORATION WORK
1	CO	BETHLEHEM RES.	BUCKE	4DD(421m)
2	CO	EWANCHUK et al	BUCKE	OPAP, 2DD(107m), GP, AVLF
3	CO	VERA CRUZ MIN. CORP.	BUCKE	9DD(962m), Mag
4	CO	COBATEC	COLEMAN	8DD(264m), AD, Str, Blast, PD
5	CO	FALCONBRIDGE LTD.	COLEMAN	GL, Grid, DPEM
6	CO	FALCONBRIDGE LTD.	COLEMAN / BUCKE	Line, GL
7	CO	BRYDGES, D.	LORRAIN	P
8	CO	FALCONBRIDGE LTD.	LORRAIN	4DD
9	CO	COBATEC	SOUTH LORRAIN	SA, Bulk, Tr, Samp
10	CO	GORE, J.A.	SOUTH LORRAIN	OPAP, P, Str, Tr, IP, Mag, VLF, Line
11	EN	ARRISCRAFT	ARMSTRONG	Str, Bulk
12	EN	ROSS, B.	ARMSTRONG / BEAUCHAMP	AD
13	EN	DUGAS,A/DUGAS,S.	BRETHOUR	AS,Samp,Str
14	EN	ARISTA RES.	BRYCE	OMIP, Grid
15	EN	DUNN, G.C.	BRYCE / SMYTH/CANE	Mag, GC
16	EN	EWANCHUCK, J. P.	BRYCE/ TUDHOPE	Str.
17	EN	GEREGHTY, G.	BRYCE	OPAP
18	EN	GONDOR, L. /ATKINS, G.	BRYCE/ROBILLARD	OPAP, GL, P, Line, VLF
19	EN	PINKERTON,G.	FARR	Tr
20	EN	TYRANEX GOLD INC	PENSE	Man, Tr, PD
21	EN	PINKERTON, G.	TUDHOPE	P
22	NB	CENTRAL ONT. NATURAL ST	CLARKSON	Rd, Samp
23	NB	THORNE BRILLIANT ST QU.	CLARKSON	AS,P
24	NB	JANVEAUX, J-M.	MATTAWAN	Tr,Rd
25	NB	KOMARECHKA,R.	MATTAWAN	P
26	ST	MIRON, T.A.	ASQUITH	OPAP
27	ST	TRADER RES. CORP.	ASQUITH/FAWCETT	3DD(522m)
28	ST	ASQUITH RES.	BROWNING	OMIP, AD

29	ST	FALCONBRIDGE LTD.	BROWNING/AMYOT/ SHEARD/OGILVIE	AVLF
30	ST	TITTLE, H.Z.	BURROWS	OPAP, P, Str, IP, SP
31	ST	JONPOL EXPL. LTD.	CABOT	4DD(433m)
32	ST	TOMAC, J.	CHURCHILL	Line, MAG
33	ST	MULLAN, G.J.	CONNAUGHT	GL, Mag, VLF, HLEM
34	ST	ASQUITH RES.	DUFFERIN / NORTH WILLIAMS	Line
35	ST	GARVEY, R.	FAWCETT	OPAP
36	ST	TINDALE, J.	FAWCETT / MacMURCHY	OPAP, Line, Mag, VLF, P, 1DD(76m)
37	ST	GEORGIA RES. INC.	KELVIN	GP, AVLF, Mag
38	ST	DECKER, KRL et al	KNIGHT / NATAL	OMIP, 12DD(3507), AS
39	ST	LaCARTE, A.	LEONARD	Str, Blast, P
40	ST	TINDALE, J/ANNETT, R	LEONARD	P, Blast
41	ST	MULLEN et al	MacMURCHY / TYRRELL	Str, Tr, GL
42	ST	WHELAN, J.	MacMURCHY	Mag, VLF, Line
43	ST	ASQUITH RES.	SHEARD	Line
44	ST	GOLDEYE EXPL. LTD.	TYRRELL	Line, GP
45	ST	HADDINGTON RES.	TYRRELL	GL, IP
46	ST	KNIES, E.	TYRRELL	P, Str, Tr
47	ST	KOMARECHKA, R.	TYRRELL	Line, GL, Samp, Str, Tr
48	ST	LaCARTE / MacCALLUM	TYRRELL	P, Tr
49	ST	ZABUDSKI / KOZY	TYRRELL	P, Samp
50	TE	BEECHAM, A.W.	BEST	OPAP, DPEM
51	TE	CHITARONI, G.	BEST	OPAP, GL, GC, Str, EM, Line
52	TE	GODDARD, G.	ELDRIDGE	Str, Samp
53	TE	FALCONBRIDGE LTD.	STRATHY/ CASSELLS	Line, GL, GC, P, 13DD(7112m)
54	TE	BLAKE, F.	STRATHY	Str, Blast
55	TE	GRANGES INC.	STRATHY	Line, GL
56	TE	MacDONNELL, A.	STRATHY	Tr, Blast
57	TE	WEBSTER, B.	STRATHY	GL, Samp, GP
58	TE	WESTIN, B.	STRATHY	GP

Table CO-4. Assessment Reports received at the Cobalt Resident Geologist's Office in 1994

ABBREVIATIONS

AEM	Airborne electromagnetic survey	Man	Manual surface work
AGP	Airborne geophysical survey	Mag	Ground magnetometer survey
AGR	Airborne gravity survey	Met	Metallurgical testing
AMG	Airborne magnetic survey	Micro	Microscopic studies
ARA	Airborne radiometric survey	OC	Open cut
ARES	Airborne resistivity survey	OMIP	Ontario Mining Incentive Program
AVLF	Airborne VLF-EM survey	OPAP	Ontario Prospectors Assistance Program
Airphoto	Aerial imagery interpretation	P	Prospecting
AS	Assaying and analysis	PEM	Pulse electromagnetic survey
AD	Auger drilling in overburden	PD	Percussion drilling
Beep	Beep Mat survey	Pit	Pitting activities
Blast	Surface blasting	Rad	Ground radiometric survey
Bulk	Bulk sampling	R/C	Reverse circulation drilling
Comp	Compilation studies and reports	Rd	Road, trail or access construction
DD	Diamond drilling	Rehab	Rehabilitation work
DDH	Diamond drill hole	Remote	Remote imagery interpretation
DGP	Downhole geophysics	Res	Ground resistivity survey
DPEM	Downhole pulse EM survey	RS	Regional survey
Dewater	Dewatering of U/G workings	SA	Surface assaying
Dig	Digitization of base maps	Samp	Sampling
EM	Ground electromagnetic survey	SD	Sonic drilling
Env	Environmental studies	Seis	Seismic survey
GC	Geochemical survey	SP	Self potential survey
GL	Geological survey	S/S	Shaft sinking
GP	Geophysical survey	Str	Stripping activities
Grav	Ground gravity survey	Tr	Trenching activities
Grid	Control grid establishment	U/G	Underground development
HLEM	Horizontal-loop EM survey	U/WGP	Underwater geophysics
Ind	Industrial mineral testing & marketing	UTEM	University of Toronto EM survey
IP	Induced polarization survey	VLEM	Vertical-loop EM survey
Line	Linecutting activities	VLF	Very low frequency EM survey

LOCATION FILE NO.	FILE NAME	COMMODITY	RPT TYPE	WORK PERFORMED	WORK DATE
ANTOINE	KYANITE MIN. CO.	IND. (KY)	ASSESS	Str,Tr	OCT.1993
ASQUITH	JAYDEEMAR EXPL.	Au,BM	ASSESS	P, AS	MAY.1993 2.15241
ASQUITH	TRADER RES.	Au,BM	ASSESS	DD	AUG.1994
BEST	BEECHAM, W.A.	Au,BM	ASSESS	GC, Samp, GL	OCT.1992 2.15411
BEST	CHITARONI, G.	Au,BM	ASSESS	Man, AS, Str.	SEP.1992
BEST	CHITARONI, G.	Au,BM	ASSESS	Str, AS	MAY.1993
BEST	CHITARONI, G.	Au,BM	ASSESS	Str, AS, Samp, P	JUN.1992
BEST	CHITARONI, G.	Au,BM	ASSESS	VLF,Mag, Line	DEC.1993
BEST	CHITARONI, G.	Au,BM	ASSESS	GP, HLEM, Line	FEB.1994 2.15449
BEST	KING, D.F.	Au,BM	ASSESS	P,Man	AUG.1993
BEST	LARONDE, D.	Au,BM	ASSESS	GP, Line	JAN.1993 2.15313
BRYCE/SMYTH	DUNN, G. C.	Au,BM	ASSESS	Mag	MAR.1994 2.15378
BRYCE	DUNN, G.C.	Au	ASSESS	Samp, HLEM	OCT.1993 2.15181
BRYCE//CANE	DUNN, G.C.	Au,BM	ASSESS	GC	MAY1994 2.15418
BRYCE/TUDH.	EWANCHUCK, J.	Au,BM	ASSESS	Str	JAN.1994
BRYCE/TUDH.	EWANCHUCK, J.	Au,BM	ASSESS	GL,Mag,VLF-EM, Line	SEP-JAN 1993 2.15386
BRYCE et al	FALCONBRIDGE	Au,Ag,BM	ASSESS	GL,GC	OCT.1993 2.1518
BRYCE et al	GONDOR, L.	Au,BM	ASSESS	Mag, Em	DEC. 1992 2.15187
BUCKE	EWANCHUK et al	Diamd	ASSESS	GP, AVLF	SEPT.1994 2.15579
BUCKE	KWG&SPIDER RES.	Diamd	ASSESS	Bulk	MAR.1993 2.15301
BUCKE	VERA CRUZ MIN.	Diamd	ASSESS	DD, Mag	FEB.1994 2.15384
BURROWS	TITILEY, H.	Au,BM	ASSESS	DD	APR.1994
CABOT	MULLAN, G.	Au,BM	ASSESS	Mag, VLF, P, GL,Samp	SEPT.1993 2.15194
CABOT	MULLAN,G. et al	Au,BM	ASSESS	Mag,VLF,P.Line	NOV.1992 2.15129
CABOT	POLLOCK, J.	Au.BM	ASSESS	DD	JAN. 1994

CASSELS	LARONDE, D.	Au,BM	ASSESS	GP, Line	DEC.1992	2.15314
CHURCHILL	PARRES, J.	Au,BM	ASSESS	GL	SEPT.1993	2.15169
CHURCHILL	SUCHANEK, C.	Au,BM	ASSESS	GL	OCT.1993	2.1517
CHURCHILL	TOMAC, J.	Au,BM	ASSESS	Line, Mag	SEPT.1994	2.15596
COLEMAN/BUCKE	FALCONBRIDGE	BM	ASSESS	Line, GL	AUG.1994	2.15607
COLEMAN	FALCONBRIDGE	Au,BM	ASSESS	DPEM	JUN.1994	2.15484
COLEMAN/KITT.	WATTS, H.	Au,Ag,BM	ASSESS	Str, Tr, PD	JAN.1993	
CONNAUGHT	MULLAN, G.	Au,BM	ASSESS		JAN.1994	2.15291
CONNAUGHT	NORANDA EXPL.	Au,BM	ASSESS	DD	MAY.1993	
CONNAUGHT	NORANDA EXPL.	Au,BM	ASSESS	Line,Mag, IP	MAY.1993	2.15203
CONNAUGHT	NORANDA EXPL.	Au,BM	ASSESS	DD	MAY.1993	
CONNAUGHT	NORANDA EXPL.	Au,BM	ASSESS	Line,Mag, IP	MAY.1993	2.15204
FAWCETT	GARVEY, R.	Au,BM	ASSESS	P, Line,GL	MAY.1993	2.15234
FAWCETT	INCO LTD.	Au,BM	ASSESS	DD, AS	APR.1992	
FAWCETT	PATRIE, D.	Ni,Cu	ASSESS	VLF,Mag,Line	DEC.1993	2.15246
FAWCETT	PREMIER EXPL.	Au,BM.	ASSESS	DDH, SA	DEC.1993	
FAWCETT/ASQ.	TRADER RES.	Au,BM	ASSESS	HLEM,Mag,VLF,GL	NOV.1993	2.15219
COLEMAN/FIRST.	BENNER, R.	Ag	ASSESS	DD	JULY1990	
KELVIN	GEORGIA RES.	Au,BM	ASSESS	GP, AVLF, Mag	MAR.1994	2.15393
KELVIN	TINDALE, J.	AU,BM	OPAP	Line, GL, DD	NOV.1992	
KNIGHT/NATAL	DECKER et al	AU,BM	ASSESS	DD, AS	DEC-FEB.'94	
MacMURCHY/TYR.	MULLEN, D. et al	AU,BM	ASSESS	Str, Tr, (MAP)	AUG.1994	
MacMURCHY/TYR.	OBRADOVICH, T.	AU,BM	ASSESS	Mag,, EM, Line	JAN.1992	2.15245
MacMURCHY	WHELAN, J.	AU,BM	ASSESS	PD, Blast, Samp	DEC.1993	
MACMUR./FAW.	ANNETT, R.	AU,BM	ASSESS	DD	NOV.1993	
MACMURCHY	WHELAN, J.	AU,BM	ASSESS	Mag, VLF-EM, Line	JAN.1994	2.15442
NATAL	GARVEY, R.	AU,BM	ASSESS	VLF,Mag , GL, GC, SA	SEP.1992	2.15216
NATAL	PERKINS, M.	AU,BM	ASSESS	GC	SEP.1992	2.153
PENSE	GEREGHTY, G.	AU,BM	ASSESS	Grav, Mag	MAR.1993	2.15337
PENSE	TYRANEX GOLD	AU,BM	ASSESS	DD	FEB.1994	0
S. LORRAIN	GORE, J	AG,BM	OPAP	Str	OCT.1993	
S. LORRAIN	GORE, J.	AG,BM	ASSESS	P	AUG.1994	2.15553
S. LORRAIN	GORE, J.	AG,BM	ASSESS	GL	SEP.1994	2.15595
S. LORRAIN	GORE, J.	AG,BM	ASSESS	VLF-EM	AUG.1993	2.15549
STRATHY	BLAKE, F.	AU,BM	ASSESS	Man, TR, PD	DEC.1993	
STRATHY	CARON, M.	AU,BM	ASSESS	Mag, Line	AUG.1993	2.15351
STRATHY	CARON, M.	AU,BM	ASSESS	EM, Line	AUG.1993	2.15341
STRATHY	FALCONBRIDGE	AU,BM	ASSESS	Line, GL, GC	MAY.1994	2.15527
STRATHY	FALCONBRIDGE	AU,BM	ASSESS	Line, GL, GC	JUL.1993	2.15367
STRATHY	FALCONBRIDGE	AU,BM	ASSESS	Line, GL, GC	MAY.1994	2.15525
STRATHY	FALCONBRIDGE	AU,BM	ASSESS	Line, GL, GC	MAY.1994	2.15528
STRATHY	FALCONBRIDGE	AU,BM	ASSESS	Line, GL, GC	AUG.1993	2.15368
STRATHY/CASS.	FALCONBRIDGE	AU,BM	ASSESS	Line, GL, GC	MAY.1994	2.15526
STRATHY	FALCONBRIDGE	AU,BM	ASSESS	Line, GL, GC	AUG.1993	2.15364
STRATHY	FALCONBRIDGE	AU,BM	ASSESS	GC	MAY.1993	2.15363
STRATHY	GODDARD, D.	AU, BM	ASSESS	Man, Blast, Samp, SA	OCT.1993	
STRATHY	GODDARD, D.	BM	ASSESS	P	NOV.1993	
STRATHY	GODDARD, D.	AU,BM	ASSESS	P	SEP.1993	2.15277
STRATHY	GRANGES INC.	AU,BM	ASSESS	P, GL, GC	OCT.1993	2.1541
STRATHY	GRANGES INC.	AU,BM	ASSESS	Mag, HLEM, Line	APR.1993	2.15342
STRATHY	MULLAN, G.	AU,AG,CU	ASSESS	Mag.VLF.HLEM,P.Samp.	OCT.1993	2.15195
STRATHY	WEBSTER, B.	AU,BM	ASSESS	GL, Samp, GP	JUL.1994	2.15605
TUDHOPE	DUNN, G.	AU,BM	ASSESS	P, Samp	OCT.1993	2.15182
TYRRELL	GOLDEYE EXPL.	AU,BM	ASSESS	Line, GP	APR.1994	2.15406
TYRRELL	KNIES, E.	AU,BM	ASSESS	P, Str, Tr	JUL.1994	2.15532
TYRRELL	KNIES, E.	AU,BM	ASSESS	Str, Tr	JUL.1994	
TYRRELL	KOMARECHKA, R.	AU,BM	OPAP	Line, GP	JAN.1994	
TYRRELL	KOMARECHKA, R.	AU,BM	OPAP	Line, GL, Samp	JAN.1994	
TYRRELL	KOMARECHKA, R.	AU,BM	ASSESS	Str, Tr	AUG.1994	2.15552
TYRRELL	KOMARECHKA, R.	AU,BM	ASSESS	Str, Tr	JUL.1994	
TYRRELL	LACARTE et al	AU,BM	ASSESS	Tr, Blast	SEPT.1993	

RESIDENT GEOLOGIST'S STAFF ACTIVITIES

During 1994, the Cobalt Resident Geologist office was staffed by: J. Ireland, Resident Geologist; R.V. Zalnierunas, Contract Staff Geologist; E. Baša, Staff Geologist; G. Quevillon, Administrative Assistant; Patrick Green, contract Geological Assistant and C. Pickard, on call Office Support. Jennifer Pickard was our Experience '94 summer student assistant.

1994 was a year of change and transition for all staff at Cobalt. In addition to his traditional duties and responsibilities, Jim Ireland became directly involved in the Temagami Comprehensive planning process, representing the Ministry of Northern Development and Mines on the inter-ministerial planning team. (see "Land Use Planning Activities").

Ray Zalnierunas continued in the position of acting Staff Geologist until August when E. Baša returned from maternity leave. He provided client services support and assisted J. Ireland in the office and field. Ray also represented MNDM on the interministerial planning team and provided input into the Temagami Comprehensive planning process during the series of public open houses and workshops held in various localities this year.

Elaine Baša returned from maternity leave in August and resumed Staff Geologist functions. In addition to her ongoing duties as staff geologist, Elaine became involved in land use issues relating to mineral potential evaluation of lands proposed for various uses not compatible with mining.

Gerry Quevillon provided client services and office support and also completed several on-going projects. With the help of both J.Pickard and P.Green, the enormous task of transcribing over twenty years' worth of R.Thomson's (former and long-time Cobalt Resident Geologist) notes from over 50% of our current assesment files. That project was completed late this year. Another project, updating of the assessment file indexing system and converting it to electronic format, was also completed in 1994.

Patrick Green was hired on contract in September and began work on the creation of several databases. Completing the transcribing of Dr.R.Thomson's field notes and work on a library reference database were two of the main objectives this year. In addition to these duties, he assisted both J.Ireland and E.Basa in the office and field.

Staff Activities

Office and staff activities in 1994 achieved levels similar to 1993.

● Office Inquiries	1153
● Phone Inquiries	854
● Property Visits	51
● Hazards Inspections	9
● Field Tours Given	10
● Field Tours Attended	6
● Internal Field Trips	2

Once again, the number of visitors to the Cobalt office has remained fairly steady in comparison with past years. With the continued interest in the opening of the Temagami Land Caution, research activities have remained relatively high. Exploration activity in the open townships in the Temagami area have sparked heightened interest which is reflected in office research and consultation.

The discovery in September of the OPAP kimberlite pipe in Bucke Township has renewed diamond interest in the area, especially considering the fact that it was discovered on a magnetic low. Several companies have accelerated diamond exploration programs within the area.

Regular staff activities included:

- reviewing and commenting on land use issues (Timber Management plans, Temagami Comprehensive Planning Council, Wendapan Stewardship Authority plan proposals, Ministry of Natural Resources' Candidate Parks, ANSI's, Wetland Initiatives, Official Plan amendments, etc.)
- active involvement as a member of the Temagami Comprehensive Planning Team
- presentation of the Discover '94 Prospectors course over a 6 week period in May and June at the Haileybury School of Mines, Haileybury. Due to the high number of registrants (49), the course was split into an Introductory and an Advanced class.
- staff participation in the Cobalt Miner's Festival (poster display and geology tours) in July.
- continued monitoring of selected crown pillars in the Cobalt area as part of the Crown Pillar Stability Pilot Project, initiated in 1992 by the Abandoned Mines Section of Mining Lands and Rehabilitation Division, MNDM. This project was completed in June of this year.
- presentation of a poster display at the Mines and Minerals Division's symposium in Toronto in December and in Sudbury in April featuring a Re-Evaluation of Copper Mineralization in rocks of the Huronian Supergroup.

In addition, staff attended several professional seminars and training sessions during the year, including the Prospector's and Developers Annual Convention, Northern Prospector's Annual General Meeting, International Association for Mathematical Geologists Conference, and CIMM Field Conference in Sudbury.

Land Use Planning Activities

Staff at the Cobalt Resident Geologist office responded to 57 requests pertaining to the disposition of approximately 370km² of public and private lands in 1994. Most requests were made for comments and concerns pertaining to the selection of candidate Natural Heritage Preserve and Area of Natural and Scientific Interest (ANSI) sites as part of the Ontario government's "Keep It Wild" initiative. Other requests were mostly for comments and concerns on private land dispositions within municipal boundaries, and involved searches of documented mine-related hazards that could influence land zonings.

The majority of candidate "Keep It Wild" sites were situated on Crown lands. A few of the candidate ANSI's were situated on privately held lands. The Ministry of Natural Resources is responsible for identifying and rating the significance of candidate areas and recommending sites to the province. The responsibility of the Ministry of Northern Development and Mines is to evaluate the mineral potential of all candidate sites and recommend exclusion of sites with moderate- to high-mineral potential.

During 1994, thirty-two "Keep It Wild" candidate sites were put forward by North Bay MNR District office. Due to the ongoing Comprehensive Planning process in Temagami, no "Keep It Wild" candidate sites were brought forward by the Temagami MNR Office in 1994.

In addition to responding to requests pertaining to the "Keep It Wild" initiative and municipal land dispositions, Resident Geologist office staff were directly involved in the Temagami Comprehensive Planning process. Field staff represented the Provincial interest with respect to assuring that the exploration landbase within the planning area was maintained at a maximum in keeping with the Comprehensive Planning Council's objectives for mineral management. MNDM staff participated directly in the establishment of the Mineral Component objectives as summarized below:

- To provide a maximum contribution to the economy through the wise use of mineral resources,

and to encourage and facilitate private sector exploration and development, using sound environmental practices while minimizing the impact on other uses and users.

- To provide for the utilization of the mineral resource in the Planning Area for optimum economic and social benefits, while applying sound environmental principles.
- To maintain most of the land base open and available for mineral exploration and development.
- To ensure that lands affected by mining operations are rehabilitated to an appropriate end use.

Staff are continuing to participate in the planning process as part of the planning team developing the next phase, the Preferred Land Use Scenario. In addition to presenting Land Use zoning, Resource Management Area prescriptions will be developed. The next round of public consultations, consisting of Workshops and Open Houses, is scheduled for the spring of 1995. Comments on the Zoning and Management Area descriptions will be considered in developing the finalized Land Use Plan.

NODA PROJECTS

Mining and Minerals Technology Program

Amelioration of Acid Mine Drainage utilizing an incorporated Peat-Wood Waste Admixture

A partnership between the University of Guelph and Dofasco Incorporated is currently investigating the effectiveness of in-situ treatment of Acid Mine Drainage - AMD, utilizing locally available sphagnum peat. The organic material is incorporated directly into sulphide-rich tailings and it is anticipated that the organic compounds will capture and immobilize heavy metals present in acidic leach. The acids will be converted to organically-based salts, thus reducing the impact of tailings run-off on the environment.

PROPERTY VISITS

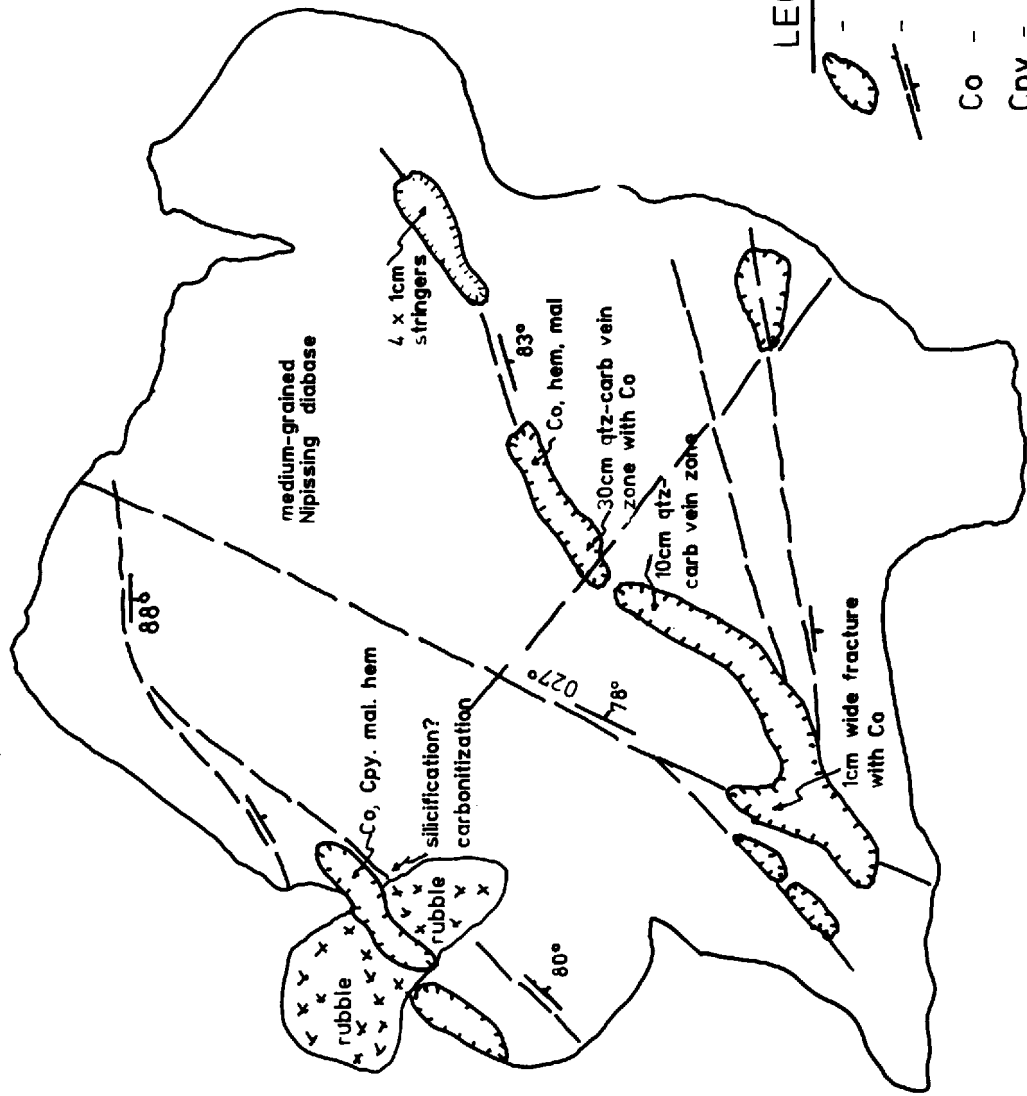
LaCarte Property
Leonard Township
UTM:5261400N, 496180E
NTS:41P/11
MDI: na

The LaCarte property is located in the southwest corner of Leonard Township. Access is provided by Bay Lumber Forest access road south from Highway 560 west. A dirt road leads east from a point approximately 300m south of South Sandstrum Lake. From the dirt road, Mr. LaCarte has put in a short road to the showing. The property was staked in 1993 and 1994 by A.LaCarte. Although the cobalt occurrence has been documented (Carter, 1977, Map 2359), there is no record of previous work done on the showing. However, hearsay reports a silver-bearing vein immediately west of the current cobalt occurrence.

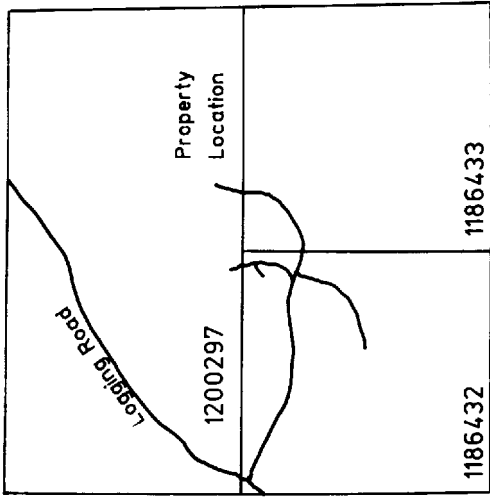
Regional geology consists of a north-trending band of Nipissing diabase with a partial cover of arkoses of the Lorrain Formation to the east of the north-trending Jess Lake fault. The area immediately west of the fault is

LACARTE PROPERTY

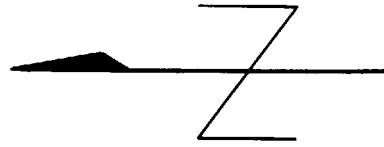
Leonard Township



SCALE



Southwest Leonard Township



LEGEND

- trench
- structure with dip
- Co - Cobalt
- Cpy - Chalcopyrite
- hem - hematite
- mal - malachite

Figure C0.6 LaCarte Property, Leonard Township

unmapped but is believed to be underlain by a sequence of Archean felsic to ultramafic metavolcanics intruded further to the west by the Granite Lake pluton, an Archean-aged felsic intrusive.

Locally, the area is mapped as medium- to coarse-grained Nipissing diabase with Huronian Lorrain Formation arkoses immediately to the east of the showing. It has been concluded by Carter, (1977) that there are two distinct diabase sills. The diabase in this location represents the so-called upper sill. This sill is intruded into the arkoses of the Lorrain Formation.

The showing exhibits several strong structures, the strongest of which are northeast trending. This is typical of the cobalt-silver bearing quartz-carbonate veins in Leonard Township (Carter, 1977). The best-developed main structure is very straight with no strike variation ($054^{\circ}/80^{\circ}$) and is 1cm at its widest point (Figure CO-6). Mineralization in the structure is limited to a very dark cobalt mineral with minor chalcopyrite and some hematite staining. The weaker vein sets are erratic in both width and strike. Predominantly quartz-filled, with minor carbonate, the width ranges from 1cm to 30cm and the strike may vary over 30° . The veins swell at the intersection with the main structure. Visual mineralization is limited to cobalt arsenide, chalcopyrite and silver. A composite grab sample from three blast pits assayed 8.02% cobalt, 2.52% nickel, 2% copper, 0.05 oz gold/ton, and 1.2 oz silver/ton.

Blasting was done mainly on the wide sections of quartz-carbonate veins. Mineralization is minor except on the northwest exposure where abundant cobalt bloom and chalcopyrite is evident but only minor cobalt mineralization noted. The veins appear to swell where the strike changes but with no visible mineralization changes.

Alteration is strongest in the northwestern exposure along one of the exposed veins. The diabase in this location is bleached, carbonatized and slightly silicified. Hematite alteration is associated with the steeply-dipping northeast-trending structures and epidote and hematite with the shallower structures.

Further work by Mr. LaCarte will concentrate on following the main mineralized structure along strike to see if the nature or width of the mineralization changes as well as on putting more emphasis on the mineralization at vein/structure intersections. Mineralization at inflections within the veins will be assayed and noted. Further stripping and channel sampling will be initiated in the spring. Possible diamond drilling to explore these structures at depth is a consideration.

Chitaroni (Acana No. 5) Property

Best Township

UTM: 52230020N, 595280E

NTS: 31M/04

MDI: N 097

The Acana No. 5 Copper-Nickel-PGE occurrence is one of several mineral occurrences located on the Chitaroni property in south-central Best Township. It is situated approximately 380m southwest of the southeast bay of Granite Lake, between Highway 11 and the Trans-Canada pipeline. Access to the property is via Highway 11, which transects the property. The 5+00 West baseline passes over the showing approximately 300m north from the highway.

Regional Geology

The Granite Lake area is underlain by Algoman granite to the west and flat-lying Proterozoic Huronian sediments to the east. A narrow, 1km to 3km wide band of northeast trending Archean metavolcanic rocks is partially exposed at the contact between the granite and the Huronian sediments. Nipissing diabase intrudes the Huronian sediments

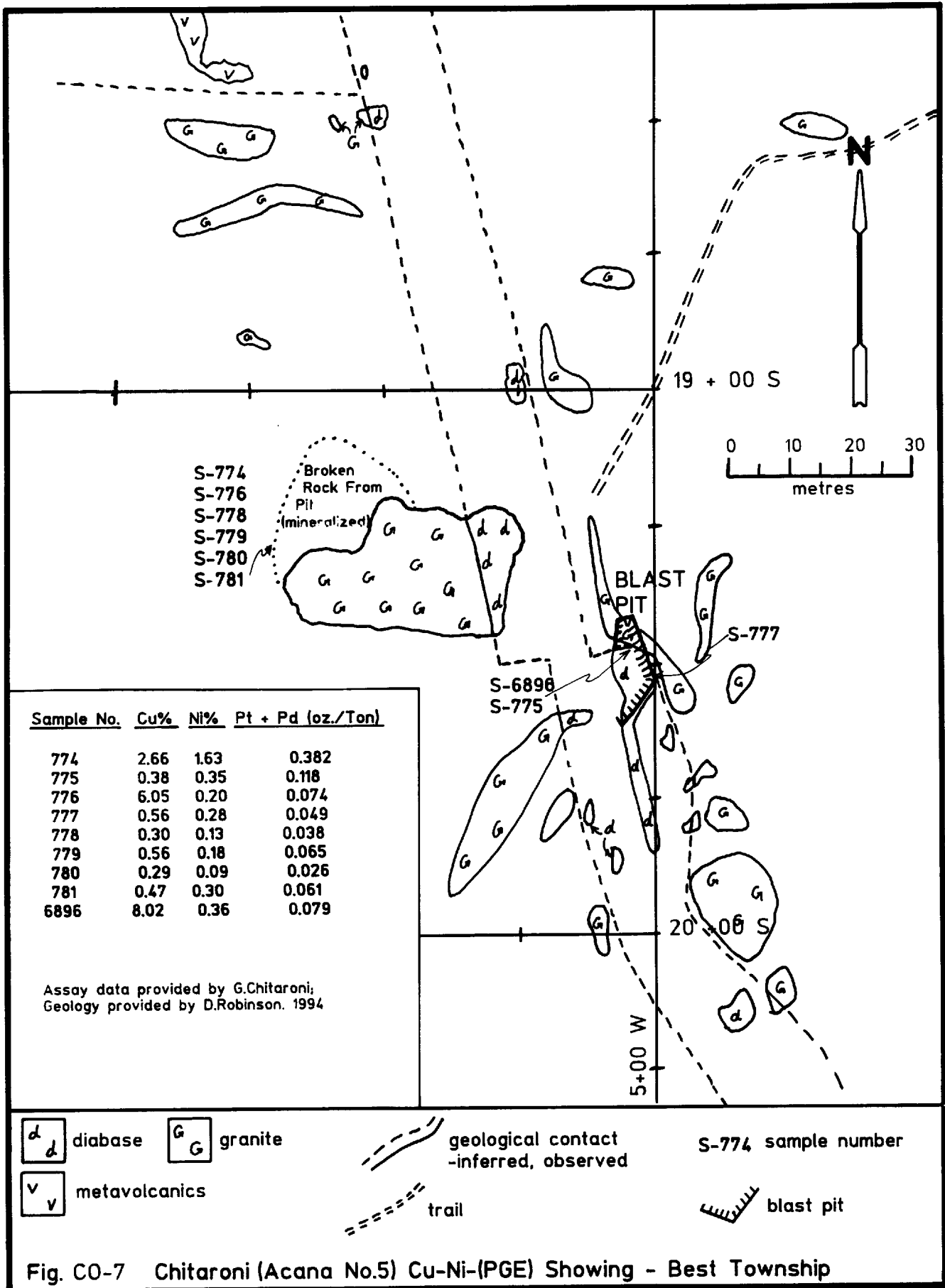


Fig. CO-7 Chitaroni (Acana No.5) Cu-Ni-(PGE) Showing - Best Township

east of Granite Lake and the granite west of Granite Lake. There is no evidence of Nipissing diabase intruding the older metavolcanics.

The Archean metavolcanic rocks are the oldest in the area. They range compositionally from thick, coarse grained, gabbroic mafic flows to quartz-rich rhyolite flows and associated pyroclastic rocks. No significant accumulations of clastic sedimentary rocks occur in the Archean sequence. Narrow, cherty interflow sediments of possible exhalative origin occur in both the mafic and felsic flows. The dominant rock type is pillowed, iron-rich mafic flows. Mafic to ultramafic dikes and small stocks have locally intruded the mafic flows, and may be sub-volcanic equivalents. The mafic intrusives vary texturally and compositionally from fine-grained gabbro-diorite to coarse-grained pyroxenite. One pyroxenitic intrusive grades laterally into a feldspar-rich anorthositic phase. Sub-volcanic quartz-feldspar and feldspar porphyry dikes intrude felsic and mafic metavolcanic rocks.

The east boundary of the Algoman granite batholith, which underlies the west half of Best Township, is in intrusive contact with the Archean metavolcanic rocks or is unconformably overlain by Proterozoic Huronian sediments. The granite exhibits several mineralogical phases, dominated by quartz, potassic feldspar, biotite and chlorite. South of Granite Lake, a north-trending diabase dike intrudes the granite and the metavolcanic rocks. The dike pre-dates the Proterozoic Huronian sediments and is mapped as a Matachewan diabase dike.

Proterozoic Huronian sediments of the Cobalt Group underlie the eastern half of Best Township. They are flat-lying to gently east-dipping, grading upwards to the east from Gowganda (Coleman) Formation conglomerate, greywacke and mudstone to Lorrain Formation arkose and quartz arenite.

Local Geology

The Acana No. 5 Copper-Nickel-PGE occurrence was first documented by R. Thompson (1968; p. 50), who reported assays of 0.04 ounces platinum per ton and 0.08 ounces palladium per ton from a grab sample from a mineral-bearing shear along the contact of a Matachewan diabase dike. Since that time, unknown operators have blasted open the occurrence and approximately 250 tons of mineralized rock is stockpiled at the site. The site was rediscovered by Mr. G. Chitaroni during linecutting on newly acquired claims.

The showing (Figure CO-7) consists of the remnant of a lens of massive pyrite-chalcopyrite within a north northwest-trending ultramafic dike, near the east contact of the dike with granite. There is no observable pyrrhotite or pentlandite. South of the sulphide lens, the east contact of the dike is variably mineralized with 5 - 15 % disseminated pyrite-chalcopyrite over a length of approximately 25m. Widths of mineralized dike range from 1m to 5m. Where the dike is mineralized, it contains numerous ultramafic nodules of possible peridotitic composition. The nodules are absent in unmineralized sections of the dike. It is possible that the dike is not a Matachewan diabase, but a metadiorite sill related to the platiniferous Ajax intrusion located 8km to the southwest. There is a distinct positive magnetic anomaly, 250m wide, extending southwest from the main showing, into the granite. There is no outcrop at the anomaly and it should be considered a target for future exploration.

Analyses of massive, semi-massive and disseminated sulphides from the showing returned the following values;

0.29 % to 2.66 % Cu	0.003 to 0.034 oz Au/t
0.007 to 0.157 % Co	0.007 to 0.059 oz Pt/t
0.09 to 1.63 % Ni	trace to 0.323 oz Pd/t
0.05 to 1.56 oz Ag/t	

The dike is traceable intermittently to the north and south over a distance of 1100m. Mineralization was noted in two additional locations. A poorly-exposed outcrop on the north side of Highway 11, 250m south of the main showing, returned values up to 0.26 % Cu, 0.08 % Ni and 0.04 ounces palladium per ton.. Approximately 500m north of the main showing, on the Trans-Canada pipeline, a composite sample of dike rock containing pyrrhotite and chalcopyrite returned assay of 0.93 % Cu, 0.33 % Ni, 0.06 % Co and nil Pt or Pd.

Goddard (Cooper Lake) Occurrence

Eldridge Township

UTM: 52112546N, 611485E

NTS: 31M/04SE

MDI: N 0080

The Cooper Lake Copper-Nickel-Cobalt-Silver occurrence, also known as the Huronian Belt or Ogistoh, is situated in northeast Eldridge Township, just south of the South Lorrain - Eldridge townships boundary. It is currently held by Mr. D. Goddard of Temagami, Ontario. Access to the property is via the Rabbit Lake Forest Access road from Highway 11 in Askin Township, 28km to an ATV trail just east of McDonald Creek, then north 6km to the south end of McDonald Lake. An old trail leads north 500m to the showing.

The showing was first staked in 1913 as a silver prospect. By 1920 two shafts, 25m and 12m deep, were put down on prospective silver-cobalt-bearing veins. Approximately 25,000 tons of development ore estimated to contain 5% cobalt was sent to Welland, Ontario in 1921 but was never treated, due to low silver content.

Regional Geology

Eldridge Township is situated at the southeast edge of the Lorrain Lake sedimentary basin, an accumulation of Proterozoic Huronian sediments that extend west from Lake Timiskaming to the Temagami greenstone belt. The sediments consist of conglomerate, greywacke, argillite and quartz arenite of the Cobalt Group. A narrow, 2km to 10km belt of Archean granitic rocks, extending from Lake Temiskaming southwest to Highway 11 in Olive Township, separates the Proterozoic Lorrain Lake Basin sediments from Late Proterozoic Grenville paragneiss. Proterozoic Nipissing diabase dikes and sills intrude all rock types in the area.

Local Geology

The Cooper Lake occurrence is located at the southeast limit of the Lorrain Lake sedimentary basin. Two separate Copper-Nickel and a Cobalt-Silver showings are located at the site of the 25m deep shaft, near the northeast-trending contact between Proterozoic Nipissing diabase and older Archean quartz diorite intrusive. The quartz diorite forms an isolated northeast trending ridge with Cobalt Group conglomerates to the northwest and Nipissing diabase to the southeast. Archean granite is exposed east and south of the quartz diorite. Silver and cobalt mineralization are associated with a narrow calcite vein striking N60°W cutting the quartz diorite. Several overgrown pits extending to the northwest from the shaft mark the approximate trend of the vein.

Immediately west of the shaft, the quartz diorite is heavily gossan stained over widths ranging from 0.5m to 5.0m. The staining is due to the presence of 3% to 5% disseminated pyrrhotite, pyrite and chalcopyrite, which forms a halo around a N65°E trending, brecciated and heavily mineralized phase of the quartz diorite. Pyrite, pyrrhotite and chalcopyrite make up the matrix of the breccia zone which comprises 20% and 55% of the breccia unit. The breccia unit is traceable for approximately 20m west of the shaft, where it approaches 4m in width, and for approximately 60m east of the shaft, where widths narrow to less than a metre. Mineralization is strong and consistent where exposed. Assays from selected grab samples consistently returned copper and nickel values in the 0.5% to 1.5% range. No significant platinum or palladium values were obtained. Anomalous gold, up to 1.5 g Au/tonne, were reported by Mr. Goddard, associated with the sulphide rich breccia. Anomalous copper values were reported from the wide, mineralized alteration halo surrounding the mineralized breccia.

RECOMMENDATIONS FOR EXPLORATION

Copper-Nickel- PGE Mineralization

Numerous Copper-Nickel-PGE occurrences, showings and deposits are documented in the Temagami area of northeastern Ontario. Most are associated with Archean extrusive and intrusive rocks (ie. the Copperfields mine, Phyllis Township; the Kanichee deposit, Strathy Township). To a lesser extent, copper-nickel occurrences appear to be associated with Proterozoic intrusive rocks, notably Nipissing diabase dikes and sills (ie. Cooper Lake occurrence, Eldridge Township).

Documentation of copper-nickel mineralization in Proterozoic mafic intrusives is minimal (R. Thompson, 1968; E.W. Todd, 1925, 1926; Assessment Files, Cobalt; R. Thompson notes, Cobalt). Much of the available information is based upon work done prior to 1970, and some observations were made only in connection with silver exploration activities carried out in the early 1900's. Some of the more accessible showings along the Highway 11 corridor, in Best and Gillies Limit townships, were under evaluation when the Temagami Land Caution was initiated in 1973. Little additional work was done prior to reopening of the peripheral lands in 1991 and the lifting of the Caution from Strathy, Cassels and Best townships in 1992. Copper-nickel mineralization is well documented within the Archean rocks of the Temagami Greenstone Belt (G. Bennett, 1978; W.W. Moorhouse, 1942; R. Thompson, 1968; P.S. Simony, 1964).

At the Copperfields mine, copper-nickel mineralization is associated with semi-massive to disseminated pyrite at the lower contact between an altered felsic gabbro and rhyolitic volcanic rocks. The gabbro is steeply dipping, approximately 250m thick and has a strike extent of at least 5km. The intensity of mineralization varies greatly but is present over most of the defined strike length of the gabbro. Copper is associated with chalcopyrite. Nickel is associated with millerite, gersdorffite, linnaeite and cobalt-nickel sulpharsenides.

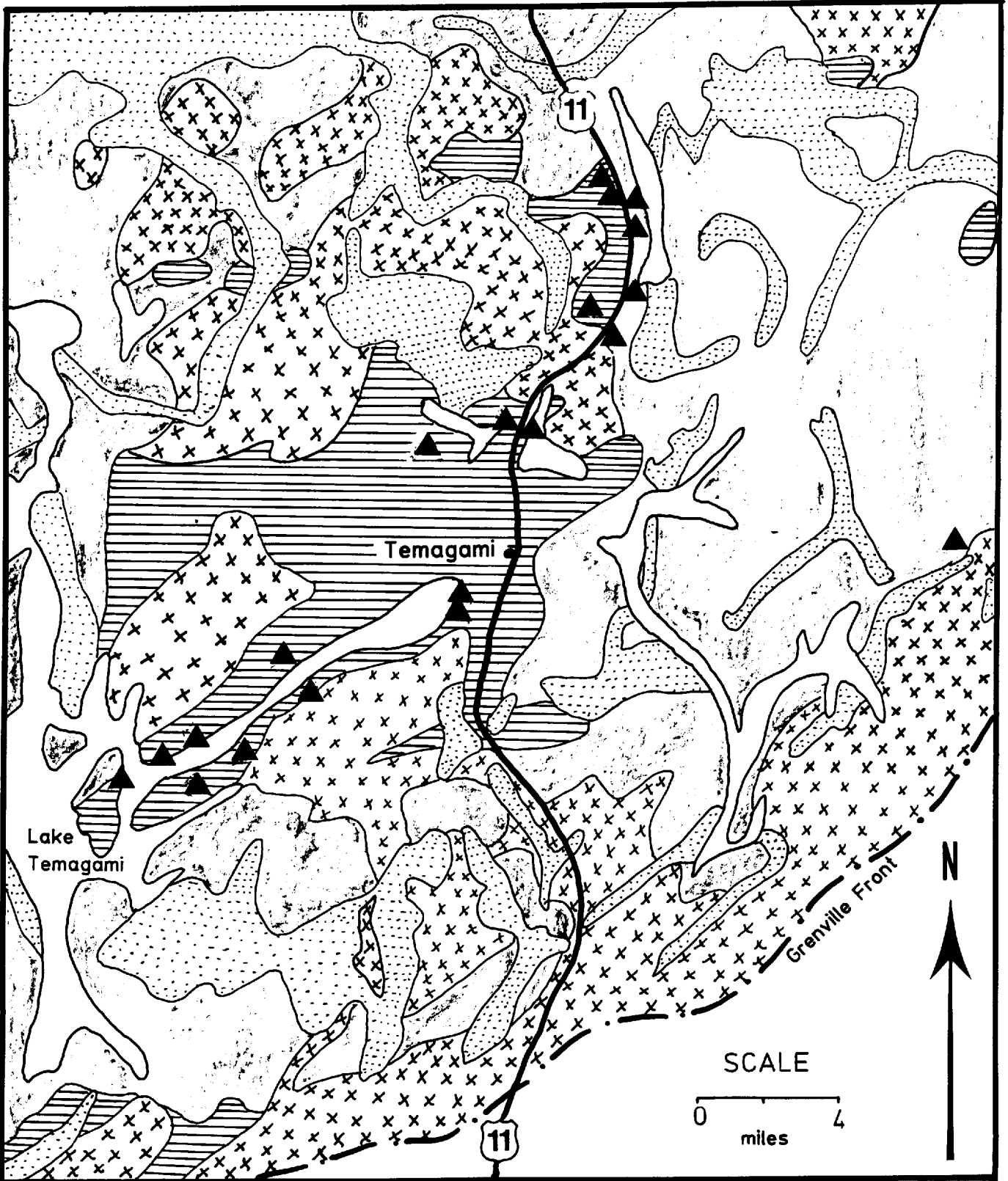
At the Kanichee mine, copper-nickel mineralization occurs within a northwest trending extension of a larger gabbroic intrusion. The extension is about 240m long by 90m wide and plunges 23° to the southeast. The extension is altered to serpentine and amphibole, while the main gabbroic intrusion is relatively unaltered. Pyrite, pyrrhotite and chalcopyrite are the primary minerals present, occurring as semi-massive to massive veins within the extension zone. Significant gold, silver and platinum-palladium occur with the sulphides.

Several copper-nickel sulphide occurrences are documented in the vicinity of Granite Lake in Best Township and west of Rib Lake in Gillies Limit Township. The majority of these occurrences are hosted in mafic to ultramafic intrusive rocks or their extrusive equivalents. One showing, located south of Granite Lake in Best Township, occurs in a hybrid mafic dike intruding granite. Significant platinum and palladium is associated with copper-nickel sulphides concentrated along the east contact of the dike. Approximately 500m south of the copper-nickel-PGE showing, the dike is feldspathic, suggesting a possible anorthositic phase (see Chitaroni (Acana No. 5) showing under "Property Descriptions").

West of Cooper Lake in Eldridge Township, copper-nickel mineralization occurs within a quartz diorite intrusion of possible Proterozoic age. Semi-massive chalcopyrite, pyrite and pyrrhotite occur within a brecciated, feldspathic phase of the quartz diorite across widths that vary from a few centimetres to over 3 meters (see Goddard (Cooper Lake) showing under "Property Descriptions").

The presence of numerous and widely distributed metalliferous mafic and ultramafic intrusives, and their extrusive equivalents, within and adjacent to the Temagami Greenstone belt, is significant. Prospecting for copper-nickel mineralization should be directed to known areas of mafic, ultramafic or anorthositic intrusion. Prospective areas include areas adjacent to Archean basement-Proterozoic sediment contacts (ie. west of Rib Lake, east of Mountain Lake, northeast of Rabbit Lake, north of Cassels Lake) and generally, along the Highway 11 corridor north of Strathcona Township to Cobalt.

Additional prospective areas not currently open to staking or prospecting are located in northern Chambers Township, along the Northeast Arm of Lake Temagami, central Banting Township, most of Strathcona Township, and the east part of Cynthia and Joan townships,



LEGEND

-  Archean Metavolcanics
-  Archean Granite
-  Proterozoic Metasediments
-  Proterozoic Nipissing Diabase
-  Copper-Nickel Occurrences

Figure C0-8 Copper-Nickel-(PGE) Occurrences in the Temagami Area

SELECTED PUBLICATIONS RECEIVED

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Thompson, R. 1968; Geology Adjacent to Highway 11 in Best Township and the South Part of Gillies Limit Township, Districts of Nipissing and Timiskaming; Ont. Dept. of Mines Open File Report 5016. Accompanied by 5 figures.

Thompson, R.; var.: Notes, Assessment Files, Cobalt.

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" " 1925: The Matabitchuan Area; Ont. Dept. of Mines Vol.34, Pt.3, 38p. Accompanied by Map 34b.

SAULT STE. MARIE RESIDENT GEOLOGIST'S DISTRICT - 1994

G. Bennett¹, M. Hailstone², B. Fremlin³

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INTRODUCTION

The continued increase in copper prices spurred interest in base metal exploration in 1994.

In March, Western Quebec Mines(3)¹ Limited purchased Noranda's interest in the Eagle River property of Central Crude Ltd., and through its subsidiary, River Gold Mines is aggressively pursuing the development of a small gold mine in Eagle River area west of Wawa.

The big news for 1994 was the very positive results of the OGS study of kimberlite indicator minerals in the Wawa area. (See "OGS Activities and Research by Other Agencies" in this report).

Ontario Trap Rock Limited came under new ownership in 1994 and expansion is underway at the Bruce Mines facilities.

During the year 13 individuals received Ontario Prospectors Assistance Program grants for a total of \$125 795. There were 2 exploration programs funded under Ontario Mineral Incentives Program for a total payout of \$73 820. This represents 30% of the total exploration expenditures for these two programs. Under the Northern Ontario Heritage Fund Corporation two companies received a total of \$246 000 for development of mineral resources. An additional \$75 000 was allocated to one company under Northern Ontario Resource Transportation Committee. Ministry of Northern Development and Mines assistance for mineral exploration and development totalled \$520 615 in the Sault Ste Marie Resident Geologist's district.

MINING ACTIVITY

Rio Algom Limited (Stanleigh Mine)

The Stanleigh Mine at Elliot Lake milled 905.610 tons of ore during the 1995 calender year. A total of 1,790,428 lbs of U₃O₈ was shipped to Ontario Hydro (These numbers include raffinate, calcium fluoride and water).

Mining is being phased out in the western extremities of the mine. The bulk of mining was from between the 3,000 and 3,500 foot levels. Scheduled production for 1995 is 1.8 million lbs.U₃O₈. Scheduled production for 1996 is 1.1 million tons of U₃O₈. The Stanleigh Mine is scheduled to close in mid 1996. (Personal communication, R. Henderson, Chief Geologist, Jan, 1995).

¹Number in brackets refer to listing in Table 2

Algoma Steel Corporation, Algoma Ore Division

During the year 1994 the Algoma Ore Division of Algoma Steel Limited continued production of iron sinter from siderate ore at the George W. Macleod Mine at Wawa in spite of a 3 month shutdown in the fall of 1994.

1994 production statistics provided by Mr. A.L. Stevens, Mine Manager, G.W. Macleod Mine are as follows:

Total sinter produced: 727,646 G.T.

of which

Superflux sinter	471,748
Low flux sinter	212,977
Tolled sinter	42,921

Raw materials used were:

MacLeod Mine siderite ore	626,070 G.T.
Limestone -	125,425
Reverts/Oxides	288,856
Subgrade fines	20,255

The average mine grade of iron ore was 34.79 percent Fe and 7.99 percent SiO₂.

Mine Reserves are: 253,000 G.T broken
6,678,000 Developed
12,000,000 Undeveloped
Total 18,931,000 G.T.

The company plans to continue to develop the market for tolled sinter in 1995. The present budget for Algoma Steel Corporation is to produce approximately 700,000 G.T. of superfluxed sinter and 200,000 G.T. of low base sinter. (Personal communication A.L. Stevens, Manager Algoma Ore Division).

Ontario Trap Rock Limited

Since 1990 Ontario Trap Rock Limited operates a quarry in Nipissing diabase (trap rock) near the Town of Bruce Mines. Products produced include material for railway ballast, rock wool insulation, armour stone, road surfacing and landscaping. Products are shipped by truck, rail or water as required.

In 1994 the Ontario Trap Rock Limited was acquired by R.W. Tomlinson Ltd. of Ottawa. R. W. Tomlinson plans substantial investments at the Bruce Mines site. These investments will be directed towards the construction of a deep water loading facility at Bruce Mines, installation of stationary crushing equipment at the quarry. New shops and office are currently under construction. There are about 12 full time employees on the site (Personal communication, B. Hamilton, General Manager, Ontario Trap Rock Limited, Bruce Mines).

Root River Sandstone Quarry

E. Koseba operates a small quarry in the City of Sault Ste. Marie. In 1994 the quarry produced between 50 and 60 tons of Jacobsville Sandstone to supply local demand for fireplace construction and landscaping.(E. Koseba, personal communication 1994)

ADVANCED EXPLORATION AND DEVELOPMENT

River Gold Mines Ltd. (30), 100% owned, Eagle River deposit is located in the Point Isacor area, 50 km west of Wawa. The deposit is currently undergoing an encouraging re-evaluation of gold reserves based on a minimum mining width of 1.4 m. In December this year River Gold Mines Ltd. announced planned production of 467,000 grams (15,000 oz.) Au for 1995 and ongoing annual production of 1.24 million grams (40,000 oz.) Au based on a 300 tonne per day output. The production reserves follow a 8,500 m, 113 hole, definition drill program on the No. 8 and No. 6 zones to define stopes above a drift located at 120 m depth. A highlight of the definition drilling is the easternmost hole drilled on the No. 6 zone with a true width intersection of 69.86 grams Au per tonne or 16.20 grams Au per tonne (cut to 34.28 grams Au per tonne) over 5.80 m (River Gold Mines Ltd., Press Release, 1994). Dewatering of the decline and 3 levels began in December 1994. The geology of this property is discussed under the Property Examinations section of this report.

EXPLORATION ACTIVITY

A total of 37 companies and individuals carried out exploration programs in the Sault Ste. Marie Resident Geologist's District in 1994. From assessment dollars filed and information provided to the authors by companies and individuals a total of \$1.75 million of surface exploration was spent in the District. This figure does not include mining or other mineral production expenditures. A summary of exploration programs include; 5 diamond drill programs for gold, 5 diamond exploration projects, 4 programs directed at copper, 1 detailed surface exploration program for zinc/copper mineralization and 1 project evaluating Nipising diabase aggregate as a source of road metal. The remaining 21 projects were surface exploration projects for gold.

Exploration data for the Sault Ste. Marie Resident Geologist's District has been tabulated in Table 2. Descriptions of work that follows is based on significant exploration expenditures and/or significant results of exploration conveyed to the author. The following property descriptions have been keyed to Table 2. for location reference on Figures 1. and 2. The reader is also referred to Table 5. for a list of properties available for option, joint venture or sale in the District.

Falconbridge Limited (14) continued with a second year exploration program on their copper, zinc property located in Joubin, Gaiashk, Proctor, Deagle and Gerow townships. Geological mapping at detailed (1:2000) and reconnaissance (1:20,000) scales were conducted in combination with litho geochem and whole rock analysis. A new zone has been stripped, trenched and sampled near the south end of Whiskey Lake in Gaiashk township. This area was remapped by the Ontario Geological Survey in 1990-92 as part of the Elliot Lake Geological Reassessment Program.

McBeau Minerals Limited (22) conducted geological mapping, sampling and compilation work on their copper properties located in Gould, Casson, Otter and Dagle townships, approximately 35 km north of Thessalon. (R.J. McLean, McBeau Minerals Limited, personal communication, 1994). Approximately 100 claim units have been staked to cover chalcocopyrite, chalcocite and bornite vein and breccia hosted mineralization. The claims include the past producing Gould Copper Mine and Cheney Mine as well as the McKee and Barcis copper prospects. At the Gould Copper Mine, McBeau has a 350 ton per day mill and an approved tailings pond.

Noranda Exploration Company Inc./Hemlo Gold Mines Inc. and partner Akiko Gold Resources Ltd. (25) completed a 2416 m, 15 hole diamond drill program for gold on the Sugar Zone. The property is located 30 km northeast of White

River in Odlum and Hambleton townships. Results from the the drill program were considered disappointing and the property was returned to the owner John Ternowesky (35). Highlights from this drill program and a description of the geology of the property are discussed in the Property Examinations section of this report.

Arthur Roy (32) had geological mapping, sampling and stripping carried out on his 107 claim unit copper property located in Varley and Nicholas township. This property is discussed in greater detail in the Property Examinations section of this report. Art has staked an additional 170 claim units in Sagard Township surrounding the past producing Bi-Ore copper mine. These claims straddle the contact between the upper Lorrain and lower Gordon Lake formations and environment considered favourable for sedimentary copper deposition. The area has been remapped by S. L. Jackson (1994) of the Ontario Geological Survey during 1994 at a scale of 1:50 000 with a view to provide a better understanding of the regional setting of selected mineral deposits in the area.

Tri-Origin Exploration Ltd. (35) conducted; a 2500 m, 11 hole, diamond drill program, an IP survey and a down hole EM survey on their gold property. The property is located in Runnalls Township, 90 km north of Sault Ste. Marie. In the southwest portion of the property, 2 gold-bearing massive pyrite horizons are separated by 500 m along strike for a total length of 4 km. The 4 km mineralized horizon is associated with a contact between felsic metavolcanics and meta sedimentary rocks. Highlights of drilling on this zone include a massive sulphide zone intersected in 3 holes near surface that assayed up to 7.2 grams Au per tonne (Northern Miner, Dec. 12, 1994 p. 3). At a depth of 150 m a 7 m intersection assayed 1.1 grams Au per tonne. Downhole probe, electromagnetic surveys suggest the presence of other conductors adjacent to the surveyed drill holes (Northern Miner, Dec. 12, 1994 p. 3). In the northeast portion of the property a gold-bearing alteration zone associated with an IP anomaly was tested by 4 holes that intersected sulphide mineralization with low gold values (Northern Miner, Sept. 5, 1994 p. 10). Drill core from Runnalls Township property has been stored at the Ministry of Northern Development and Mines Drill Core Facility in Sault Ste. Marie.

Granges Inc. & MacMillan Gold Corp. (18) had an airborne Dighem V electromagnetic, radiometric and magnetometer survey flown over 1414 line km over their Mishi Lake gold property located 30 km west of Wawa. Since 1988, 396 diamond drill holes have tested a number of Au showings, VLF and soil geochemistry anomalies, as well as the Mishi gold deposit. For the most part the work has focused on the west portion of the property.

Table 1 Summary of Claims Recorded and Assessment Work Credit

YEAR	Claim Units Recorded	Claim Units Cancelled	Claims Active	Diamond Drilling \$	Physical \$	Geotechnical & other \$	TOTAL \$
1993	2,444	2,231	10,510	\$ 86,729	\$ 88,290	\$401,139.	\$ 576,158.
1994	2,274	2,550	10,328	\$263,758	\$ 77,350	\$798,454.	\$1139562.

RESIDENT GEOLOGIST'S STAFF AND ACTIVITIES

The classified staff at the Sault Ste. Marie Resident Geologists Office is Gerald Bennett, Resident Geologist and Brenda Fremlin, Administrative Assistant.

E.J. (Ted) Leahy acted as Staff Geologist until his retirement in February, 1994. Ted first joined the Ontario Department of Mines in 1963 and served for 28 years as a Field Geologist, Geological Assistant and Staff Geologist in the Sault Ste. Marie and Timmins offices.

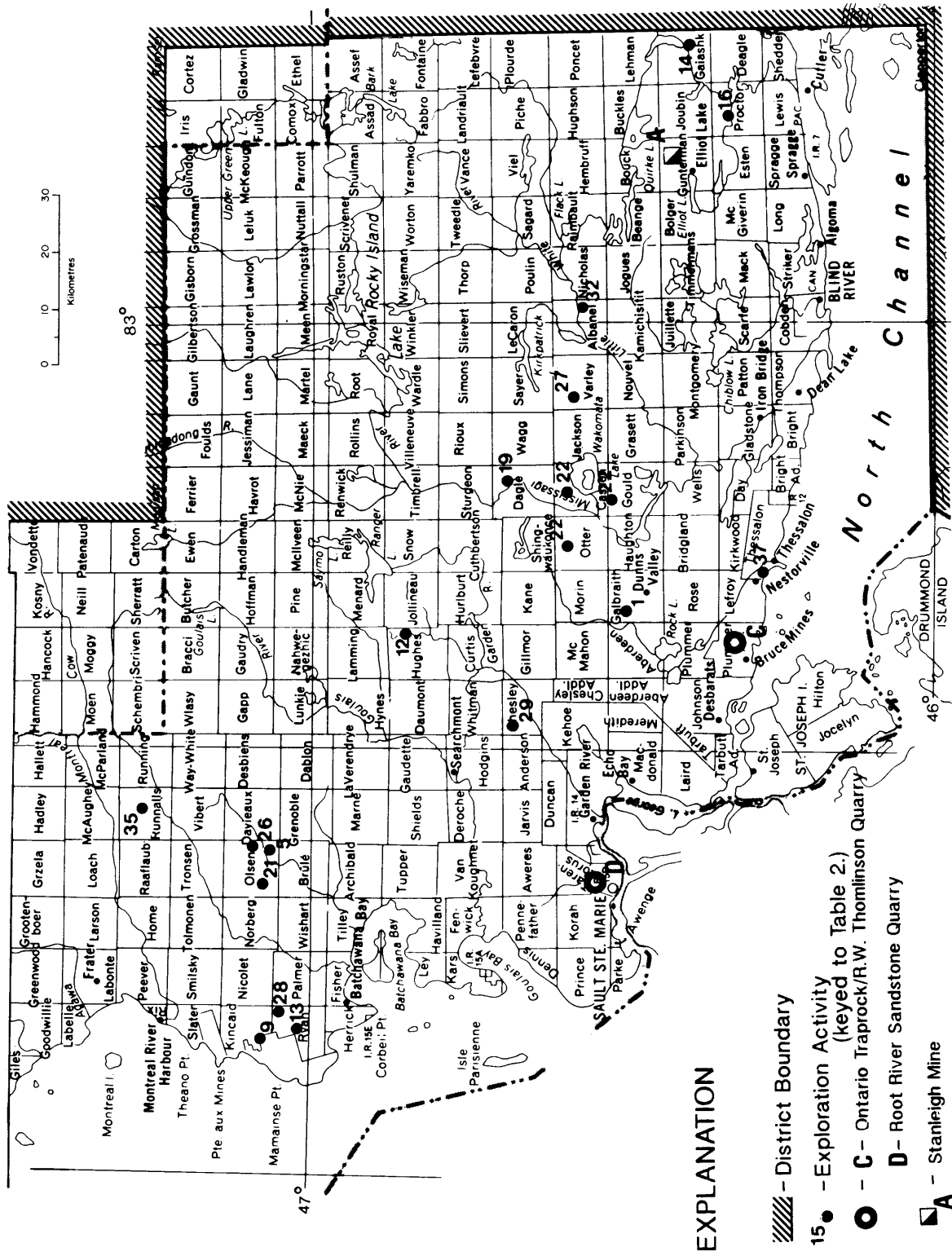


Figure 1. Sault Ste. Marie Resident Geologist's District South half: exploration, development and mining activity, 1994

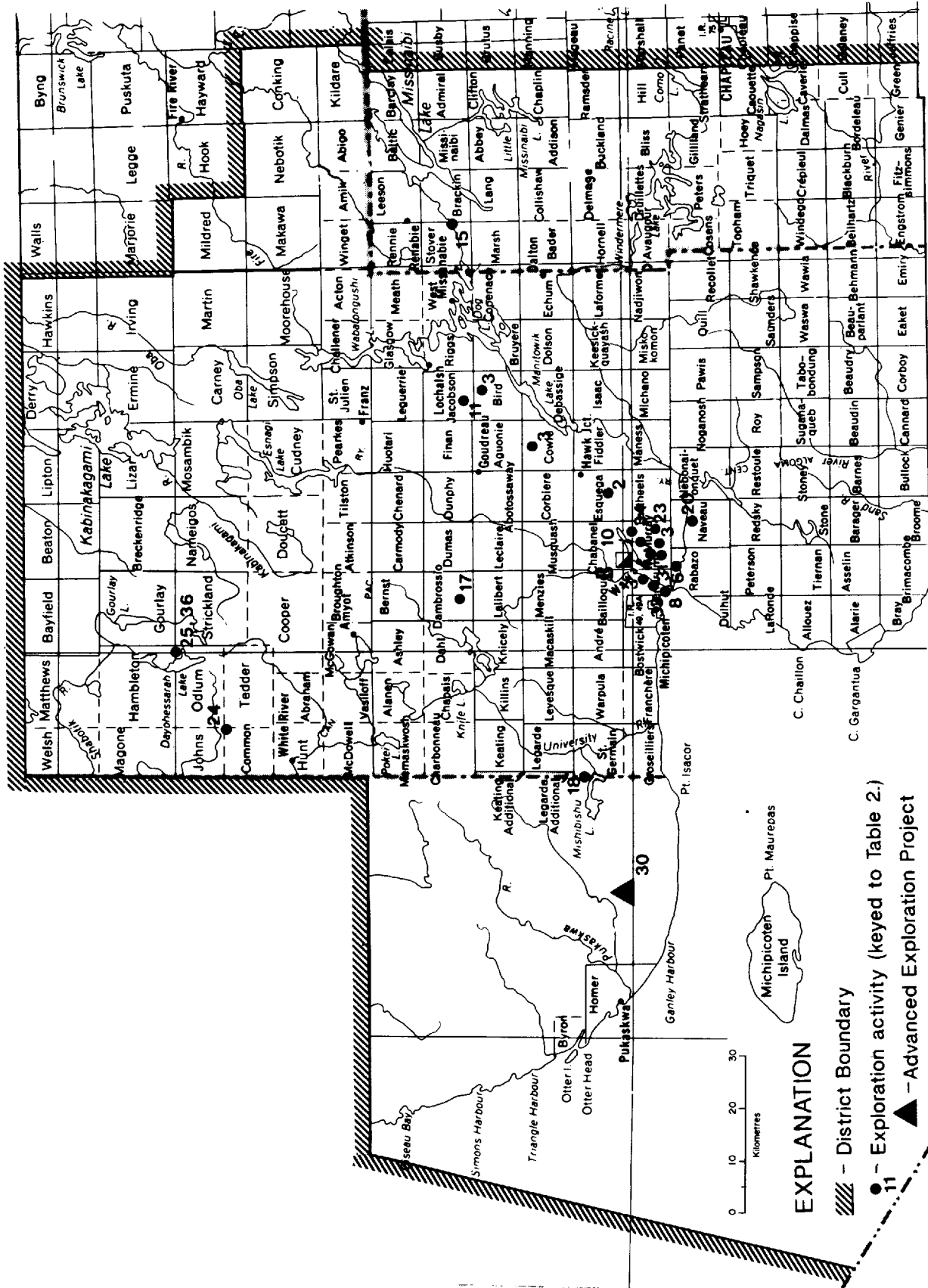


Figure 2. Sault Ste. Marie Resident Geologist's District North half: exploration, development and mining activity, 1994

TABLE 2 - Companies active in the Sault Ste. Marie Resident Geologist's District in 1994

Abbreviations:						
A-GP	- Airborne Geophysical Survey	DS	- Dimension Stone Sampling	Prosp	Prospecting/General Exploration	
Adv Ex	- Advanced Exploration	GC	- Geochemical Survey	SA	- Sampling	
Aggr	- Aggregate Development	GL	- Geological Survey	STr	- Stripping and Trenching	
BM	- Base Metals	GP	- Geophysical Survey			
DD	- Diamond Drilling	OD	- Overburden Drilling			
No. On Figure	Commodity	Individual or Company	Area/Township	Activity	Assessment Dollars	Number of Active Claim Units
1	Au	Albertower Mines of Canada	Galbraith Tp.	GL, GP	1 140	1
2	Au	Babcock, George	Esquega Tp. Finan Tp.	SA, GC, GP Adv Ex	10 000	
3	Diamonds	Barry, Joan & Sears, Seymour	Lendrum, West, Bird Esquega, Echum Tps.	SA, GC, GP	20 000	100
4	Au	Barry, Joan/Sears, Seymour	McMurray	DD, GL	10 240	8
5	Au	Bridge, Ron	Olsen Tp.	STr, SA, GP	10 993	8
6	Au	Bridget Lake Resources	Rabazo Tp.	DD	34	
7	Au	Central Crude/ Oil City Lubricants Ltd.	Pilot Harbour	GL	9 114	50
8.	Diamonds	Clement, Claude	Lendrum Tp.	Prosp, SA, GP	10 000	47
9.	Cu	Cominco Ltd.	Ryan Tp.	GP	49 785	85
11.	Diamonds	Consolidated Cline Dev Corp	McMurray Tp.	OD, GC, SA	8 000	48
11	Au	Cymbal Resource Corp	Jacobson Tp.	STr, SA, GP	7 034	6
12	Au	Desjardins, Yves	Hughes Tp. Olsen Tp.	GP GP, STr, SA	10 000	2 25
13	Cu, Au	Doran, Frank	Ryan Tp.	Prosp		3
14	BM, Au	Falconbridge Limited	Proctor, Joubin Gaiashk, Deagle Gerow Townships	GL, STr, SA	125 585	458
15	Au	Fraser, Malcolm	Stover Tp. Brackin Tp.	STR, SA, GL	8 674	5
16	Quartz	Gilbert, Bernie	Proctor Tp.	Prosp		4
17	Au	Godin, Denis	Dambrossio Tp.	STr, SA		1
18	Au	Granges Inc. & MacMillan Gold Corp.	Abbie Lk, David Lk Mishibishu Lk. & St Germain Tp.	A-GP, GP	93 381	497
19	Au, Diamonds	Kerr, William	Dagle Tp.	Prosp, SA, GP	10 000	1
20	Au	Konig, Gerhard	Naveau Tp.	Prosp		9
21	Au	Loydex Resources Inc.	Olsen Tp.	STr	10 657	5
22	Cu	McBeau Minerals Ltd.	Gould, Casson, Otter Dagle Townships	Prosp	150 000	100
23	Au	Monk Gold & Resources Ltd.	Rabazo Tp.	GP	5 564	25
24	Au	Nabigon, Peter	N White River Area	Prosp		
25	Au	Noranda Exploration Co. Ltd. Hemlo Gold Mines Inc. & Akiko Gold Resources Ltd	Odlum, Hambleton Townships	DD, GP	246 329	17
26	Au	Patrie, Bryan Patrie, Dan	Olsen Tp.	GP	14 880	16
27	Cu	Pellerin, Ulrich	Varley Tp.	Prosp, STr, SA		21
28	Au	Richards, William Haugeneder, John	Ryan Tp.	STr, SA	10 000	44
29	Cu, Au	Richards, William Haugeneder, John	Chesley Tp.	GP		10
30	Au	Desjardins, Yves River Gold Mines	Point Isacor Groseilliers Tp.	Adv Ex, DD DD	500 000 29 010	442 220

No. On Figure	Commodity	Individual or Company	Area/Township	Activity	Assessment Dollars	Number of Active Claim Units
31	Au	Romios Estates Ltd.	Rabazo Tp.	Prosp.		
32	Cu, Ag	Roy, Arthur	Albanel, Nicholas Townships	GL, STr, SA	47 118	107
33	Diamonds	Surmacz, Sandor Hauseaux, Marcelle	Lendrum Tp.	Prosp, SA	20 000	
34	Au	Trans Gold Explorations & Investments Inc.	McMurray Tp.	GL	1 008	20
35	Au	Tri Origin Exploration Ltd.	Runnalls Tp.	DD, SA, GP	199 020	120
36	Au	Ternowsky, John	Hambleton, Odlum Townships	GP	63 27	70
37	Aggr	Warren Paving and Materials Group Ltd.	Leroy Tp.	Aggr	80 325	2

Jacobson	Cline Lake Dev. Noranda Ex.	Trenching, DD, RPT.	1986	WP Jacobson 56
Jacobson	Esso Res.	DD	1986	WP Jacobson 57
Jacobson	Prophet Res./ Cline Dev.	DD	1987	WP Jacobson 58
Jacobson	Spirit Lake Ex. L	GEOL., Ore Invent, DD,RPT.	1992	WP Jacobson 59
Jarvis	Algoma C.R. Jarvis D.S.	RPT. & Map	1969	SSMP Jarvis 18
Jarvis	Carroll, Tom	Trenching, Assays	1990	SSMP Jarvis 02
Kehoe	Lock City Copper	Prop. RPT., Assays	1955	SSMP Kehoe 3
Knically	R.D. Burns	RPT.	1952	WP Knically 01
Lalibert	R.D. Burns	RPT.	1952	WP Lalibert 01
Leclair	Algoma Steel	GEOL.	1993	Leclair 15B1
Lewis	Consolidated Tungston	Prop. RPT.	1955	SSMP Lewis 01
Lewis	Komarechka, Don	RPT.	1992	SSMP Lewis 02
Lizar	Hemlo Gold	Mag., IP.	1993	WT Lizar 19
Maeck	Boissoneau, W.	Notes	1955	SSMP Maeck 13B1
Maeck	Joubin, F.	Correspondence	1964	Maeck 13A1
McDonell Location	Cominco Ltd.	GRNDEM & Mag	1994	SSMP McDonell Location 03
McMurray	Citadel Gold Mines	Trenching, Assays	1987	WP McMurray 05
McMurray	Darwin Gold Mines	DD	1988	McMurray 42
Meath	Barry, J.	Pros., Mapping	1992	Meath 06
Mishibishu Lake	Granges Ex./ MacMillan Energy	DD	1987	Mishibishu Lk. 40
Montreal Mng. Loc.	Coppercorp. Ltd.	RPT., Assays, DD	1964-65	SSMP Montreal Mng. Loc. 02
Naveau	Cameron, D.	GRNDEM & Mag, GEOCHEM.	1992	WP Naveau 10
Naveau	Knowlton, Leroy	GRNDEM. & Mag.	1992	WP Naveau 11
Neil	Tremblay, M.A.	GEOCHEM.	1990	SSMP Neil 11
Nouvel	Ridgefield Uranium	Prop. RPT.	1956	SSMP Nouvel 16
Odlum	Hemlo Gold Noranda	DD	1994	WP Odlum 05
Odlum	Gold Giant/ Orequest	GEOCHEM.	1993	WP Odlum 04
Olsen	Murphy/Goodmurphy	Linecutting, VLF- EM, Mag, Scint. Surveys	1993	SSMP Olsen 21
Olsen	Murphy/Goodmurphy	Assays	1993	SSMP Olsen 22
Olsen	Bridge, Ron	VLF-EM, Mag	1994	SSMP Olsen 23

Palmer	Ont. Inc. 600278	DD	1990	Palmer 33
Pt. Isacor	Eagle River,/Noront Res.	Rec. work, VLF, EM	1993	WP Pt. Isacor 13
Pukaskwa R.	Carnovale, G.	DD	1990	WP Pukaskwa R. 12
Raaflaub	Echo Bay Mines	GEOLOG., GEOCHEM.	1990	SSMP Raaflaub 01
Rabazo	Bridget Lk. Res.	GEOCHEM., Assays, DD	1992	WP Rabazo 28
Rabazo	Funk, Herb/ Orequest	DD	1987	WP Rabazo 29
Rabazo	Monk Gold & Res/ Sears, S.	GRNDEM & Mag	1994	WP Rabazo 30
Rennie	Noranda Ex.	GEOCHEM. Survey	1993	WP Rennie 08
Riggs	Cominco Ltd.	DD	1988	WP Riggs 37
Runnalls	Tri Origin Ex.	GEOCHEM.	1990&93	SSMP Runnalls 06
Runnalls	Tri Origin Ex.	Borehole Survey	1993	SSMP Runnalls 08
Strickland	Akiko Gold Res.	RPT.	1993	WP Strickland 01
Timmermans	Dominion Ur. C.	RPT.	1955	SSMP Timmermans 10A1
Varley	Lucuik/Babcock	Stripping, Sampling, Assays	1992	SSMP Varley 02
West	Loydex Res.	Pros. RPT., Assays	1992	WP West 08
West	Loydex Res.	Sampling	1993	WP West 09
Wishart	Inco Gold/ Loydex Res.	DD	1990	SSMP Wishart 05

Table 4. Property and other visits, Sault Ste Marie Resident Geologist's District. (Keyed to Figure 1. and 2.)

	Commodity	Property Name	Township/Area
1	Au	Properties on the Goudreau Shear	Wawa area
2	Au	Properties on the Jubilee Shear	Wawa area
3	Cu, Fe	Laframboise Property	Aberdeen Tp.
4	Cu, Ag	Jentina Property(ArtRoy)	Albanel Tp./Nicholas tp.
5	Cu, Ag	Tribag Mine	Nicolet Tp.
6	Au	Dayohessarah Lake, Sugar Zone	Odlum Tp./Hambleton Tp.
7	Cu	Copper Core Mine	Sand Bay /Location
8		Ron Sage Field Trip	Wawa area
9	Au	Richards/Haugeneder Property	Ryan Tp.
10	Au	Loydex Property (L. Nelson)	Olsen Tp.
11	Zn, Cu	Haynes Lake Exhalite Occurrence	Gapp Tp.

Table 5 List of properties available for joint venture sale or option.

Commodity	Name	Location
Au, BM	Bridge/Hammer property	Davieaux Tp.
Cu, Au, Ag, Au	Copper Creek property	Kincaid Tp.
Au	Dayohessarah Lake, Sugar Zone	Odlum, Hambleton, Strickland Tps.
Au, BM	Falconer claim	Proctor Tp.
Au, BM	Goodmurphy/Murphy property	Olsen Tp.
Cu, Ag	Jentina Mine property	Albanel & Nicholas TP
Cu	Pelky copper occurrence	Lewis Tp.
Au, Cu, Ag	Ranson property	Chesley Tp.
Au	Richards/Haugeneder gold property	Ryan Tp.
Au	Romios Estates gold prospect	Rabazo Tp.
Diamonds	Romios Estates diamond claims	McMurray, Rabazo, Lastheels Tps.
Au, BM	Ron Bridge property	Olsen Tp.
Diamonds	Sears/Barry diamond claims	Wawa area

M.R. (Mike) Hailstone joined the Sault Ste. Marie Resident Geologist's office as Staff Geologist in June, 1994. Mike had previously been Staff Geologist at the Kenora Resident Geologist's office.

The office of the Sault Ste. Marie Resident Geologist responded to 1625 telephone requests and 636 visitors during 1994 calendar year.

Amber Torrence of White Pines High school filled a Co-Op position from March 1 to June 15, 1994. Kirk Loubert held an Experience 94 position during the months of July and August. Student Assistant Ralph McNally began a five month contract on October 31, 1994.

During 1994, the Resident Geologist spent 28 percent on administrative duties, 15.2 percent on property and mine visits, 14.6 percent on land use planning, 21 percent on client services and 6 percent on public education. The remaining time was spent on committee work, training etc.

The Resident Geologist attended the final URAG (Uranium Reserves Assessment Group) meeting at Elliot Lake in May, 1994. Input was provided to focus group sessions held in Sudbury in the Spring of 1994. In May, 1994, he made a presentation at the technical sessions of the annual meeting of the Institute on Lake Superior Geology at Houghton, Michigan.

The Resident Geologist led geological field trips in the Thessalon and Elliot Lake areas for groups from Pennsylvania State University and Michigan Technological University. Presentations on various subjects were made at two local schools, one service club, local prospectors association, and at the Wawa Winter Carnival.

The reader is referred to Table 4. for a complete list of property visits made by office staff.

The Staff Geologist worked on three land use issues during the summer -The Sault Ste Marie Official Plan, The Espanola Timber Management Plan and the Dayohessarah road issue.

The Staff Geologist organized and presented a 6 night (18 hour) prospecting course in Elliot Lake along with 2 days of field trips in the immediate Elliot Lake area. The average attendance for the course was 26 people per evening. Forty two prospecting course certificates were mailed out.

In December a poster display was presented at the Ontario Mines and Minerals Symposium in Toronto. Submissions for the Properties available for Options or Sale in the SSM Resident Geologist's District were prepared and 74 copies handed out at this symposium.

PROPERTY DESCRIPTIONS

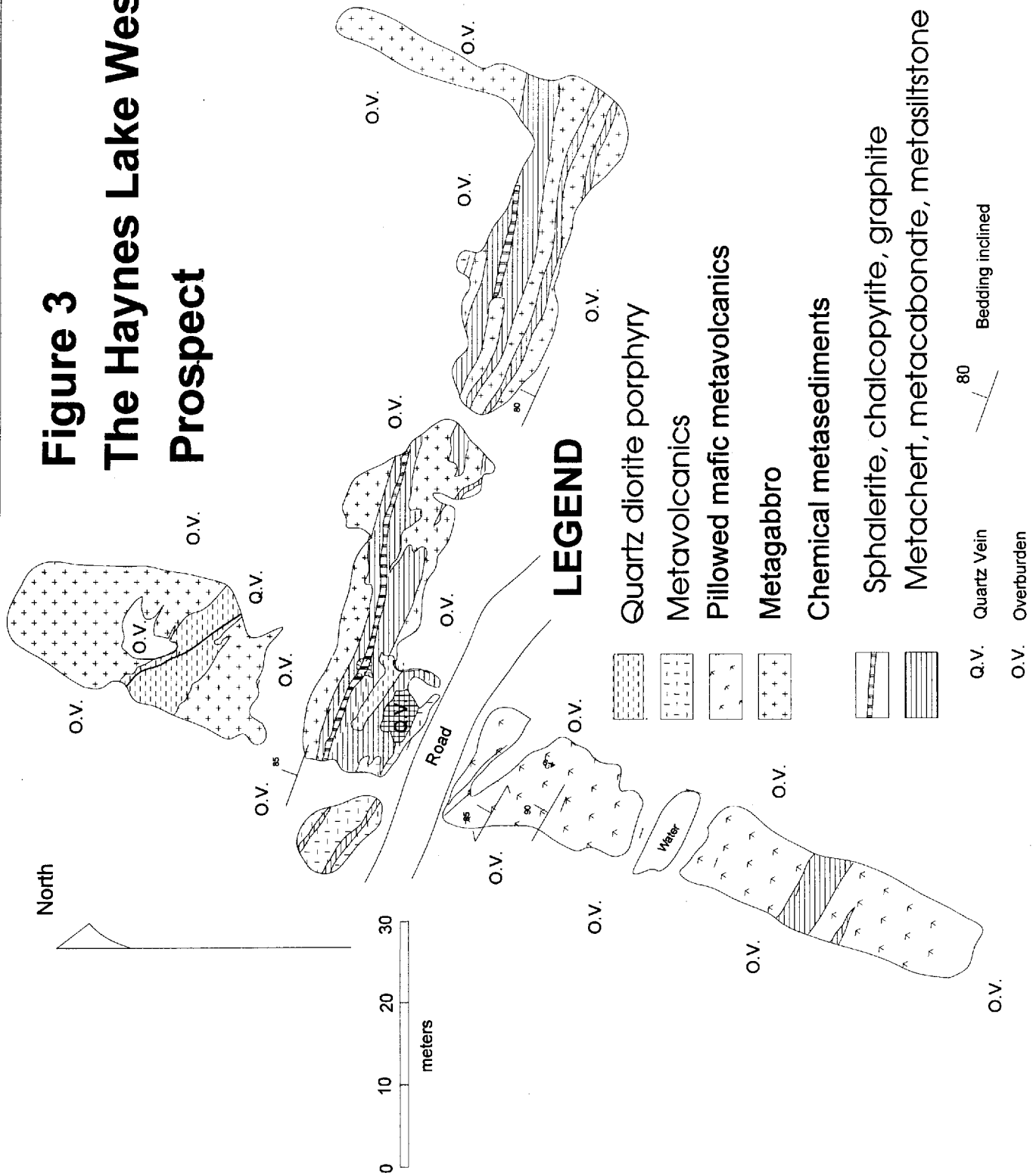
Haynes Lake Exhalite Occurrence (Haynes Lake West Prospect)

The Haynes Lake West occurrence (Grunsky, 1980) was staked by Wolverine Resources in 1987 and optioned by Noranda Explorations Limited in 1988. Noranda carried out geochemical, geophysical and geological surveys in 1989 and 1990. A 1242 meter drilling program in 7 holes was completed in 1990. The option was not renewed.

The Sault Ste. Marie Resident Geologist undertook a two day examination of the deposit in August of 1994. Two of the areas which Noranda Explorations Limited had stripped and washed in 1989 were mapped by the writer at a scale of 1:200 using a 50 meter metal chain for control.

The Haynes Lake west occurrence is easily accessible by the Witman Dam Road, a forest access road from the village

Figure 3 The Haynes Lake West Prospect



of Searchmont about 35 km northeast of Sault Ste. Marie. The occurrence is in Gapp Township about 500 meters west of the main body of Haynes Lake. The center of the main stripped area is located at UTM zone 17, 279515E and 5221786N. A subsidiary timber access road passes over the showing.

The oldest rocks recognized at the Haynes Lake West prospect are a well bedded sequence of pale gray metachert with intercalated metacarbonate and black graphitic sulfide bearing mudstone. The overall preserved thickness of this unit is about 10 meters. The graphitic sulfide bearing bed is about a meter thick near north east (lower) contact of the chemical metasedimentary sequence. The chemical metasediments are overlain by a relatively massive unit of pillowed mafic metavolcanics. The pillow shapes show an unambiguous facing direction to the southwest. The strike of the bedded units in the assemblage is about 115 at 80 degrees north.

Mafic sills which are probably intrusive equivalents of the overlying pillowed volcanics make up much of the stripped area and disrupt the stratigraphic relationships of the deposit (Figure 3.). The intermediate to felsic porphyritic dikes and sills may in turn be intrusive equivalents to felsic volcanic rocks which are locally prominent just west of the stripped area (Grunsky, 1980).

Fourteen grab samples from the main showing in August 1994 were submitted to the Ontario Geoservices Center Geoscience Laboratories for analysis. Two grab samples from the sulfide zone returned greater than 1 percent zinc with elevated values of copper. Gold, silver and lead values were trace to ND.

The association of stratabound graphitic mudstone with base metal sulfides and chemical sediments such as layered iron carbonate-metachert strongly suggests this deposit represents a sea floor exhalite system similar to those observed at modern mid-oceanic ridges. The presence of graphite further suggests that this ancient thermal system may have provided the thermal and chemical energy necessary to support abundant but presumably simple life forms just as today's equivalents attract and support more complex and advanced species.

It is likely that the Haynes Lake prospect represent only a distal part of the submarine volcanogenic vent system. Its presence indicates that such systems did exist in what is now the Batchawana greenstone belt and that continued exploration for base metals in this belt is warranted. The general lack of alteration is probably due to the intrusion of (slightly) younger sills which apparently have wedged out older, and possibly altered, seafloor metabasalts.

Dayohessarah Lake Gold Prospect - The Sugar Zone

The Dayohessarah Lake gold property consists of a group of 697 unpatented claims centered around Dayohessarah Lake about 35 km northeast of the town of White River on Highway 17. The property is located within the townships of Hambleton, Strickland, Odium, Cooper and Tedder. UTM coordinates for the central part of the main mineralized zone are UTM zone 16, 5407040N, 646230E

The Dayohessarah Lake area was mapped by the Ontario Department of Mines in the 1960's (Fenwick, 1964) and recently by G.M. Stott of the Ontario Geological Survey at a scale of 1:20,000 (Stott et al, 1994).

During the "Hemlo rush" (1983-1986) most of the Dayohessarah Lake belt was staked by Pezamerica Resources Corporation which undertook an extensive airborne electromagnetic and magnetometer surveys which detected a total of 31 geophysical anomalies. A soil sample by Mascot Gold Mines Limited from near the east shore of Dayohessarah Lake returned 690 ppb Au. In spite of the recommendation for additional work Pezamerica allowed the claims to lapse.

Forestry operations on the east side of Dayohessarah Lake led to the discovery of a zone of alteration and sulfide mineralization with anomalous gold values led prospectors into the area. In 1987 prospectors L. Halverson, E. Beaven

and P. Nabigon, encouraged by staff of the Schreiber-Hemlo Resident Geologist's office, continued prospecting in the Dayohessarah Lake belt. The identification of visible gold in quartz veins east of Dayohessarah Lake led to the eventual staking of most of the belt and option by J. Ternowesky. (Irwin, 1993, Stott et al (1994))

Noranda Exploration Limited began geological mapping and geophysical surveys at the east side of Dayohessarah Lake in 1990. Legal problems led to the cessation of exploration work until August 1993. Diamond drill programs undertaken by Noranda Explorations Limited in 1993 intersected up to 0.5 oz Au/ton (17.15 gm/tonne) over 12.5 feet (3.8 m) and identified a broad zone of felsic intrusions and quartz veining referred to as the "Sugar Zone". (Calhoun, 1993). However the overall results did not meet Noranda's requirements and Noranda's option was discontinued in the spring of 1994.

The Sault Ste. Marie Resident Geologist visited the property in August of 1994 along with the staff of the Schreiber-Hemlo Resident Geologist's office, Greg Stott of the Ontario Geological Survey and most of the principal holders of the property including J. E. Ternowesky, P. J. Nabigon, L. J. Halverson. Access to the sugar zone is by helicopter.

The main area of interest is the "Sugar Zone" a 30 to 40 meter wide zone of sheared mafic rocks intruded by numerous porphyries concordant to the regional foliation. Quartz veins associated with these porphyries locally carry multi ounce gold values. (Calhoun, 1993)

It is the frequency of pale gray, fine grained felsic sills which characterize the Sugar Zone (Stott, 1994). These sills generally range in width from less than a meter to three meters (Calhoun, 1993) and display almost equidimensional to obviously porphyritic textures. They may be loosely termed feldspar and quartz feldspar porphyries. The spatial association between quartz veins and many of the porphyry sills observed during the August visit is striking. Gray to white glassy quartz looking veins, with rusty patches of disseminated sulfides are commonly found along one or both contacts between the porphyry and mafic volcanics. Minor amounts of galena, sphalerite, chalcopyrite, pyrite and pyrrhotite are common in the quartz veins of the Sugar Zone. Visible gold was observed in one of the veins during the writers brief August visit. Of the 15 grab samples collected during the visit and forwarded to the Ontario Geoservices Center Geoscience Laboratories for assay, the two best assays were 1.03 and 2.15 ounces Au per ton ((35.3 and 73.7 g per tonne). Four of the samples returned between 0.49 and 0.91 ounces Au per ton and three samples returned between 0.01 and 0.09 ounces Au per ton (0.34 and 3.08 g per tonne). Four samples contain trace Au and gold was not detected in two of the samples. (Results from 12 samples were kindly provided by Mark Smyrk of the Schreiber-Hemlo Resident Geologist's office). There was an apparent correlation between gold content and base metal content of the samples.

The main host rocks observed during the August visit are moderately foliated mafic metavolcanics which locally display well preserved (although deformed) pillow structures. The general attitude of the foliation is about 150 degrees with a dip of about 60 -80 degrees to the southwest. Stott(1994) successfully determined facing directions from pillow structures which indicate tops to the southwest.

Calhoun(1993) reports individual veins up to about one meter wide. Stott(1994) states that veins locally occur as parallel sets up to several meters wide. Stott(1994) notes that the veins are notably flattened and boudinaged in both vertical and horizontal directions and suggests that the deformation may have influenced the distribution of gold values.

There are minor late, unmineralized felsite or felsic porphyry dikes which cross cut the foliation and appear to be significantly younger than the mineralized porphyries of the Sugar Zone.

Although drilling results were not up to Noranda Exploration Limited requirements, drilling was relatively widely spaced, allowing the possibility of undetected, small, high grade deposits.

There are interesting exploration targets remaining to be tested on the Dayohessarah Lake property. Areas along strike with the Sugar Zone are poorly exposed and untested by drilling. The source of mineralized boulders west of the sugar , one of which assayed over 3580 ppb gold, has yet to be determined. (Calhoun, 1993, Stott, 1994). Spinifex textured

komatiitic flows around the north end of Dayohessarah Lake opens the possibility of nickel and PGM potential (Stott, 1994).

River Gold Mines (Formerly Central Crude Ltd.) - Eagle River Deposit

The property which includes the Eagle River gold deposits consists of 323 claims (including 48 leased) located about 50 km west of Wawa and 10 km south of Mishibishu Lake. (Canadian Mines Handbook, 1993-94). A gravel surfaced road leads to the property from Highway 17 near Kabenung Lake.

The Sault Ste. Marie Resident Geologist and Staff Geologist visited the property in September 1994. Mr. George Manard, Vice President of River Gold Mines Limited and Mr. Aleksa Kusic, Mine Geologist, kindly provided an overview of the geology of the main gold bearing zones .

The general geology of the area is described in Bennett and Thurston(1977) and Reid et al(1994).

The original 101 claims, which include the most important gold occurrences on the property, were staked by prospectors in 1982 and vended to Central Crude Limited in 1983. In 1983 Central Crude Ltd. carried out airborne electromagnetic and magnetic surveys with some ground follow-up and reconnaissance geological mapping at 1:6000 scale. Several of the 125 rock samples collected during the mapping returned anomalous gold values.(Hodgson, 1983)(Northern Miner Nov. 3, 1983)

In 1986 Noranda Explorations optioned the Eagle River Property and earned the right to a 60 percent interest in Central Crude Ltd. by the expenditure of 1 million dollars on the property. Noranda assigned the claims to its subsidiary Hemlo Gold Mines Limited. Following extensive stripping, sampling and prospecting, Noranda began a major drilling program in 1987. (Northern Miner Nov. 26, 1987, CMH ,1988-89). Between 1987 and 1990 Noranda Explorations Limited drilled 76,000 meters of surface diamond drilling in 266 holes. Most of this drilling was on the No. 8, No. 6 and No 8 zones. (Unpublished summary provided by River Gold Mines Limited.). In 1990 a 1759 foot decline to the No 8 zone was completed by Noranda Explorations. A 66,000 ton bulk sample was processed at Noranda's Golden Giant Mine at Hemlo. (Northern Miner, May 7, 1990)

In 1991 the reserves of the Eagle River deposit were reported as 2.24 million tons proven and probable averaging 0.25 Oz Au/ton fully diluted. Nevertheless a feasibility study undertaken for Noranda Explorations Limited recommended that, although the operation would be profitable at 1991 prices, production be deferred until the cost/price structure improved to allow greater profitability. (Northern Miner, Feb. 25, 1991).

The property lay more or less dormant from late 1991 until March 1, 1994 when Western Quebec Mines Inc. purchased Hemlo Gold Mines Ltd. interest in the property.(Annual Report for 1993, Central Crude Ltd.). A press release of River Gold Mines Limited dated December 5, 1994 stated that River Gold Mines, a new company, had acquired a 100 percent interest in the Eagle River Gold Property in return for the issuance of 11,500,000 common shares of River Gold Mines to Western Quebec Mines Inc. River Gold Mines Ltd. has no significant debt. The same press release stated that the sale of special warrants totalling \$8,790,000 is being used to finance a mining development program as outlined in the engineering report of Roscoe Postle and Associates.

River Gold Mines began a definition drilling program of over 100 holes in the summer of 1994. Additional exploration drilling to test other known gold occurrences on the property began in October, 1994.. (Press release of River Gold Mines dated Oct. 7, 1994).

River Gold Mines Ltd. plans to have its Eagle River property in production by August, 1995. The projected output for 1995 is 467,000 grams(15,000 oz). With a production rate of 300 tonnes per day an annual production is expected to be 1.24 million grams (40,000 oz). As of Dec. 1994 the reserves are stated to be 816, 689 tonnes grading 14.1 grams

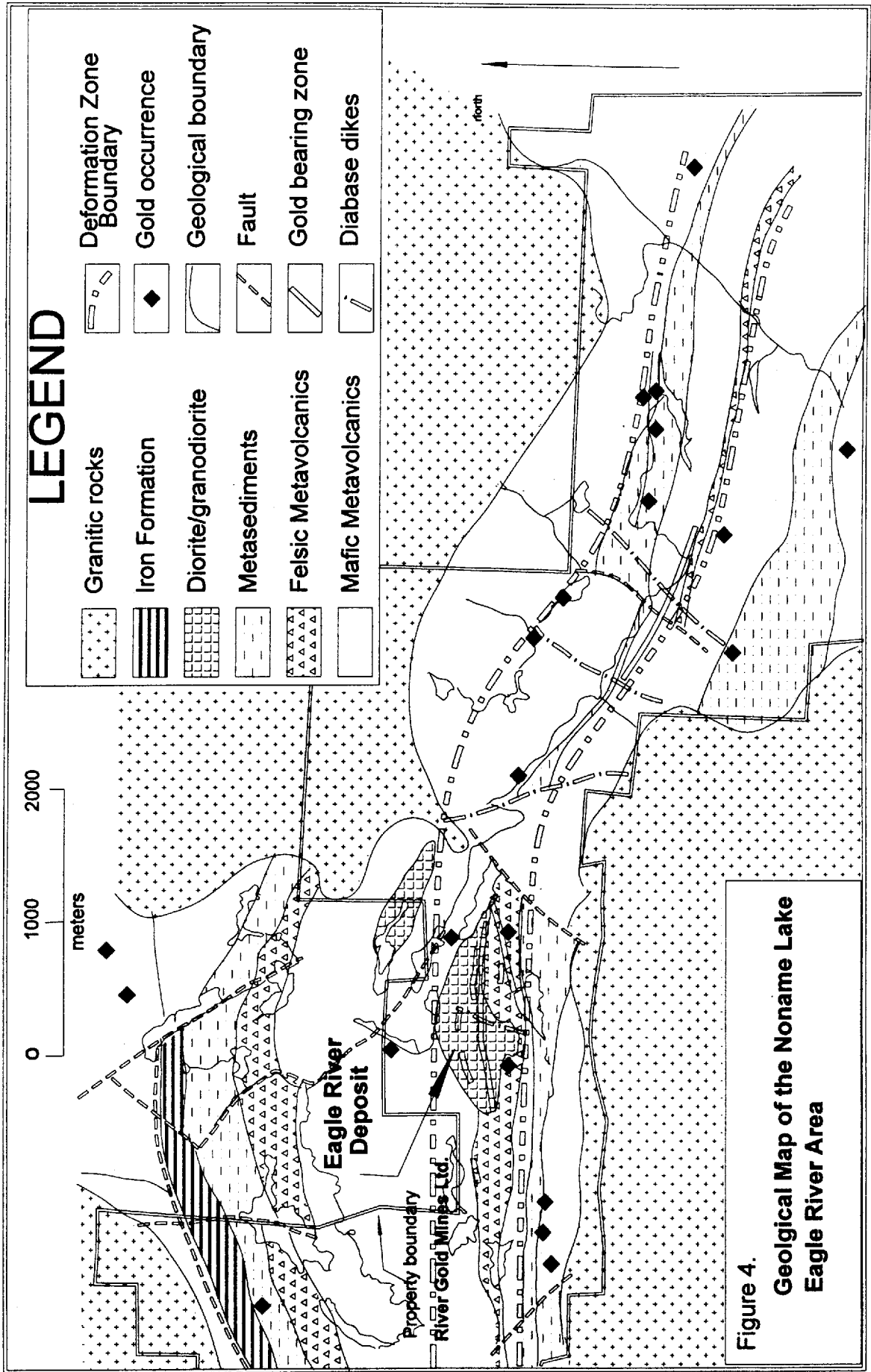


Figure 4.
 Geological Map of the Noname Lake
 Eagle River Area

Au per tonne with a 7 grams Au per tonne cutoff grade and a 1.5 m minimum mining width (Northern Miner, Dec 26, 1994, p.3).

In addition to the auriferous veins under development there are several additional gold occurrences on the property which warrant more thorough exploration.

The known gold occurrences of the Eagle River Property lie, for the most part, within a relatively narrow section of the Mishibishu Lake Greenstone Belt between the Bowman Lake Pluton and the Floating Heart Batholith (Reid et al 1994) (Figure 4.). The supracrustal rocks in this portion of the Mishibishu Lake greenstone belt include mafic to intermediate metavolcanic flows and intermediate pyroclastic rocks. The intermediate volcanic rocks include feldsparphyritic flows, lapilli tuffs and volcanic breccias. (Heather, 1986). North of Noname Lake the metavolcanic rocks are intruded by a thick sill like lens of metamorphosed diorite-granodiorite over 2000 meters long by 1000 meters thick (Figure 4.).

An east-west to northwest trending zone of anastomosing shear zones, quartz veins and variously altered rocks was identified as the Eagle River Deformation Zone by Reid et al (1994) More detailed mapping by Central Crude Limited and Noranda Explorations Limited resulted in a broadly defined deformation zone which was renamed the Noname Lake Deformation Zone(Figure 4.).

Subsequent drilling has shown that the shear zones of the Eagle River Deformation Zone are subvertical with individual mineralized quartz lenses displaying moderate to steep plunges to the east. (Unpublished exploration summary provided by River Gold Mines Limited).

During the September visit the writer examined parts of the No 7, No.8 and No. 6 zones. These three shear zone/quartz vein appear to be wholly within the gray medium grained, massive to intensely sheared diorite-granodiorite stock. The almost white to gray sugary quartz vein is commonly stretched or flattened into boudinage structures and tight folds with a steep easterly plunge. The laminated grey to white veins range from a few centimetres to at least three meters wide. Rusty staining revealed the presence of pyrite as well as galena, chalcopyrite and sphalerite.

A few diabase dikes and at least one fine-grained dike of intermediate composition locally cross the deformation zone. At a few localities the quartz veins are cut by a peculiar breccia which forms irregular bodies less than three meters wide. The breccia typically consists of angular, rotated blocks of diorite and gray laminated quartz set in a matrix of white quartz. There is commonly an associated reddish alteration(hematite?) and a finely crystalline pink mineral(feldspar or laumontite) filling drusy cavities. The breccia is clearly younger than the tectonic events which created the deformation zone and may be evidence of Keweenaw tectonic activity or gas streaming.

Richards/Haugeneder Gold Occurrence

The Richards/Haugeneder gold occurrence is located 64 km north of Sault Ste. Marie in the northeast corner of Ryan Township. It is accessible by a logging road leading 14.7 km north from the Trans Canada Highway. From there an 800 meter skidder trail leads into the property.

The area mapped by P.E. Giblin in 1969 shows iron formation hosted within Archean mafic volcanics of the Batchawana Greenstone Belt(Gibin, 1973). This iron formation has a westerly strike length of 4 km and a width of 400 m. It is composed of interbedded chert-magnetite that dips south at 60-70 degrees. Left-handed, northwest trending faults offset the iron formation

Stripped outcrops observed in the vicinity of the Jalore Mining Company iron ore bulk sample pit, 1.45 km east of the showing, show beds of magnetite are thickest (0.3 to 1 m) on the north side of the iron formation and become progressively thinner (1 - 3 cm) towards the south. The number of chert beds also increase from north to south with chert composing up to 60% of the rock towards the south.

In the same exposure patches of gossan are the result of weathered, northwest trending, fracture controlled, euhedral replacement of pyrite and marcasite. These patches vary in diameter from 0.3 m to 2 meters but make up less than 1% of the exposed outcrop. Minor folds within the chert magnetite bands show plunges to the west southwest. This sample contained fragments of hematized chert and sulfide patches containing up to 51 ppb gold. (Geoscience Laboratories, Ministry of Northern Development and Mines)

During the late summer of 1994 prospectors William Richards and John Haugeneder carried out stripping, trenching and sampling on the surface trace of two diamond drill holes drilled by Jalore Mining Company for iron ore, in 1954 (Anonymous). With the financial assistance of an OPAP grant, stripping was carried out to test for gold associated with quartz veins and sulfides described in logs from the two diamond drill holes. Stripping (area "B") along the surface trace of Jalore DDH # 3 exposed sulphide bearing outcrop containing pyrrhotite and pyrite interlayered with fragmented grey and red chert (jasper). Subsequent trenching and chip sampling of this section returned an assay of 25, 577 ppb Au over 3 feet between 114 and 117 feet from the collar of Jalore DDH #3. Additional sampling produced the following values: (footage given represents horizontal distance N in stripped area "B" from the collar of Jalore DDH #3) 111-114 feet assayed 223 ppb Au, 117-120 feet assayed 261 ppb Au, 120-123 assayed 374 ppb Au, an additional grab of quartz and sulphides at 300 feet assayed 294 ppb Au (William Richards, Prospector, personal communication, 1994).

Stripping (area "A") to test quartz veining and sulphides described in the drill log was also carried out along the surface trace of Jalore DDH #2, located 800 feet west of stripped area "B". A grab sample of quartz vein material, located 300 feet north of the collar for Jalore DDH # 2 contained up to 5% pyrite and assayed 1425 ppb Au. Sheared mafic rocks in this area showed shearing and biotitic alteration.

Much of the sampling work on this property was carried out in mid-September and at the time of writing further assay results are pending. Additional sampling and washing of outcrop and sampling for gold in other sulphide bearing zones associated with this iron formation is yet to be completed.

Jentina Mine Copper Property

The Jentina Mine property is located in Albanel and Nicholas townships 36 km northwest of Elliot Lake or 45 km north of Blind River. The property can be accessed by logging roads and skidder trails from Highway 546 at the White River Lodge and at the Albanel-Nicholas boundary.

The area has been mapped by K.M. Siemiatkowska (1978) and J.A. Robertson (1977) as being underlain by Proterozoic sedimentary rocks of the Huronian Supergroup intruded by a large sill of Nipissing diabase striking westerly across the claim group. This Nipissing diabase separates the No. 1 and No. 2 copper bearing structures. A total of three copper bearing zones have been defined on the claim group comprising 127 contiguous claim units and an additional contiguous 5 patented units covering the past producing Scarbo mine.

Mineralization on this property is associated with westerly trending structures paralleling the Flack Lake Fault on the north side of the Huronian supracrustal belt. These mineralized structures are cut and offset along northeast trending faults in a left and right lateral sense by as much as 107 m. The west end of the No.1 structure terminates against one of these northeast trending faults.

Chalcopyrite mineralization in the No.1 Copper-Precious Metal Structure is hosted by a west trending quartz-chlorite-carbonate, +/- albite, breccia zone that has been traced over 1.5 km. At both east and west ends of the No.1 structure a steeply south dipping chloritic shear envelopes the sulphide bearing quartz +/- albite breccia core. The 18 to 45 meter wide zone cuts limestones and siltstone of the Espanola Formation. On the west end of the zone grab samples from Trench #1 assayed 1.25% Cu and 0.25 oz gold per ton with channel samples returning values up to 0.63% Cu over 1.22 m (Willoughby, 1994).

At the east end of the No.1 Copper-Precious Metal Structure mineralization is associated with quartz veinlets and stringers in a chloritic shear with local iron carbonate. Mineralization is also exposed as massive chalcopyrite, pyrite bands up to 20 cm wide. From the east end of the structure, in Pit #1 on the Main Showing, a 2.4 m channel sample containing some massive sulphide returned values of 6.78% Cu, and 1.90 oz silver per ton(65.14 gms Ag per tonne). Some grab samples assayed up to 0.029 oz gold per ton (0.99 gms Au per tonne)(Willoughby, 1994)

The No. 2 Copper Structure remains open to the east but is on strike with the White River Lead prospect 915 m (3000 ft) to the west. The quartz carbonate veining hosted by sheared and chloritized Espanola Formation siltstone and Gowganda Formation conglomerate has been traced for 1.34 km. In the southeast trench on this zone a 1.22 m channel sample of chalcopyrite-rich quartz veining assayed 1.83% Cu. A grab of almost massive chalcopyrite from a pit 76 m west, of the Southeast trench, assayed 13.00% Cu (Willoughby,1994).

The White River Lead prospect is hosted within a 1.5 m wide, 150 m long quartz-carbonate vein trending west and cutting Nipissing diabase. A shoot within the vein was explored by a 24 m long by 2 meter wide adit that averaged 7.6% Pb, 1.0 % Cu and 2.3 ounces Ag per ton. Chalcopyrite, pyrite, pyrrhotite and galena are the main economic sulphide minerals. A grab sample reportedly ran 0.10 oz Au per ton, 3.46 oz Ag per ton, 1.56% Cu, 0.63% Pb, 0.26% Zn, 0.1% Co and 0.05 % Bi.(Siemiatkowska, K.M., 1978)

SUGGESTIONS TO PROSPECTORS AND EXPLORATIONISTS

Developments over the past year have provided increasing evidence for the presence of kimberlite pipes in the Michipicoten area.(Morris, 1993, 1994) It is acknowledged from the history of kimberlite exploration in glaciated areas of the globe that the search for diamondiferous kimberlite is a long and expensive process which is generally beyond the scope of individual prospectors.

However in at least some of those areas where kimberlite pipes are known to occur prospectors and geologists have recognized the presence of kimberlite cobbles and boulders in local gravel pits A systematic examination of gravel pits and natural gravel exposures in the Michipicoten area may lead to the eventual identification of kimberlite cobbles or boulders. Such a discovery would add to the already substantial body of evidence for the occurrence of kimberlite in the Michipicoten area.

Since the identification provides a special challenge for most prospectors and geologists, it is suggested that prospectors take "suspicious" samples to the nearest Resident Geologist's office for preliminary evaluation. The Resident Geologist may then screen the samples for further evaluation by a kimberlite specialist.

The Richards/Haugeneder gold occurrence is an example of gold associated with Archean banded iron formation within the north margin of the Batchawana Greenstone Belt. Additional iron formations have been documented on the north margins of this belt. Results from the exploration work presented here suggest that these occurrences of iron formation should also be explored for gold particularly where they appear to be cut by late faults.

The copper mineralization associated with the Flack Lake Fault on the Jentina property suggests that the area may have significant potential for copper mineralization. The Flack Lake Fault is a regional structure traced over 120 km on the south side of the Algoma Craton. In the vicinity of the Jentina property, the Flack Lake Fault is thought to be a reverse thrust on the north side of the Huronian supracrustal belt separating gently dipping rocks of the Cobalt Group to the north from gently folded rocks of the Elliot, Hough, Quirke and Cobalt groups to the south (Jackson,S.L.,1994). Diamond drill logs from the assessment files indicate that Huronian basalt is present at the base of the Huronian stratigraphy in this area. Huronian basalt is known to contain copper mineralization (Pearson, W.N.,1978). A Compilation of Lake sediment copper analysis by the Geological Survey of Canada indicates a significant, 200 km long, west trending copper anomaly coincident with the Flack Lake structure (Fiske et al, 1994).

DEPOSITS WITH RESERVES NOT BEING MINED

NAME : Eagle River - Prospect

HELD BY : River Gold Mines Limited (Western Quebec Mining (100%).

LOCATION : 47deg. 58"35" 85deg. 27'20"

REPORTED RESERVES : 2.035 million tons @8.44 g/t. Proven and probable .

COMMENT : Gold in quartz veins in 1 to 5 m wide shear zones in Archean diorite. Production planned for summer 1995.

SOURCE : NM Jan 24, 1994; CMH 1993-1994. MDI Number: TB 1955

NAME : Edwards Mine - Past Producer, 45 claims

HELD BY : Spirit Lake Explorations Limited

LOCATION : Jacobson Twp.

REPORTED RESERVES : Preliminary Drilling indicates 277,000 tons @ 0.55 oz Au per ton. to 600 feet.

COMMENT : Spirit Zone is 500 ft. south of Edwards Mine shaft. Quartz veins and silicified sections 1 to 2 m wide in mafic volcanics.

SOURCE: NM SEPT. 21, 1992; cmh 1993-1994. MDI Number A0080

NAME : Granges - Prospect

HELD BY : Granges Exploration Ltd & MacMillan Gold Corp.

LOCATION : 48deg. 07'00" 85deg. 27'00"

REPORTED RESERVES : 1,569,000 t @ 0.12oz Au/ton. Cut and diluted.

COMMENT : Very fine grained gold in sheared, silicified zone in Archean volcanic rocks.

SOURCE: CMH 1993-1994, NM June 19, 1989. MDI Number TB 1949

NAME : Kremzar - Past Producer

HELD BY : Canada Tungsten Incorporated

LOCATION : Finan Township

REPORTED RESERVES : 181,645 @ 6.27gpt. possible reserves 107,645 @ 7.95 gpt.

COMMENT : Gold in sheared and altered mafic sills. 450 tpd mill on care and maintenance.

SOURCE: CMH 1993-1994, NM January 7, 1991, MDI NUMBER A0077

NAME : Lochalsh - Prospect

HELD BY : Canamax Resources Inc.

LOCATION : 48deg. 17'30" 84deg. 26"00"

REPORTED RESERVES : 1,500,000 t @ 0.248 oz. Au/ton., 1,500,000 t @ 0.248 oz. Au/ton.

COMMENT : Gold in silicified quartz sericite schist

SOURCE: NM January 7, 1991. , CMH 1993-1994. MDI Number A 0504

NAME : Magino Mine - Past producer

HELD BY : Muscocho Explorations Ltd & McNellen Resources Ltd

LOCATION : Finan Township

REPORTED RESERVES : 829,187 t @ 0.163 oz Au/t. to 500 ft. level

COMMENT : 700 tpd mill on care and maintenance. Gold in shear zones in Archean granodiorite pluton.

SOURCE: CMH 1993-1994. MDI Number A 0075

NAME : Magnacon Mine - Developed Prospect - 26 claims

HELD BY : Muscocho Exp.L., Windarra Min. & Flanagan McAdam Resources Inc.

LOCATION : Mishibishu Lake area.

REPORTED RESERVES : 1.47 million tons @ 0.19 oz Au/ t.. Decline to 600 ft level.

COMMENT : Gold in sheared and silicified Archean volcanic rocks. 600 tpd mill on care and maintenance.

SOURCE: NM April 23, 1990, CMH 1990-1991. MDI Number TB 0522

NAME : Surluga - Past Producer

HELD BY : Citadel Gold Mines Limited

LOCATION : McMurray Township, 47deg. 59'20" 84deg. 45'00"

REPORTED RESERVES : 150,000 @ 0.230oz/Au t. also 211,37 @0.175 oz (ind
106,000 @ 0.158 inferred, 150,000 @ 0.230oz/Au t. also 211,37 @0.175 oz (ind.)

COMMENT : Gold occurs in quartz stringers and lenses in granitic pluton. Mill on care and maintenance status.

SOURCE: NM, March 5, 1990, CMH 1993-1994. MDI Number A 0090

OGS ACTIVITIES AND RESEARCH BY OTHER AGENCIES

Dr. Tom Morris of the Sedimentary and Environmental Geoscience Section carried out a study of the distribution of kimberlite indicator minerals in overburden in the Michipicoten area. For the preliminary results of this study see Morris(1994).

Dr. S. L. Jackson of the Precambrian Geology Section completed the third year of a long term study of the Huronian Supergroup. This year focused on stratigraphy and structural features in the Flack Lake area. (Jackson, 1994)

Dr. G.M. Stott carried out geological mapping in the Dayohessarah Lake area northwest of White River. An open File map at a scale of 1:20,000 is available.(Stott, 1994)

Dr. Chris Fedo, of the University of Western Ontario, is performing post doctorate studies research on feldspars in the Serpent Formation of the Huronian Supergroup.

ACKNOWLEDGEMENTS

Sue Kinzie, while working as a volunteer employee for the Mining Lands Branch, provided assistance in the field for four days in August. Paul Morra of the Mining Lands Branch assisted with office organization while working out of the Sault Ste. Marie office. Mr. Bob Burns kindly donated material for the assessment files.

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SOUTHEASTERN RESIDENT GEOLOGIST'S DISTRICT - 1994

by P.W. Kingston(1) and V.C. Papertzian(2)

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- (2) Staff Geologist, Southeastern Ontario District, Ontario Geological Survey - Precambrian Geoscience Section

Introduction

In 1994 there were 33 active mining operations and 16 mills and plants operating in the Southeastern Resident Geologist's District. With one exception - the Chromasco magnesium metal plant in Ross Township - all produce industrial minerals, stone or stone products, and all, with the exception of the underground talc mine of Canada Talc Limited, are open pit operations.

Mining Activity

Mining activity in the Southeastern Resident Geologist's District in 1994 is summarized in Figure 1 and Table 1.

Two large cement companies, Lafarge Canada Incorporated, and Essroc Canada Incorporated (formerly Lake Ontario Cement), continued production during the year, in our area, with production capacities ranging from 1 million to 1.9 million tonnes of cement per year. Lafarge and Essroc quarry limestone at their plant sites. Limestone quarried from the St. Lawrence quarry near Colborne in Cramahe Township is shipped by barge to the St. Lawrence Cement Company Limited Clarkson plant near Oakville for processing.

I.K.O. Industries Limited's traprock operation west of Madoc which began production in 1992, continued to be developed during 1994. I.K.O. Industries Limited is an integrated roofing products manufacturer who established this mining operation to provide roofing granules for use on its asphalt shingles. During 1993 uncoloured roofing granules were produced, along with HL-1 aggregate for asphalt road surfacing. The crushing plant was operational in 1993. A new natural gas pipeline between Stirling and Madoc was built in late 1993. This pipeline supplies gas to IKO Industries Limited and to the Village of Madoc. The gas is required to fire the furnaces in the new high-tech granule colouring plant which IKO are now constructing. Coloured ceramic coatings are fired on the greyish-black trap rock granules in

order to provide the complete colour range of granules commonly found on asphalt roofing shingles. Expenditures on the whole operation to date are about \$12 million, with total expenditures when the colouring plant is finished likely to be well over \$15 million. Presently the colouring plant is still under construction with the start up date set for early in 1995. However, lap granules for roofing shingles are produced at the moment.

Other major operators, in terms of production and employment, are Timminco Limited (magnesium metal), Unimin Canada Limited (nepheline syenite), Steep Rock Resources Incorporated (calcium carbonate), 3M Canada Incorporated (roofing granules), and Canada Talc Industries Ltd. (talc and dolomite).

Exploration and Development Activity and Property Examinations

Exploration and development activities for southeastern Ontario are summarized in Figure 2 and Table 2.

All the following properties were examined in the field by P.W. Kingston or V.C. Papertzian, in the process of documenting exploration and development activity in the Region.

During 1994 two new dimension stone quarries were under development in Eastern Ontario. One is in a rose granite and the other in pink marble and marble breccia. Both of these developments are on properties that were small former producers. New exploration has indicated substantial reserves of what appears to be excellent stone with considerable market potential.

BELMONT ROSE GRANITE QUARRY

The Belmont Rose Granite Corporation, operates a granite quarry in Lot 31, Con X, Belmont Township some 18 km. north of Havelock, Ontario. The quarry is operated under a Class B quarry licence under the Aggregates Act.

The first quarrying on the property was a small test quarry in the early 1970's, followed in the early 1980's by the work of Fairmont Granite Corporation who operated a production quarry producing large dimension stone blocks for several building contracts. The stone is medium grained and massive to slightly foliated and is a pleasing pink or rose in colour.

In 1993 Belmont Rose Granite Corporation quarried the remainder of the first lift left by Fairmont Granite. In 1994 the company started development of a new quarry about 50 meters northwest of, and downslope from the Fairmont quarry, and have successfully removed a number of good blocks for testing and evaluation. Some of this work is being carried out with the assistance of an OMIP grant. Belmont Rose operate the quarry with 6 staff from May to October each year. Standard blocks are in the 10 x 5 x 5 foot range but blocks for special purposes as large as 17 x 5 x 7 feet

(53 tons) and 10.5 x 8 x 3.5 feet have been produced. The main market at present for Belmont Rose is for monument stone but the blocks are quarried to suit the dimension stone market as well.

The property and adjacent land holds considerable potential for further development as there is an extensive area of good outcrop southeast of the present quarry operations. These outcrop areas show only very widely spaced vertical joints, uniform colour and texture, and absence of deleterious materials.

TEMAGAMI PINK MARBLE QUARRY

Senator Stone Supply Ltd. under the direction of Mr. Joseph Palu is exploring and developing 2 quarry sites on the property formerly operated as the Barker Marble Quarries, located on lot 41, West-Hastings Road concession, Faraday Township in the county of Hastings.

The Barker Quarries operated intermittently from 1908 until the late 1930's under a number of owners. The marble was used for interior trim at the Royal Ontario Museum and at the Parliament Buildings in Ottawa, and in a number of other government and bank buildings. Both calcitic and dolomitic marbles were produced from a number of small quarries, with the following colours and varieties : pink, grey-green breccia, red, chocolate brown veined, green, brown, buff, grey-black banded. Many of these colours are intermixed both in massive, veined, or banded, and brecciated varieties.

During the summer of 1994 Mr. Palu drilled a number of test holes and an attractive dominantly pink siliceous marble breccia observed in two holes is being opened in a new test quarry with the assistance of an OMIP grant. This quarry was approximately 10 meters long by 3.5 meters high at the time of writing and has produced a number of well-shaped unfractured blocks in the 3-5 ton range for testing purposes. This marble is strongly siliceous, ranges from pink to grey and white, with rose and red patches as well as yellow and brown bands. Work is also planned at an adjacent former quarry site where the marble is dominantly massive and pink in colour.

VICTORIA GRAPHITE INC.

The Victoria Graphite mine and mill at Portland, near Perth is in the process of commencing production. During 1994 the company completed a number of engineering and geology studies and commenced pilot plant production on a temporary basis. The initial start up problems are being worked out at the time of writing. The mill consists of a crusher, a ball mill, classification system, and several sets of flotation cells, and a large plastic-lined tailings and water recycling pond.

The area of the open pit has been stripped of overburden, and a small test pit has been opened up. It measures 30 m square and is approximately 10 m deep at its deepest point. The Company will be leasing/buying a 5,500 square m plant in Perth's industrial

park for secondary processing and acid leaching to raise the grade to 99%+ carbon. The plant, which the company hopes will be operational by late 1995, will also be making graphite foil products such as automotive head gaskets. The plant will require 500 tons of graphite per year for foil products.

DESERT LAKE QUARTZ INC.

The Richardson Feldspar Mine underwent continuing exploration during the year. Mr. W. Kennedy, of Desert Lake Quartz Inc. has retained Golder Associates to carry out engineering studies to further evaluate the high-purity quartz core of the pegmatite in the old Richardson Feldspar property in Bedford Township. A bulk sample of less than 500 tons is being considered, as is dewatering the pit and drill sampling from an old drift. There are good development possibilities for the very pure quartz core in this pegmatite. The present owner drilled the property a couple of years ago. A typical analysis of impurities in acid washed quartz (in ppm) was: MnO 3, MgO 1, Fe₂O₃ 16, CaO 59, Al₂O₃ 120, TiO₂ 20. The best analysis was 230 ppm total impurities.

TUDOR TOWNSHIP - GOLD

In September, 1994, a very interesting gold prospect was visited in Tudor township with a strike length of approximately 1.7 km, widths in the order of tens of meters and widespread values of up to 0.068 oz Au/ton; approximately 12 large trenches had been stripped, washed and sampled. This property has been optioned and planned expenditures are in the order of \$120,000 this year.

CAVENDISH TOWNSHIP - ZINC

Another property with a large geochemical zinc anomaly has just been optioned in Cavendish Township. A flagged grid has been established, soil geochemistry work has been carried out along with an SP survey and some geological mapping. At areas of magnetic highs small test pits have been dug.

SHEFFIELD TOWNSHIP - GRANITE GNEISS BUILDING STONE

A third building stone property with potential for very large blocks, in a pink/grey granite gneiss will be test-quarried after the planned option agreement is signed. This area is in Sheffield township. Fractures in outcrop are in the order of 3 m or greater apart and sheeting appears to be limited. Some pegmatite dikes are present but they are not very numerous. Two sample blocks, 2 cu. ft. in size, have been extracted and one has been sent for testing. The block will be cut and polished to determine marketability. ASTM testing is also being carried out at this time.

RAM PETROLEUMS LTD.

Ram Petroleum Limited, owner of the wollastonite deposit in Olden Township, completed a large diameter drilling project in 1993. The Northern Miner (January 24, 1994) reported that the estimated reserve of Ram's property is more than 2.7 million tons grading 32% wollastonite, 63% calcite and 5% diopside to a vertical depth of about 75 m. Company president Robert Opekar was

quoted as saying that "one hundred percent of the wollastonite recovered from the milled sample has an aspect ratio (i.e. crystal length to thickness) of greater than 17-to-1".

Land Use Planning Activity

Land Use Planning became an increasingly prominent part of the Tweed office's activities during 1994. In addition to P.W. Kingston's involvement in the "Core Team" and the Land Use Planning for Mineral Resources Committee, the Tweed office worked on the Algonquins of Golden Lake Land Claim information, the Madawaska Highlands planning area, and Official Plans for the Regional Municipality of Ottawa-Carleton, and for Sheffield township, Huntingdon township, and the Townships of Sherbourne, Livingstone, McClintock, Nightingale, and Lawrence, the township of North Plantagenet, Elizabethtown township, and Bedford Township. In addition we examined and commented on rezoning applications, MNR ANSI sites, MNR Keep-it-Wild sites, and the Beaver Creek Watershed Study.

The Centre and South Hastings County Waste Management Master Plan has been under preparation for many years, as local municipalities search for a new household waste landfill site. MNDM staff have on several occasions supplied relevant environmental geology information requested by members of the concerned public.

Kingston Pilot Project

In the fall of 1994 Ministry of Northern Development and Mines and Ministry of Municipal Affairs (MMA) commenced an ongoing 6-month Co-Operative Review Project in which three pilot areas, Simcoe County, Wellington County and Region of Waterloo, and the Greater Kingston Area, were chosen for study.

The purpose of the project is to establish criteria and mechanisms by which MMA planners can screen all planning applications to determine whether and when an application should be circulated to MNDM for comment. MNDM provides Mineral Planning Interest Maps for the pilot areas identifying areas of mining, future development, mineral potential, and manmade and geological hazards. MMA planners use these Mineral Planning Interest Maps to screen out the applications which MNDM needs to review.

P.W. Kingston spent a lot of time in the latter part of the year preparing information and plotting mineral deposit and mineral potential planning maps for the MMA pilot planning project in the greater Kingston area which covers Ernestown, Kingston, and Pittsburgh townships. The project is continuing at the time of writing.

Resident Geologist Staff Activities

Services

The Resident Geologist and his staff in the Tweed office provide a consultative technical service to people engaged in both mineral exploration and mining development in southeastern Ontario. This service involves consultations conducted both in the office and in the field, and use of the Resident Geologist's library, files, and computer systems.

We provide comprehensive data on all known past mining and exploration activities in the Southeastern Resident Geologist's District, and monitor ongoing exploration and development. We also maintain contact with other government ministries and agencies on concerns that might have an impact on exploration or mining.

The Resident Geologist's clientele also use the diamond-drill core library, for examining archived drill core and for logging newly-drilled core. Geological maps and reports, claim maps, and prospectors' licenses are available at the Resident Geologist's office.

Staffing

In December of 1994, P.W. Kingston was the Resident Geologist, V.C. Papertzian was the Staff Geologist, and C.M. Neal and S. Ryan were the Secretaries on a shared basis.

S. van Haaften was the Staff Geologist until August of 1994. At that time he accepted a position with the Sedimentary and Environmental Geoscience Section of the Ministry of Northern Development and Mines in Sudbury. V. C. Papertzian was hired as Staff Geologist in August, 1994.

J.M. Ridgway worked on a contract basis from January to May, 1994 compiling data for the provincial Mineral Deposit Inventory (MDI) database.

T.M. King was a contract employee from September through December 1994. She assisted in amalgamating the mineral deposit and assessment files from the Bancroft and Dorset offices into the files of the Tweed office.

Other Activities

In addition to providing regular office and field services, the Resident Geologist and staff undertook other activities.

P.W. Kingston and S. van Haaften served on the Mines and Minerals Information Technology Committee. P.W. Kingston also served on the Land Use Planning for Mineral Resources Committee and Ministry of Municipal Affairs' land use planning "Core Team".

The Resident Geologist and Staff Geologist visited selected mineral prospects and active mines. Field trips and mine visits were arranged for representatives of the MNDM Mineral Development and Rehabilitation Branch.

V.C. Papertzian and P.W. Kingston spent 5 days with C. Simon from the Incentives Office in Sudbury performing field inspections of OMIP and OPAP work sites. A lot of activity is going on and a number of option agreements have been or will shortly be signed. OPAP/OMIP is very important to this area and seems to be the spark to get companies interested in optioning properties and starting exploration again.

P.W. Kingston attended two meetings of the Economic Development Working Group - Algonquins of Golden Lake Claim Negotiations, to develop "Economic Development Packages".

In public education and mining awareness activities, all Tweed staff set up a booth and sold publications at the Bancroft Gembo-ree. It was a very successful event with thousands of visitors, sales of \$1,083.87 worth of posters, maps, and reports, and the giving away of literally a half-ton truck load of brochures, pamphlets, booklets and the like. S. van Haaften and P.W. Kingston were very ably assisted by R. Debicki and B. Leonard, MNDM, Sudbury.

In May, P.W. Kingston and S. van Haaften gave a 6-session prospector's course 2 nights a week for 3 weeks, including Mining Week. M. Hall very kindly came to Tweed to give the session on Mining Lands and Claim Staking. We had 16 students all of whom were very keen. In addition we ran a Saturday field trip to 6 stops to illustrate Grenville geology and mineral deposits. During the field trip the students learned to stake a model mining claim. Two past-producing mine sites were visited providing opportunities for good mineral collecting as well as for studying the local geology and for demonstrating the Beep Mat as an exploration tool.

We also held an Open House for one day during Mining Week. Members of the public were given tours of the facilities, shown equipment, and given brief talks on local geology, the role of the Ministry, and the importance of mining to the Ontario economy. The Ontario Mining Association kindly provided us with brochures, handouts and Mining Week T-shirts which were most welcome. We had a school tour of the Tweed facilities, including the Core Library, for 30 students.

S. van Haaften ran several special instructional classes at local schools for Mining Week and for Earth Day. These included a class of 20 at a Separate School near Tweed, 80 students all day at the Bancroft High School, and 80 students for Earth Day at a Belleville public school.

At the Mines and Minerals Symposium in Toronto, December 5-8, 1994, P.W. Kingston and V.C. Papertzian presented a poster display titled "Exploration Highlights in Southeastern Ontario". P.W. Kingston together with W.F. Caley and R.H. Bryden of the Technical University of Nova Scotia presented a poster display at the Symposium titled "Sintered Glass-Ceramics From Alumina-Wollastonite Mixtures". P.W. Kingston gave a paper "Mineral Potential Assessments for Land Use from the Resident Geologist's Perspective" at a day-long workshop on "Land Use, Mineral Potential, and Industry".

During the year, P.W. Kingston and V.C. Papertzian attended several meetings of the Bancroft Chamber of Commerce Mineral Development Committee, to help them plan their activities in promoting mineral collecting. They received a 50% funding grant from jobs Ontario Community Action for a \$45,100 project for this purpose. The Chamber was also the successful bidder on MNDM's Request for Proposals to develop the Bear Lake Diggings Collecting Site.

W.F. Caley and P.W. Kingston, and several other co-authors gave two papers and two posters at the 6th Canadian Materials Science Conference, 20-24 June, 1994, at the Royal Military College in Kingston, Ontario. These presentations all dealt with new uses for Ontario industrial minerals in composites and ladle metallurgy.

Geological Hazard Investigations

P.W. Kingston sits as the MNDM representative on the working group dealing with the Decommissioning of the Madawaska Mines Limited mine site at Bancroft under the Atomic Energy Control Board. In addition this group deals with the idle past producing Bicroft mine and Dyno mine sites.

These three sites have been largely rehabilitated with structures removed and tailings areas stabilized. Most concerns are due to the radioactive nature of the mill tailings. P.W. Kingston attended the joint regulatory inspection and annual compliance meeting in June, 1994, for the Madawaska Mines site, and a joint regulatory inspection of the idle Dyno site.

Recommendations for Exploration

The Grenville Supergroup Rocks in southeastern Ontario have been the target of well documented mineral exploration for at least 200 years. A very broad range of minerals have been discovered and many have been mined depending on the economic and market needs of the time. Labour costs and availability of manpower, mining machinery or the lack thereof, and competition, tariffs,

and commodity prices, all played a role in determining what was mined and what was undeveloped.

In recent years in southeastern Ontario exploration for industrial minerals has come to prominence. Relative to base metals for example, the high volumes of industrial minerals shipped, makes these products very transportation sensitive and the proximity of southeastern Ontario to large markets in Canada and northeastern United States favours development of these minerals.

WOLLASTONITE

Wollastonite is not presently produced in Canada, although several occurrences are currently under investigation in Ontario, British Columbia, Quebec, and Nova Scotia. World demand is largely met by production from the United States, Finland, Mexico, and India. Global demand for wollastonite is forecast to grow at an annual rate of 10%. Wollastonite is used in a broad spectrum of products such as fillers in plastics, paints, and ceramics, and as an extender to replace non-fibrous materials and asbestos.

Wollastonite occurrences were recently identified by MNDM mapping in the townships of Marmorata, Madoc, Hungerford, Lake, McNab, Olden, Dungannon and Pittsburgh. The wollastonite content of these mineralized zones frequently varied from 20 percent to over 50 percent within any one deposit. Preliminary testing of several occurrences indicates that liberation and beneficiation of high-purity wollastonite for both the ceramic and filler markets, may be achieved by conventional flotation methods.

Substantial wollastonite deposits in Olden, Pittsburgh, and Rear of Leeds and Lansdowne townships have been identified and explored in considerable detail. One is nearing a production decision. Wollastonite is essentially a skarn mineral and prospecting should concentrate on calcitic, siliceous marbles located within the thermal metamorphic aureoles surrounding high-temperature plutons such as gabbros. The composition of the siliceous carbonates provides the elemental components in intimate contact to form the wollastonite, and the high temperatures associated with gabbro intrusions along with the structural dislocations at the edges of the intrusion provide respectively the energy to drive the development of wollastonite and the conduits to allow escape of the carbon dioxide whose continual removal from the system is necessary for the reaction to proceed to completion. In areas of high regional metamorphism, the periphery of late intrusives that post-date the regional high grade metamorphic event should also be investigated.

MUSCOVITE, SILLIMANITE, and STAUROLITE

Fine-grained muscovite is a mineral in demand as a functional filler in plastics and paints. Two large undeveloped deposits of this mineral are found in the pelitic schists of the Flinton

Group rocks near Tweed and near Fernleigh. These schists also host garnet, sillimanite, kyanite, staurolite, feldspar, and magnetite deposits, with the relative abundance of these minerals varying along and across strike. An economic deposit may exist where the grain size of the constituent minerals is sufficiently coarse to allow the production of several mineral products and co-products. Zones in which muscovite, sillimanite, and staurolite dominate are the most promising, as these minerals have both existing and emerging markets.

Sillimanite is used in the manufacture of acidic refractories, especially in mortars and castables because of its ability to form a high performance mullite phase which imparts its refractoriness as well as thermal shock resistance to the products. Markets have also grown for finely ground white mica for use as a functional filler in plastics and related materials. Value-added products such as surface chemically-modified mica are more attractive to the mineral producer as this modification may add \$0.02 to \$0.23/kg. to the value of the product. In North America, sales of treated mica are expected to grow 19% annually over the next 5 years. Staurolite has traditionally been used as an abrasive but demand for this mineral for sandblasting sand has sharply increased in response to the US Government efforts to discontinue use of silica sand for health reasons.

Exploration should be focussed on the pelitic schists of the Clare River synform and Fernleigh-Ardoch areas where sillimanite, staurolite and muscovite occur in sufficient quantities (>60 % combined) and coarseness to warrant consideration as co-products.

DOLOMITE

Dolomite is used by the iron and steel, glass, non-ferrous metals, ceramics, chemical and petrochemical, construction, agricultural, and paint/plastic/rubber industries through a variety of products. Dolomite fillers provide a very cost-effective pigment extender for more expensive titanium dioxide in paint formulations, are used in plastics, and in other applications requiring opacity, brightness, high whiteness, and low oil absorption. Dolomite fillers enjoy good markets in Europe but less so in North America suggesting there are good local market opportunities for aggressive developers and marketers of this mineral.

The Ministry of Northern Development and Mines in Tweed has mapped and sampled a number of dolomite prospects. Impurities and variable chemistry of the original sediments, as well as subsequent metamorphic effects, reduce the chances of finding large, high grade, mineable deposits. Nevertheless, several deposits were identified which would appear to hold good promise of development. Prospecting efforts for high purity dolomite should include Griffiths, Mayo, Olden, and Ross townships.

HIGH PURITY CALCITE

High purity, high brightness, pure white calcite (marble) is always in strong demand, especially at the low end of the market for products such as chips, decorative aggregate, golf trap sands, and ground fillers. Several good deposits of white marble are well documented and opportunities exist in many of the marble belts for locating additional ones. Work done by the Ministry in Tweed has identified several dozen undeveloped prospects.

OTHER INDUSTRIAL MINERALS

Southeastern Ontario hosts marbles and granites with a wide variety of colours and textures with potential applications as dimension stone and decorative aggregate. Over the years staff of the Tweed office have carried out extensive field surveys for building stone and a number of promising areas have been identified.

The minerals talc, graphite, silica, nepheline, ilmenite, and trap rock all have high potential in the area, and in fact undeveloped or partly developed deposits of each are well documented. However for various reasons, such as low prices, market domination by foreign suppliers, or excess existing production capacity, these commodities are presently in lower demand at the exploration level.

BASE METALS AND GOLD

Base metals and gold continue to be strong targets for exploration with several interesting new zinc and gold deposits and prospects having been found in the last decade. Much promising ground remains underexplored, especially for zinc in the marble belts. A new deposit of large tonnage (5 million plus tons) low grade gold (1 to 2 grams per ton) was discovered a few years ago in a very small strongly sheared and altered satellite intrusion peripheral to the Deloro pluton. Exploration should be directed to this type of skarn gold occurrence in Marmora, Madoc, Rawdon and Huntingdon Townships as this type of mineralization has only recently been recognized in this part of the Grenville.

OGS Activities and Research

Final reports on the Grimsthorpe Area (PU90-19) and Bon Echo Provincial Park (PU91-08) by R.M. Easton are being published in the spring of 1995.

Aggregate resource inventories for Hope and Hamilton Townships were released as ARIP Paper 142 during 1994. Aggregate resource inventories for both Belmont and Harvey Townships, by Dave Rowell, are also being published in the spring, 1995.

The Ontario Geological Survey carried out the following work in Southeastern Region this past year:

1) Project 91-08; R.M. Easton and J.A. Ayer; Volcanogenic Massive Sulphide Deposit Potential of the Mazinaw Terrane, Grenville Province.

2) Project 94-07; R.M. Easton and R.S. Hildebrand; Sharbot Lake - Frontenac Terrane Relationships in the Carleton Place Map Area, Grenville Province.

3) Project 92-19; P.J. Barnett; Geology of the Oak Ridges Moraine Area, Parts of Peterborough and Victoria Counties and Part of Durham Regional Municipality, Ontario.

4) Project 94-26; D. Rowell; Aggregate Resources Inventory of Brighton, Cramahe, Murry, Percy and Seymour Townships, County of Northumberland.

Reports on these projects may be found in the Summary of Field Work and Other Activities, 1994.

-end-

FIGURE 1: OPERATING MINES AND MILLS, 1994

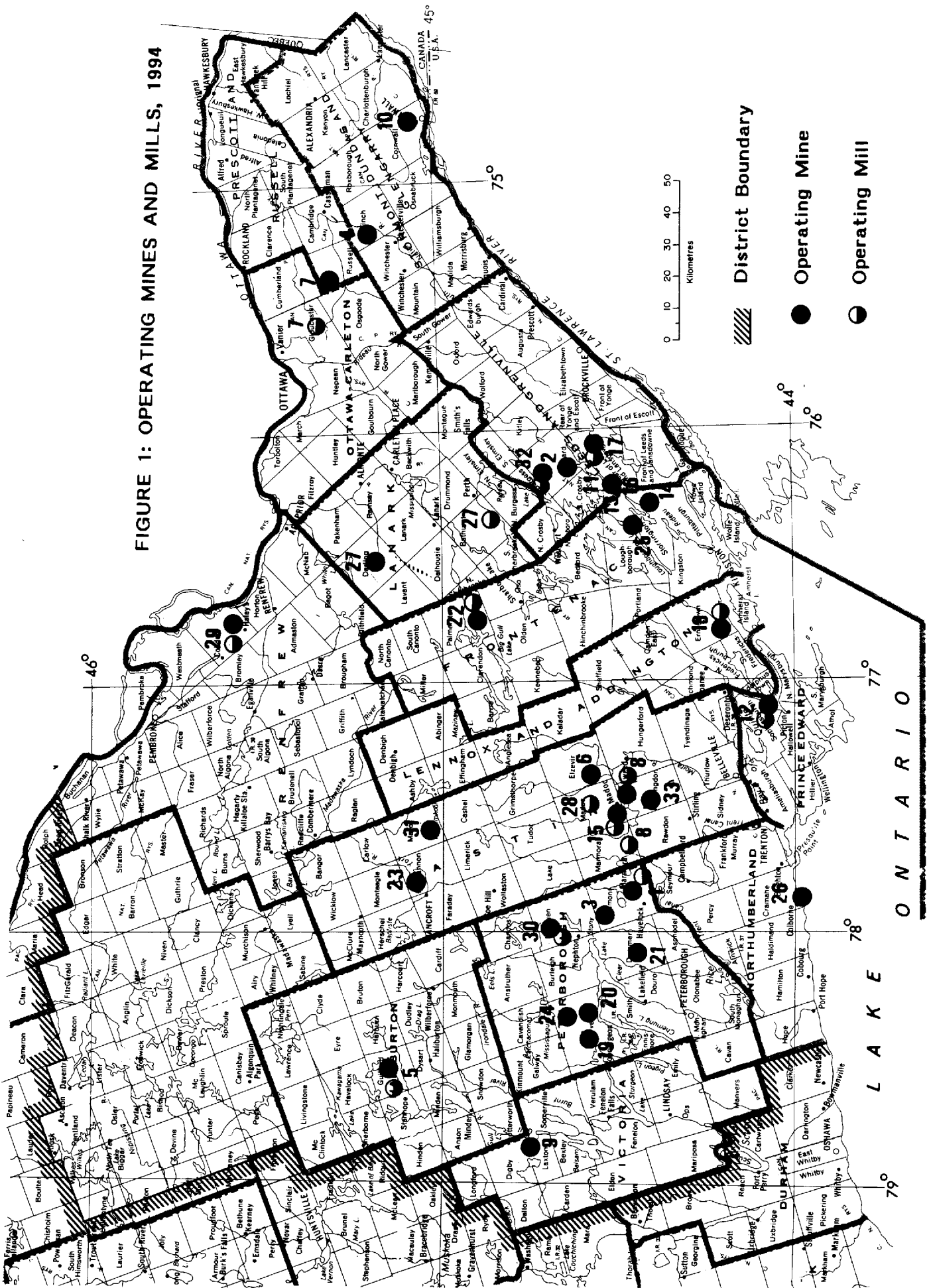
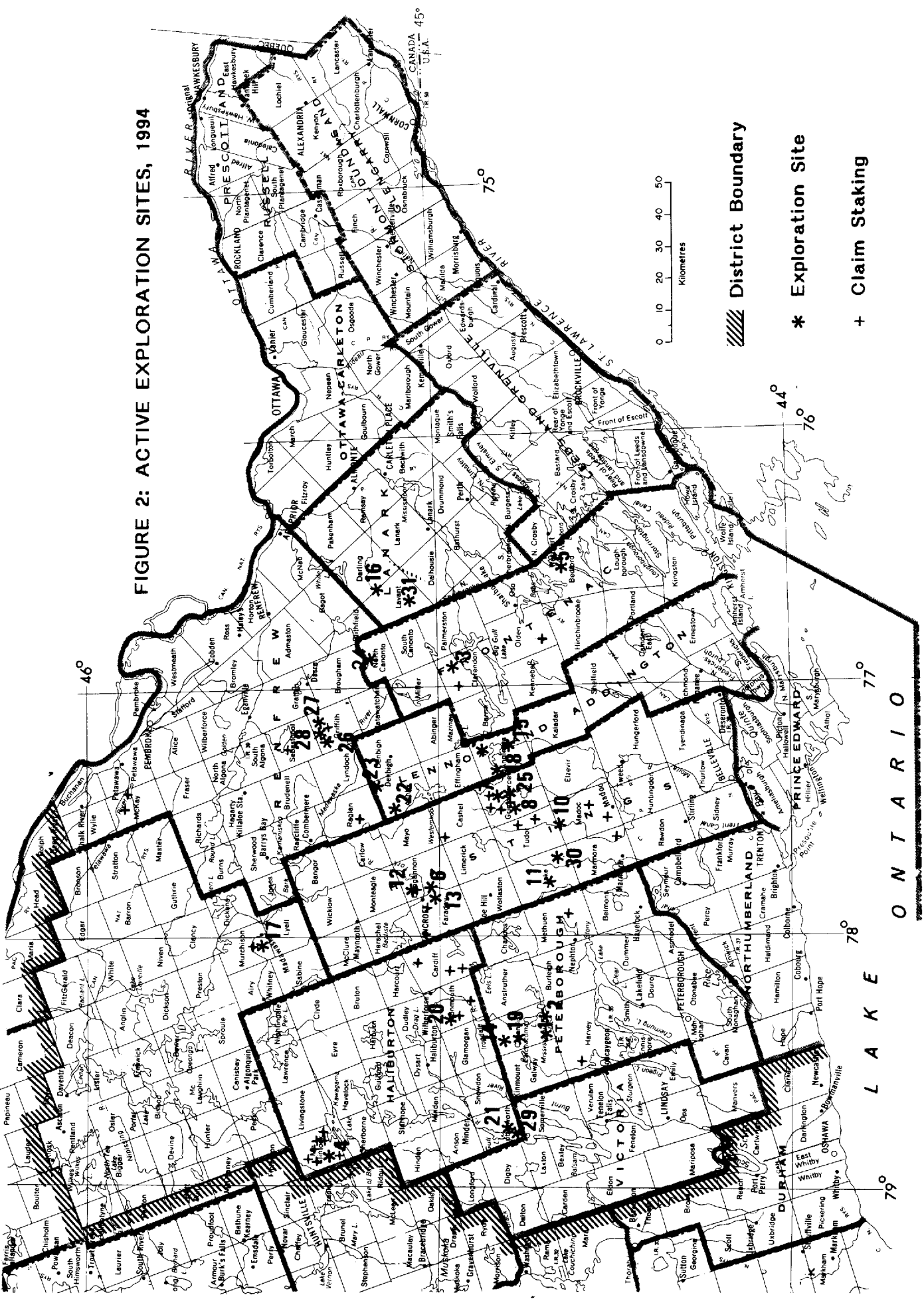


FIGURE 2: ACTIVE EXPLORATION SITES, 1994



**Table 1: Mining activity in 1994
in the Southeastern Resident Geologist's District
(numbers keyed to Figure 1).**

MAP NUMBER	COMPANY/ INDIVIDUAL (MINE NAME)	TOWNSHIP (COMMODITY)	MINING ACTIVITY
1	3 M Canada Inc. (Havelock Quarry)	Belmont (Trap Rock)	Roofing granules and HL-1 aggregate are produced.
2	Arriscraft Corporation (Elgin Quarry)	Bastard (Sandstone)	Silica sandstone is mined for the manufacture of reconstituted sandstone. Raw material is shipped to Cambridge, Ontario for processing.
3	Belrose Minerals Corp. (Belmont Quarry)	Belmont (Dimension Stone)	Granite blocks for dimension stone are produced, also custom-made stone steps, benches, and other objects are made with quarrying tools, and decorative stone pieces for landscaping use are offered for sale.
4	Blair, A.L., Construction Ltd. (Blair Quarry)	Finch (Lime)	Agricultural lime is produced from this limestone construction aggregate quarry.
5	Bolender's Ltd. (Bolender [Eagle Lake] Quarry)	Guilford (Dolomitic marble)	Terrazzo chips, poultry grit, landscaping stone, white cement blocks and white sand are produced.
6	Byer, J.L. (Bridgewater Mine)	Elzevir (Trap Rock)	Trap Rock is produced for use in the manufacturing of rock wool.
7	Canada Brick Manufacturing Ltd. (Russell Quarry)	Russell, Gloucester (Clay Products)	Clay brick is produced from red shale. The quarry is in Russell Tp, and the plant is in Gloucester Tp.
8	Canada Talc Ltd. (Henderson Mine)	Huntingdon (Talc, Dolomite)	Talc products, and ground and crushed dolomite products including terrazzo chips are produced from this mine. This company operates mills at the mine site and at Marmora.
9	Central Ontario Natural Stone (Red Deer Road Quarry)	Laxton (Limestone)	Grey, buff and black limestone are produced as flagstone.
10	Cornwall Gravel Company Ltd. (Cornwall Quarry)	Cornwall (Limestone)	Rough blocks of black limestone for dimension stone are produced on demand from thick upper beds of this construction aggregate quarry.

**Table 1 continued: Mining activity in 1993
in the Southeastern Resident Geologist's District
(numbers keyed to Figure 1).**

MAP NUMBER	COMPANY/ INDIVIDUAL (MINE NAME)	TOWNSHIP (COMMODITY)	MINING ACTIVITY
11	Easton Minerals Ltd. (Straw Hill Quarry)	Rear of Leeds and Lansdowne (Granite)	Decorative red granite aggregate is produced from this quarry. The company also has a currently-inactive industrial minerals processing mill at Northbrook in Kaladar Township.
12	Essroc Canada Inc. (Picton Quarry)	Sophiasburg (Cement)	This is a cement plant with an on-site limestone quarry.
13	Granimar Quarries Ltd (Gananoque Quarry)	Rear of Leeds and Lansdowne (Granite)	Red granite ("Rideau Red") for building and monumental stone.
14	Hughes, W. (Hughes Quarry)	Pittsburgh (Silica sandstone)	Silica is mined and sold for the production of Portland cement.
15	I.K.O. Industries Ltd. (I.K.O. Quarry)	Madoc (Trap Rock)	Trap Rock is mined for roofing granules and HL-1 aggregate. An on-site mill and colouring plant were under construction during 1993.
16	Kingston Red Granite Co. Ltd. (Kingston Red Granite Quarry)	Rear of Leeds and Lansdowne (Granite)	Decorative red granite aggregate is produced.
17	Kingston Stone Products Ltd. (Ellisville Quarry)	Rear of Leeds and Lansdowne (Sandstone)	Sandstone building blocks (ashlar), and flagstone are cut by diamond saw in a plant on site.
18	LaFarge Canada Inc. (Bath Quarry)	Ernestown (Cement)	This is a cement plant with an on-site limestone quarry.
19	Nelson Windover Quarries (Windover [Buckhorn] Quarry)	Harvey (Limestone)	Grey limestone is quarried as flagstone.
20	Ormell Sand and Gravel Ltd. (Ormell Quarry)	Harvey (Limestone)	Flagstone is produced seasonally at this quarry.
21	Payne, E.W. (Payne Quarry)	Dummer (Limestone)	Flagstone is produced seasonally from this quarry.
22	Ram Petroleums Ltd. (Ram Petroleums Quarry)	Palmerston (Tremolite)	Tremolite-rich rock containing minor mica and talc is quarried and milled, and sold as "Clarendite", a mineral filler.
23	Rasmussen, P. (Princess Sodalite Mine)	Dungannon (Gemstones)	Sodalite is mined, and sold for mineral specimens. There is a rock shop on site.

**Table 1 continued: Mining activity in 1993
in the Southeastern Resident Geologist's District
(numbers keyed to Figure 1).**

MAP NUMBER	COMPANY/ INDIVIDUAL (MINE NAME)	TOWNSHIP (COMMODITY)	MINING ACTIVITY
24	Redstone Quarries Ltd. (Redstone Quarry)	Harvey (Limestone)	Red and grey limestone are produced as flagstone, and grey limestone as armour stone.
25	Rideauview Contractors Ltd. (Sloan Quarry)	Storrington (Sandstone)	Buff and red sandstone are produced as ashlar and flagstone.
26	Saint Lawrence Cement Co. Ltd. (Colborne Quarry)	Cramahe (Cement)	This is a limestone quarry. The rock is barged to the Clarkson plant near Oakville for processing.
27	Steep Rock Resources Inc. (Tatlock Quarry)	Darling (Calcitic Marble)	High-purity, fine-grind calcite for fillers, plus other grades of calcite, and marble chips. The mill is west of Perth.
28	Stoklosar Marble Quarries Ltd.	Madoc (Marble)	Marble chips (terrazzo) are produced at this mill, from 8 marble and limestone quarries in Madoc, Huntingdon, Marmora and Lake Townships.
29	Timminco Ltd. (Timminco Metals Quarry)	Ross (Magnesium)	Magnesium is produced from high-purity dolomite marble which is mined at this location. Strontium and calcium are produced from purchased limestone and celestite.
30	Unimin Canada Ltd. (Blue Mountain quarry)	Methuen (Nepheline Syenite)	Nepheline syenite is mined from a quarry in this township and processed in two mills. Magnetite is also produced.
31	Upper Canada Stone Company Ltd. (Mayo Marble Quarry)	Mayo (Dolomitic Marble)	White marble is quarried and sold as crushed marble, and for landscaping stone, decorative stone and white cement blocks.
32	Victoria Graphite Inc.	Bastard (Graphite)	Graphite is mined from an open pit on the property and is milled there as well. As of late 1994, full production had as yet not been achieved.
33	Wimpey Minerals Canada Ltd. (Crookston Quarry)	Huntingdon (Limestone)	Rough dimension stone blocks, and armour stone blocks, are produced on demand.

Table 2: Exploration activity in the Southeastern Resident Geologist's District (numbers keyed to Figure 2).

Abbreviations

DD Diamond Drilling
 GL Geological survey
 GC Geochemical survey
 GM Ground magnetic survey
 VLF-EM Very low frequency electromagnetic
 Str Stripping
 Tr Trenching

MAP NUMBER	COMPANY/ INDIVIDUAL (OCCURRENCE NAME)	TOWNSHIP (COMMODITY)	EXPLORATION ACTIVITY
1	Archibald, A.A.	Cavendish (Vermiculite)	CG, GL, GM, DD, prospecting
2	Archibald, C.W.	Cavendish (Vermiculite)	Linecutting, GM, VLF-EM, GM, GC, Str, Prospecting, DD
3	Christie, B.J.	Clarendon (Au)	Tr, GL, GC, prospecting
4	Ellerington, W.C.	McClintock (Base Metals)	GM
5	Graphite Mountain Inc.	Bedford (Graphite)	Tr
6	Lacey, P.J.	Dungannon	Prospecting
7	Laidlaw, James Beesley, Timothy	Grimsthorpe (Au)	Prospecting, GM, VLF-EM
8	Laidlaw, James Beesley, Timothy	Grimsthorpe (Au)	GL, prospecting, GC
9	MacLachlan, James Malcolm	Anglesea (Au)	GM, GL
10	McBride, Derek E.	Madoc (Au, Pb)	DD
11	Osiel, Michael	Lake (Au)	Prospecting
12	Palu, Giuseppe	Dungannon (Dimension Stone)	DD
13	Palu, Giuseppe	Faraday (Dimension Stone)	DD
14	Pitman, Paul	Cavendish (Zn)	VLF-EM, GM, GC
15	Procter, T.A.	Anglesea (Zn)	VLF-EM, DD, Tr, Str
16	Rampton, Vernon	Lavant/Darling (Au)	DD

Table 2 continued: Exploration activity in the Southeastern Resident Geologist's District (numbers keyed to Figure 2).

MAP NUMBER	COMPANY/ INDIVIDUAL (OCCURRENCE NAME)	TOWNSHIP (COMMODITY)	EXPLORATION ACTIVITY
17	Reed, Alan	Murchison (feldspar, quartz)	GC, prospecting, GM
18	Rapski, John P.	Anglesea (Au,Cr,Ni,Cu,Zn,Pt)	prospecting
19	Rapski, John P.	Cavendish (Au)	prospecting
20	Sharpmin Developments Incorporated	Monmouth	Str, Tr
21	Soever, Alar T. & Associates Inc.	Lutterworth (Zn)	DD
22	Stewart, Ralph V.	Ashby	GL, GC
23	Stewart, Ralph V.	Ashby	DD
24	Stewart, Ralph V.	North Canonto (Si)	GL
25	Tulonen, Paul V.G.	Grimsthorpe	prospecting, GL, GM
26	Two Island Marble Corporation	Griffith (Stone)	recut claim lines
27	Two Island Marble Corporation	Griffith (Stone)	recut claim lines
28	Two Island Marble Corporation	Griffith (Stone)	Str, prospecting
29	Webster, Blaine	Lutterworth (Zn)	Spectral IP
30	Wilkinson, Stephen J.	Lake (Pb, Zn)	GL, GC
31	Willy, Allan J. North, Jon W. Woolham, Roderick W.	Lavant	GL, prospecting, VLF-EM

SUDBURY RESIDENT GEOLOGIST'S DISTRICT - 1994

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INTRODUCTION

Mining and exploration activities continued in 1994 at relatively the same levels as the previous year despite fluctuations in nickel and copper prices throughout the year. The average price of nickel in 1994 was US\$2.88 per pound, compared with US\$2.40 per pound in 1993. The metal broke the US\$4.00 per pound mark late in the year, and continued to climb in early 1995. The copper price averaged US\$1.05 per pound in 1994, compared to US\$0.87 per pound the previous year. Production difficulties at Russia's Noril'sk Kombinat and an over-all decrease in metal stockpiles are attributed to these price increases.

The production of nickel, copper, and precious metals by Falconbridge Limited and Inco Limited dominate mining activities. A total of 16 underground mines and one open pit mine operated in the Sudbury area and produced 10 commodities. Inco Limited re-opened the Garson and Whistle mines, while Falconbridge Limited placed the Lockerby Mine on care-and-maintenance status due to poor market conditions. A feasibility study is currently underway to access the higher-grade Lockerby Depth Zone.

Graphite mining operations were suspended at the Applied Carbon Technology Incorporated Graphite Lake Mine in June 1994 due to a critical and costly equipment failure. Other industrial minerals produced in the district include silica, dolostone, and various types of building and landscape stone products.

Inco Limited announced the company would sink a 6000-foot exploration shaft on the Victor property to explore the deposit from underground. Falconbridge Limited continued deep drilling on its adjacent Nickel Rim property where one NQ-sized hole drilled to a depth of over 10 000 feet is thought to have set a world record.

Surface exploration for nickel and copper continued in several townships underlain by the Sudbury Igneous Complex. Outside the Sudbury Igneous Complex, exploration targets included gold, cobalt, platinum, base metals, and building stone.

Staking activity reached a five-year high, with approximately 3500 claim units being recorded in the Sudbury Mining Division in 1994. A great deal of these were staked as part of a regional exploration program by an off-shore concern.

Ontario Prospectors Assistance Program (OPAP) grants were awarded to 18 individuals, totalling approximately \$175,000. Ontario Mineral Incentive Program (OMIP) loans totalling \$232,400 were awarded to five companies and one individual.

Funding through the Canada-Ontario Development Agreement (NODA) allowed two industrial mineral projects to continue in the district.

MINING ACTIVITY

Falconbridge Limited

Falconbridge Limited produced nickel, copper, platinum group metals, and other by-product commodities from six operating mines in the Sudbury District (refer to Figure 1). Production in 1993 was 84.4 million pounds of nickel and 104.1 million pounds of copper from 2.76 million short tons of ore hoisted (Giancola 1994). This represents an 8.26 per cent increase, respectively, of these metals from 1992. Production figures from 1994 were unavailable at the time of writing.

Although Falconbridge Limited reported a net loss of \$44 million in 1993, it raised approximately \$1.4 billion through an initial public share offering in June. The interest of Noranda Incorporated fell slightly from 50 per cent to 46.4 per cent while the interest of Trelleborg AB of Sweden dropped from 50 per cent to 28.3 per cent. The remaining 25.3 per cent of shares are now trading on the Toronto Stock Exchange. Falconbridge Limited was last listed in 1989.

In the past five years, the company has spent approximately \$450 million on capital expenditures at its Sudbury operation. Another \$80 million is expected to be similarly allotted in 1995.

During the year, Falconbridge Limited operated the following mines in the Sudbury District: Fraser Mine, production capacity 1.0 million tons per year; Lockerby Mine, production capacity 400 000 tons per year; combined Onaping Mine and Craig Mine, production capacity 1.1 million tons per year; Strathcona Deep Copper Mine, production capacity 300 000 tons per year; and Lindsley Mine, production capacity 120 000 tons per year. Full production at the Craig Mine, originally scheduled for 1994 has been deferred to some time in 1995. Current mining operations are via the Onaping shaft.

In June operations ceased at the Lockerby Mine due to poor market conditions. The last three years at the mine were spent exploring the Lockerby Depth Zone from 5300 feet to 7200 feet below surface. Due to higher metal prices toward the end of 1994, the status of the mine was upgraded from a care and maintenance to a standby operation. A feasibility study has also commenced to study the development of an internal shaft from the bottom of the present workings at the 4200-foot level. Another new, but relatively small zone, the Lockerby East Zone is accessible from the present workings. Ore from the main zone was to be exhausted by the end of 1994. The Lockerby Mine commenced production in 1975, but was placed on standby in 1978. In 1979 the mine re-opened at present production capacity of 400 000 tons per year. The operation produced 8.3 million pounds of nickel in 1993, or 0.44 per cent of world production.

Ore from all Falconbridge Limited mines is concentrated at the Strathcona Mill, which has a milling capacity of approximately 10 000 tons per day. The concentrate is trucked to the company's smelter in Falconbridge. Copper-nickel matte is then shipped from the Falconbridge smelter to the company's nickel refinery in Kristiansand, Norway.

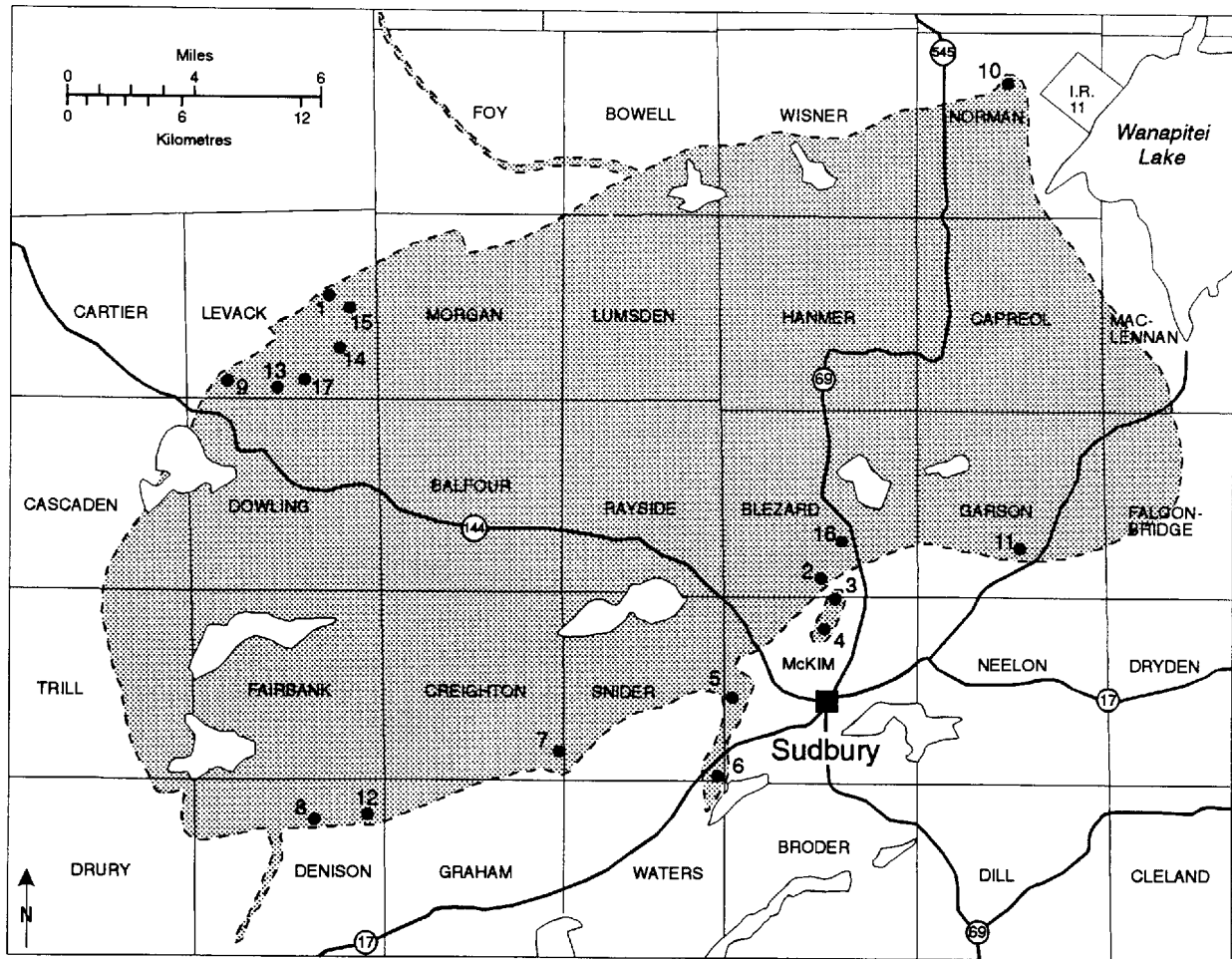
Over the past five years at its Sudbury operations, Falconbridge Limited has lowered its cash costs of producing nickel to less than US \$1.80 per pound. The company is now the world's lowest cost nickel producer. During the same five-year period the number of employees was reduced from 2450 to 1535 (*Globe & Mail*, June 11, 1994).

Since 1926, the Falconbridge Limited Sudbury operations have processed approximately 127 million tons of ore with an average grade of 1.43 per cent nickel and 0.92 per cent copper. Proven and probable reserves are approximately 30 million tons grading 1.75 per cent nickel and 1.61 per cent copper. An additional 15 million tons grading 1.34 per cent nickel and 0.9 per cent copper are listed as possible reserves (*The Northern Miner*, August 15, 1994, p. 1).

Inco Limited

In the Sudbury area in 1994, Inco Limited operated eleven mines, two mills, one smelter, two refineries, three sulphuric acid plants, one liquid sulphur dioxide plant, one oxygen plant, and one strip rolling mill for coinage blanks (refer to Figure 1).

Figure 1. Producing Mines in the Sudbury area, 1994.



Inco Limited

(Ni, Cu, Co, Au, Ag, PGM, Se, Te, SO₂, H₂SO₄)

- 1) Lower Coleman
- 2) Little Stobie
- 3) Stobie
- 4) Frood
- 5) Copper Cliff North
- 6) Copper Cliff South
- 7) Creighton
- 8) Crean Hill
- 9) McCreedy West
- 10) Whistle
- 11) Garson

Falconbridge Limited

(Ni, Cu, Co, Au, Ag, PGM, H₂S)

- 12) Lockerby
- 13) Onaping
- 14) Fraser
- 15) Strathcona
- 16) Thayer Lindsley
- 17) Craig

----- Outline of the base of the Sudbury Igneous Complex, showing some of the Offset Dikes

The operating mines and their rated capacities are as follows: Copper Cliff North Mine, 3400 tons per day; Copper Cliff South Mine, 4400 tons per day; Crean Hill Mine, 2780 tons per day; Creighton Mine, 5200 tons per day; Frood Mine, 5050 tons per day; Garson Mine, 2000 tons per day (by late 1995); Little Stobie Mine, 400 tons per day; Lower Coleman Mine, 2700 tons per day; McCreedy West Mine, 2700 tons per day; Stobie Mine 12 600 tons per day; and, Whistle Mine, 2000 tons per day.

The Levack Mine, which ceased operation in 1993, is still used to hoist ore from the McCreedy West Mine, and as access to extensions of the McCreedy East orebody.

Production resumed at the lower levels of the Garson Mine in October of 1994. Redevelopment of the mine began in 1993, after operations were suspended in 1986 due to poor ground conditions. Production will be from below the 3400-foot level. The orebody has been defined to the 5400-foot level. Known mineralization extends to 5600 feet below surface, and the orebody is considered to be open at depth (L. Cochrane, Inco Limited, personal communication, 1994). Grades and tonnages have been previously reported in Cosec et al., 1994; Whiteway 1993. A summary of the geology of Garson Mine is given in Ball 1993.

In December 1994, Inco Limited also re-opened its open pit Whistle Mine. The property was discovered in 1897, but remained unmined until January 1988. Mining was continuous until September 1991, and recovered a total of 3.3 million tons of ore. At the time of closure, eight cuts had been mined leaving four cuts to be taken. Approximately 1.5 million tons remain to be mined from the pit with some underground potential (Morrison and Sweeny 1994).

At the Creighton Mine, the company has announced it will invest \$13.6 million to establish a new ore-handling system. The system is designed to recover 2.6 million tons of ore grading 2.45 per cent copper and 2.9 per cent nickel between the 7200- and 7400-foot levels and will provide the initial stage for the further deepening of the mine. The Creighton Mine, in production since 1902, currently operates down to the 7200-foot level and has reserves that extend well below a depth of 7400 feet. The mine is also home to the Sudbury Neutrino Observatory on the 6800-foot level and the nursery on the 4500-foot level from which Inco Limited this year raised its one-millionth tree seedling (Inco Limited, press release, 1994).

All the Inco Limited Sudbury ore is milled at its Clarabelle Mill, at a rated capacity of 40 000 tons per day. Actual throughput ranges from 33 000 to 34 000 tons per day. Here, the ore is upgraded from 1.2 per cent nickel and 1.2 per cent copper to a combined total of 7 per cent. A new semi-autogenous grinding unit was recently installed at the complex. The Copper Cliff Mill provides flotation facilities used to separate bulk copper-nickel concentrate produced by the Clarabelle Mill and upgrades the concentrate to 20 per cent combined nickel and copper.

The company shut down operations from late December 1993 to the end of February 1994, and also for six weeks in the summer.

Inco Limited reported a net loss of US\$65 million for the first nine months of 1994, compared to a net profit of US\$66 million for the corresponding period in 1993. The 1993 profit includes the sale of Inco Limited's 61.8 per cent interest in TVX Gold Incorporated for US\$289 million. The net loss in 1994 is attributed to lower deliveries of nickel related to production shutdowns.

Due to increased demand in nickel toward the end of 1994, the company will increase its world-wide production of the metal to 430 million pounds, up from an estimated 345 million pounds in 1994. The target for the year 2000 has been set at 480 million pounds.

These production increases will be achieved by lower unit production costs and a reduction of the Sudbury workforce, from approximately 7000 to 5500 by 1997. In 1994, the break-even cost per pound nickel was US\$2.70 worldwide. The company plans to reduce this to US\$2.25 in the near future (Inco Limited, press release, 1994).

Industrial Minerals Production

Several industrial mineral commodities were produced in 1994. These included dolostone, silica, graphite, building stone, flagstone, landscape stone, and several varieties of coloured aggregate (Table 1).

Unimin Canada Limited operates the Badgely Island high-grade silica quarry, four kilometres west of the village of Killarney. Annual production is approximately 430 000 tons. The coarse silica is shipped to Midland, Ontario and Ashtabula, Ohio for further processing into silica sand for the glass industry.

Lafarge Canada Incorporated (formerly known as Standard Aggregates Incorporated) operates a large quarry on the Mississagi Strait, in Dawson Township, on the western tip of Manitoulin Island. Massive dolostones of the Amabel Formation are excavated in a single lift of approximately 17 m. In 1994, the quarry shipped 2 126 830 tonnes, of which 70 per cent is construction aggregates and 30 per cent is metallurgical stone. The product is shipped to United States and Canadian markets. Future expansion will allow the quarry to produce approximately 2.5 million tonnes in 1995 and 3.0 million tonnes in 1996, if market conditions warrant (E. McCulligh, Lafarge Canada Incorporated, personal communication, 1994).

Applied Carbon Technology Incorporated suspended operations in June 1994 at its Graphite Lake open pit mine and mill facility in Butt Township. The operation experienced a failure of a critical electric generator, and due to financial considerations, repair funds were not approved. The company produced a high quality graphite flake containing 95 per cent carbon. A newly-installed semi-autogenous grinding mill and drying circuit operated at design capacity of 3000 tons per day, even during extremely cold temperatures early in 1994.

The mine and mill are currently on a care and maintenance status, with eight persons employed in security and support.

Carman Construction Incorporated produced approximately 50 000 tons of silica from a quarry it operates on a seasonal basis near Alban in Delamere Township. The material is used as smelter flux at the Inco Limited Copper Cliff Smelter. The company also operated a small silica quarry in Roosevelt Township, the material from which is used as exposed aggregate.

Hercules Stone Limited extracted several hundred tons of Silurian Manitoulin Formation limestone from the Foxey Quarry in Gordon Township on Manitoulin Island. The rock is used as curbing, walkways, and in landscaping. Several tons of breccia from Aylmer Township were also extracted. This breccia consists of relatively small angular fragments of buff-coloured Gowganda Formation siltstone in an orange-coloured hydrothermal quartz and carbonate matrix. This material has previously been used locally as an ornamental facing stone.

Gibson Granite Incorporated commenced extraction of building stone at the former Canadian Shield Quarries Limited (Dana Black Granite) quarry near River Valley. The rock is a medium- to coarse-grained gabbroic anorthosite of the River Valley complex. The rough quarry blocks are sent to the company's processing plant in Evain, Quebec.

Jarvis Resources Limited continued production from various small limestone properties northeast of Sudbury. The company's processing plant, located in Lively, can produce slabs and tiles of various sizes, as well as curb stones and accent pieces.

Flagstone is produced from several seasonal operations in the Parry Sound and Huntsville areas, the largest of which is Mill Lake Quarry Limited. This quarry has been in operation for over 80 years. A proposed new intersection on Highway 69 will encroach on the quarry.

Several companies produced coloured aggregates for decorative landscape material. Most of the stone is shipped to southern Ontario or U.S. markets.

Considerable amounts of sand and gravel were also extracted by numerous companies throughout the Sudbury District.

Table 1. Industrial Mineral Production, 1994

Company	Township	Commodity
Allstone Quarry Products Incorporated	Bigwood	stone
Amsen Quarries Ltd.	Franklin	stone
Applied Carbon Technology Incorporated (operations suspended)	Butt	graphite
Boothby Quarry	Finlayson	stone
Carman Construction Limited	Delamere, Goschen, Roosevelt	silica
Crea-Mac Construction Ltd., Coloured Aggregate Ltd.	Ratter	stone
Ethier Sand and Gravel Ltd.	Dill	stone
Fowler Construction Company Ltd.	Macaulay, Sinclair	stone
Fraser Quarry	Finlayson	stone
Gibson Granite Incorporated	Dana	stone
Hercules Stone Ltd.	Gordon, Aylmer	stone
International Quartz Ltd.	Ryerson	stone
Jarvis Resources Limited	Parkin	stone
Lafarge Canada Incorporated	Dawson	dolostone
McDonald Quarry	Finlayson	stone
Mill Lake Stone Quarry Ltd.	McDougall	stone
Rock Lake Granite	Proudfoot	stone
Unimin Canada Ltd.	Badgely Island	silica
Tasso Lake Stone	Finlayson	stone
Ted Boyes and Sons Construction Ltd.	Ryerson	stone

ADVANCED EXPLORATION

Underground exploration and development continued at most of the producing mines in the Sudbury area throughout the year. Development properties of notable interest are mentioned below.

Falconbridge Limited

The majority of work performed during the year consisted of definition drilling to upgrade previously known probable and possible reserves to proven reserve status.

Development work continued at the Craig Mine, where 13.5 million tonnes containing 2.00 per cent nickel and 0.74 per cent copper have been outlined within nine zones over a strike length of 1000 m lying between 650 m and 1700 m below surface (Moore and Nikolic 1992). Falconbridge Limited has committed \$280 million to the project which is expected to supply over 60 per cent of the company's future nickel production in Ontario.

At the Lockerby Mine, a feasibility study was initiated on development of an internal shaft to access the Lockerby Depth Zone, located between 5300 and 7200 feet below surface (P. Johannesen, Falconbridge Limited, personal communication, 1995).

Development work was completed on the Powderhouse Zone, a high-grade copper-platinum group metals deposit located between the Fraser and Strathcona mines. Production from this zone is expected in 1995.

Inco Limited

Development work continued at the McCreedy East Mine, the company's largest proven, undeveloped nickel-copper deposit in the Sudbury area. The mine will be developed in three phases. The first phase, involving the mining of 15 million tons of ore grading 4.32 per cent copper and 1.44 per cent nickel, was begun in 1989 but suspended in 1991 to incorporate new discoveries into the mine development plan. Development resumed in June, 1993. The mine is expected to produce its first ore in 1996. When full production is achieved in 1999, it is scheduled to produce 3000 tons of ore per day for 17 years. At this rate, it will produce 22.5 million pounds of nickel and 77.5 million pounds of copper annually. The ore handling and materials transportation will be integrated with the company's Coleman Mine (Inco Limited, press release, 1994). Details of phases two and three have yet to be released.

At the Victor property, a shaft pilot hole for engineering studies has been completed to a depth of 6000 feet, and shaft-sinking is expected to commence in 1995. The shaft will access an orebody located 5400 feet below surface and provide a base for extensive underground exploration (R. Martindale, Inco Limited, personal communication, 1995).

Three kilometres west of the Creighton Mine, surface definition drilling commenced at the Gertrude Mine for possible open pit development. This deposit was first discovered in 1892 and developed in 1899 by the Lake Superior Power Company. A smelter and roast yards were also operated at the site. In 1903 the company collapsed and all operations ceased. Approximately 18 000 tons of ore were raised during this period. There has been no production at the Gertrude Mine since 1903 (Report of the Royal Ontario Nickel Commission 1917).

EXPLORATION ACTIVITY

The Sudbury Resident Geologist's District encompasses approximately 40 000 square km and includes over 330 townships and some unsurveyed areas. Refer to Figure 2.

Geologically, the area is underlain by rocks of Archean, Proterozoic, and Paleozoic age. The Grenville Front bisects the district into fairly equal, but geologically dissimilar parts.

Table 2. Summary of Claims Recorded and Assessment Work Credit

Year	Claims Recorded	Claims Cancelled	Claims Active	Geotechnical Survey (Dollars)	Physical Survey (Dollars)
1994	3511 units, 483 blocks	3027	6738	449 847	341 063
1993	696 units, 335 blocks	1332	6092	448 740	441 100
1992	1127 units, 355 blocks	212	6852	293 286	
1991*	1237 units, 137 blocks	2179	6158	44 750	67 600
1990	2576	2068	7458	35 097 (man days)	14 309 (man days)

* new Mining Act June 1991, assessment work requirements changed to dollar value

** the above numbers only refer to the Sudbury Mining Recorder's Division

Exploration by major mining companies concentrated primarily on the nickel-copper-precious metal ores hosted in the Sudbury Structure. The activities of junior mining companies increased moderately throughout the district, and focussed on gold and industrial minerals. Prospecting and grass-root exploration by individuals remained at similar levels from the previous year. Gold, cobalt, and building stone were popular targets.

Several exploration projects are highlighted below. For a detailed summary of exploration in the district, please refer to Table 3 and Figure 2. In this report, a claim unit refers to a single forty-acre unit.

William Resources Incorporated

In June 1994, William Resources Incorporated acquired all interests of Bharti Laamanen Mining Incorporated, which held several base metal properties in and near the Archean Benny greenstone belt.

The company resumed exploration on the Holmstrom lead-zinc occurrence in Botha Township. In 1993, stripping, trenching, and some lithochemical work were completed in the vicinity of the main trench on mining claims S.80132 and S.80133. In 1994, linecutting, horizontal loop, VLF-electromagnetic, and magnetometer geophysical surveys, detailed geological mapping, and a soil geochemical survey were completed over most of the property.

This work led to the discovery of a second lead-zinc occurrence known as the Stromsholm occurrence, near the west boundary of mining claim S.1197514. Assay results were unavailable at the time of writing. Further work has been recommended.

Meridian Resources Incorporated

Meridian Resources Incorporated commenced work on a 15-claim unit property in Parkin Township in order to determine the control of several previously discovered gold occurrences.

Linecutting, various geophysical surveys, trenching, lithochemical sampling, and geological mapping were completed. Results of the program and the property geology are described in the "Property Examinations" section of this report.

Flag Resources (1985) Limited

Flag Resources (1985) Limited continued with their long-term diamond drilling program throughout the year.

In January and February, the company deepened a diamond drill hole, originally drilled in 1992, from a depth of 1700 feet to 2730 feet, at the Camp Zone at Wolf Lake in Mackelcan Township. The hole intersected thin seams of secondary magnetite and Sudbury-type breccia in Lorrain Formation arkose.

In June, deepening of a 2715-foot hole commenced on the west shore of Laundry Lake, also in Mackelcan Township. The hole, initially started in February of 1994, was drilled on the western peak of the Wanapitei magnetic anomaly to a final depth of 4485 feet. Down to a depth of 3386 feet, the hole intersected Lorrain Formation quartzites and arkoses, while from 3386 to 4485 feet laminated Gowganda Formation argillite was encountered. Large sections of the core have undergone soda metasomatism and contain seams of secondary magnetite up to one-quarter inch wide. The magnetite is at stratigraphic levels which elsewhere in the Huron Supergroup contain only hematite. The source of the magnetite may represent low temperature fluids associated with local late faults (Cosec et al. 1994).

In August, diamond drilling commenced near Matagamasi Lake in Rathbun Township. The hole was collared in soda metasomatized Gowganda Formation and intersected intermittent zones of such alteration to the end of the hole at a depth of 2000 feet. The lithologies are conglomerates and laminated wackes. Some of the clasts in the conglomerate have been replaced by pyrite to various degrees. Traces of other sulphides, namely pyrrhotite, sphalerite, and galena were also observed in the drill core, particularly along fracture planes.

In October, the company deepened a diamond drill hole initially drilled in 1992, from a depth of 2000 to 2500 feet, at the Rathbun occurrence in Rathbun Township. The hole intersected similar rock to that encountered at Matagamasi Lake.

Late in 1994, Flag Resources acquired several claims near Ozhway Lake in McNish Township. The area is known to host several small sulphide occurrences, possibly the result of hydrothermal remobilization of sulphide disseminations in Archean rocks (Dressler 1979). Future work may include reconnaissance geological mapping and diamond drilling.

Inco Exploration and Technical Services Incorporated

Inco Exploration and Technical Services Incorporated conducted exploration in several townships underlain by the Sudbury Structure, the majority of work being concentrated on long-held patented ground. This work is considered confidential. Exploration consisted primarily of geological and geophysical surveys as well as diamond drilling and borehole geophysical surveys.

Late in the year the company began an evaluation of the Stralak base metal deposit in the Benny greenstone belt, possibly in order to evaluate its cadmium potential.

Falconbridge Limited

Falconbridge Limited continued exploration on several properties in the Sudbury area in 1994, all of which are underlain by the Sudbury Structure. Much of this work was done on long-held patented ground and the information is considered confidential.

Exploration was carried out in the area downdip of the Onaping and Craig mines, in the Joe Lake area, and on the Trill-Drury project (*The Northern Miner*, August 15, 1994).

In September, the company completed what is believed to be the deepest NQ-sized diamond drill hole in the world as part of its exploration program at the Nickel Rim property in MacLennan Township. The hole, completed to a vertical depth of 10 033 feet, had a total footage of 33 030 feet. Falconbridge Limited has reported undiluted reserves at this deposit of 520 000 tonnes with an average grade of 4.13 per cent nickel and 25.53 per cent copper (*The Falcon*, October 1994, p. 7).

Cameco Corporation

Cameco Corporation continued exploration on the Big Swan gold skarn in Porter Township. This showing was discovered by D. Brunne and M. Turcott in 1991 and was subsequently optioned to Cameco Corporation. A detailed geological description is presented in Meyer et al. 1993.

Work completed during the 1994 season included washing and stripping outcrop in the vicinity of the main showing as well as detailed geological and geochemical surveying of the entire claim group. Subsequently, three diamond drilling holes totalling 847 m were completed. (M. Koziol, Cameco Corporation, written communication, 1994).

Results of this work were unavailable at the time of writing.

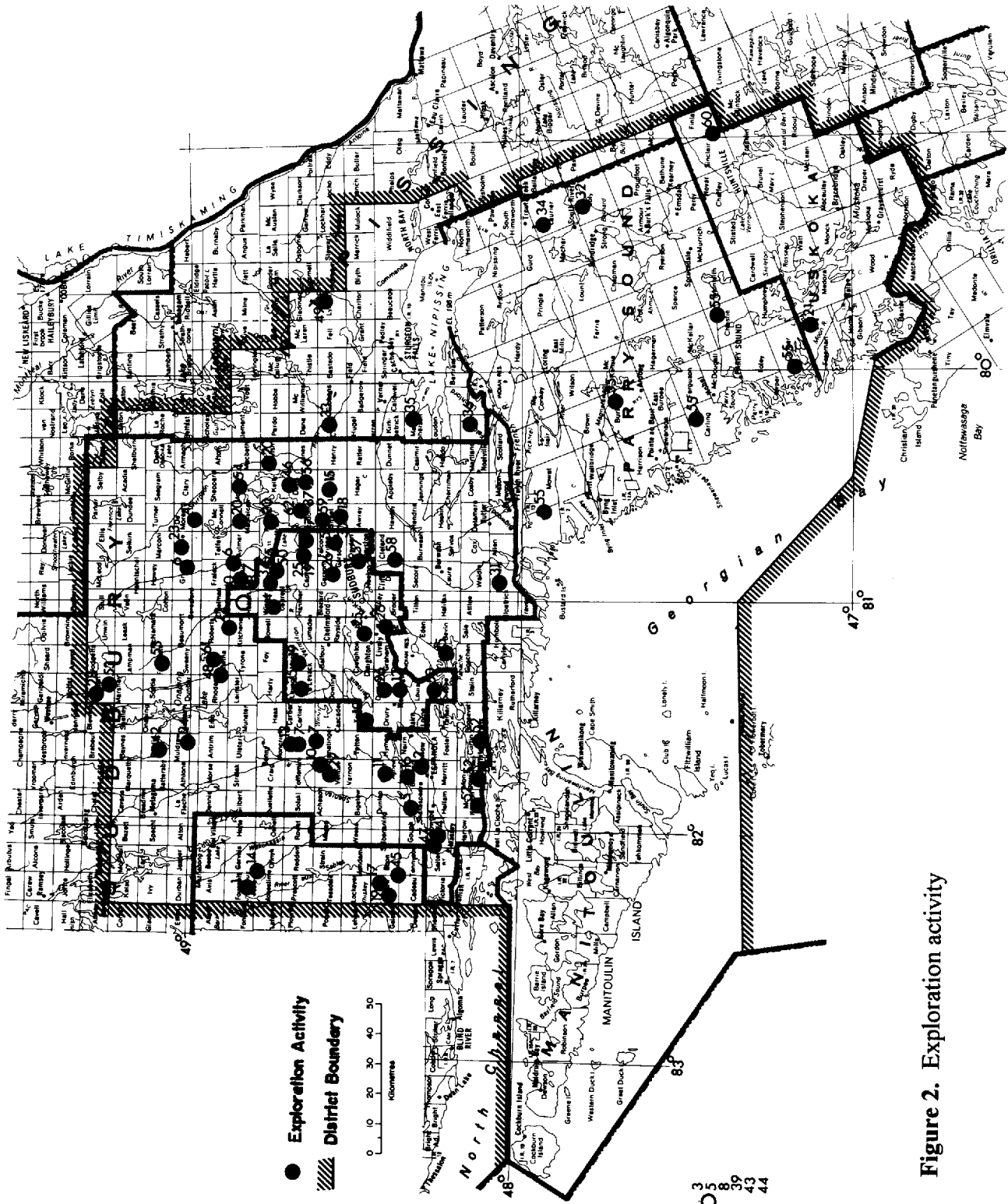


Figure 2. Exploration activity

Table 3: Exploration Activity, Sudbury Resident Geologist's District, 1994

No.	Company/Individual	Township	Work Performed	Commodity
1	Ardiel, M.	Foucault	Str, Tr	Au***
2	Barry, A. G.	Baldwin	P,Gp,Gc	Cu, Ni
3	Barry, H.	Norman, Hutton	Str, Tr, Gc	Au
4	Barry, R.**	Wisner	P	Cu, Ni
5	Blue, P. G.	Shakespeare, Hutton, Caen	P,Str, Tr, Gc	Cu, Ni
6	Boulard, V.	Parkin, Grigg, Stobie	P, Gc	Au, stone***
7	Brady, J.**, Brady, M.**	Ermatinger, Hart	Gc, P	Au, Co, stone***
	-----**	Parkin,	P, Str, Tr, Gc	Au, stone
8	Brisson, A.	Hutton	P,Str, Tr, Gc	Au
9	Brisson, A., Brisson, D, Brisson, J., Hull, R.	MacLennan	P, Gc	Au
10	Burns, I.	Venturi, Tofflemire	Gc	fertilizer
11	Cameco Corporation*	Porter	Str, Tr, DD, Gc	Au
12	Carman Construction Incorporated	Denison	P, Str	Cu, Ni
13	Chittaroni, G., Ego Resources Limited	Hart	P	Co, Pb, Zn
14	Crossan, P.	Olinyk, Foucault	Tr	Au***
15	Cyr, R.	Loughrin, Davis	P	stone, Au
16	D & H Consulting Services Incorporated	Baldwin	bulk sample	Cu
17	D'arcy, F.	Gerow	P	Mo, PGM
18	Emerald Isle Resources/Stralak Resources Incorporated	Street	Gc, Str, DD	garnet
19	Falconbridge Limited	Sudbury Area	P, Gl, DD	Cu, Ni, PGM
	-----	Whiskey Lake Area	Gl, Gc	Cu, Pb, Zn

20	Flag Resources (1985) Limited*	Mackelcan, Rathbun	DD	Au, Cu, Ni
	-----	McNish	P	Cu, Ni, Au
21	Forster, J.**	Freeman	P, Gl, Gc	stone***
22	Gervais, R.	Roberts, Kitchener	P, Gc	Au
23	Hammerlund, G.	Stobie	Str, Tr, DD	Au
24	Houle, G.	Muldrew	DD	pinite (stone)
25	Inco Exploration & Technical Services Incorporated	Creighton, Levack, Norman, Snider, Maclellan, Waters	DD	Cu, Ni, PGM
26	Inco Limited	Sudbury Area		Cu, Ni, PGM
27	Jarvis Resources	Maclellan, Scadding	P, Str, Tr	stone
28	Johnson, T. C.	Beulah	P	Au
29	Junior Mining Exploration Limited	Venturi, Tofflemire	Gc	fertilizer
30	Kinross Gold Corporation	Falconbridge	Gl, Gc	Au
31	Lahaie, G.	Struthers	Str	stone***
32	Lashbrook, R.**	Joly	P, Str, Gl	stone***
33	Leblanc, A.**	Crerar	P	Cu, Ni
34	Mandziuk, Z.**	Laurier	P	stone
35	Manex Granit Inc.	Macpherson	Gc	stone
36	Manitou Stone (Canada) Limited	Falconer	Str, bulk sample	stone***
37	McLean, P.	Scadding	P, Gc	Au
38	Meridian Resources	Parkin	P, Gp, Gl, Gc, Str, Tr	Au***
39	Norwin Geological Limited	Hutton	Gc	Fe (tailings)
40	Ontario Quarries Inc.*	Parkin	P, Str, Gl	stone
41	Patrie, C.	Demorest	P	Ag, Cu, Zn
	-----	May	P, Gc	Si

42	Patrie, D.	Dublin	P	base metals
43	Pitre, D.	Hutton	P, Str, Gc	Au
44	Pratte, D.	Hutton	P	Au
45	Quartec Mineral Developments Incorporated*	Cadeau, Boon	Str, Tr, Gc	Si
46	Racicot, F. **	Kelly, Davis	P	Au, Cu, Ni, PGM, stone
47	Richer, L.	May	P, Gc	Si
48	Rieux, M.	Rhodes, Botha	P, Tr, Gc	base metals
49	Ringuette, G.	Lyman	DD	Au, Cu***
50	Salo, G.**	Dieppe, Louise, Norman	Gc, P	Au, Cu, Ni, PGM
51	Stringer, E.**	Mongowin, Falconbridge	P, Str, Gl	Au, Cu, Ni
52	Stringer, R., ** Brunne, D., ** Turcott, M., Bald, R.**	Curtin, Mongowin, McKinnon	Str, Tr, Gc	Au
53	Symmonds, F., St. Pierre, M.*	Frechette, Beulah	P	Au
54	Teck Exploration Limited	Sheppard, McCarthy	Gl, Gc	Au
55	Trusler, J. F.	Carling, Burton, Mowat, Christie, Conger	Gl	stone
56	Van Lith, G.**	Davis	P, Str, Gc	Au, Cu
57	Walker, R. F.	Neelon	P	stone
58	Wanup Pit Incorporated	Dill	P, Str	feldspar
59	Weiss, M.	Street	P	Au
60	Wickern, B.**	Ryerson	Str	stone
61	William Resources Incorporated*	Botha	Str, Tr, Gl, Gc, Gp	Cu, Pb, Zn***
62	Williams, J.D.**	Scadding	P, Gl, Gc	Au

Gp - Geophysical
DD - Diamond Drilling
P - Prospecting

Gc - Geochemical
Str - Stripping

Gl - Geological
Tr - Trenching

*OMIP

**OPAP

***new mineral occurrence

PROPERTY VISITS

Meridian Resources Incorporated

Meridian Resources Incorporated acquired 15 contiguous mining claims in 1994, in order to investigate known and new gold occurrences. The property is under option from J. Brady.

The claims are located in lots 6, 7, and 8; concessions II and III, Parkin Township, approximately eight miles due north of Capreol. Road access is by Highway 545 from Capreol north approximately four miles to the Portelance Lumber Road, then northeasterly approximately four miles to a series of bush roads. The property is 1.5 miles west of the Portelance Lumber Road. Refer to Figure 3.

Various parts of the property have been explored intermittently since the turn of the century. Several sulphide-bearing gold zones have been discovered either in outcrop or diamond drill core. For the detailed exploration history, consult the Sudbury Resident Geologist's assessment files.

Regionally the area is underlain by an irregularly-shaped northwest-trending inlier of Archean metavolcanic rocks, varying in width from 300 to 7000 feet. To the southwest, the metavolcanic rocks have been intruded by Archean monzonite and granodiorite. These units are unconformably overlain by various metasedimentary rocks of the Huron Supergroup. Subsequently, all units have been intruded by diabase and gabbroic rocks of various later ages.

The property is underlain primarily by metavolcanic rocks which consist of a massive, medium- to fine-grained mafic unit and a fine-grained to aphanitic intermediate to felsic unit. These units are intruded by a small granitic stock approximately 500 feet wide. The stock is considered to be part of the Algoma plutonic domain (Meyn 1970; Card 1979). The metavolcanic units are unconformably overlain by, and are in fault-contact with, Mississagi Formation quartz arenite. On the western third of the property, a Nipissing diabase dike intrudes the metavolcanic units. It is essentially north-trending, and approximately 200 feet wide and 2000 feet long.

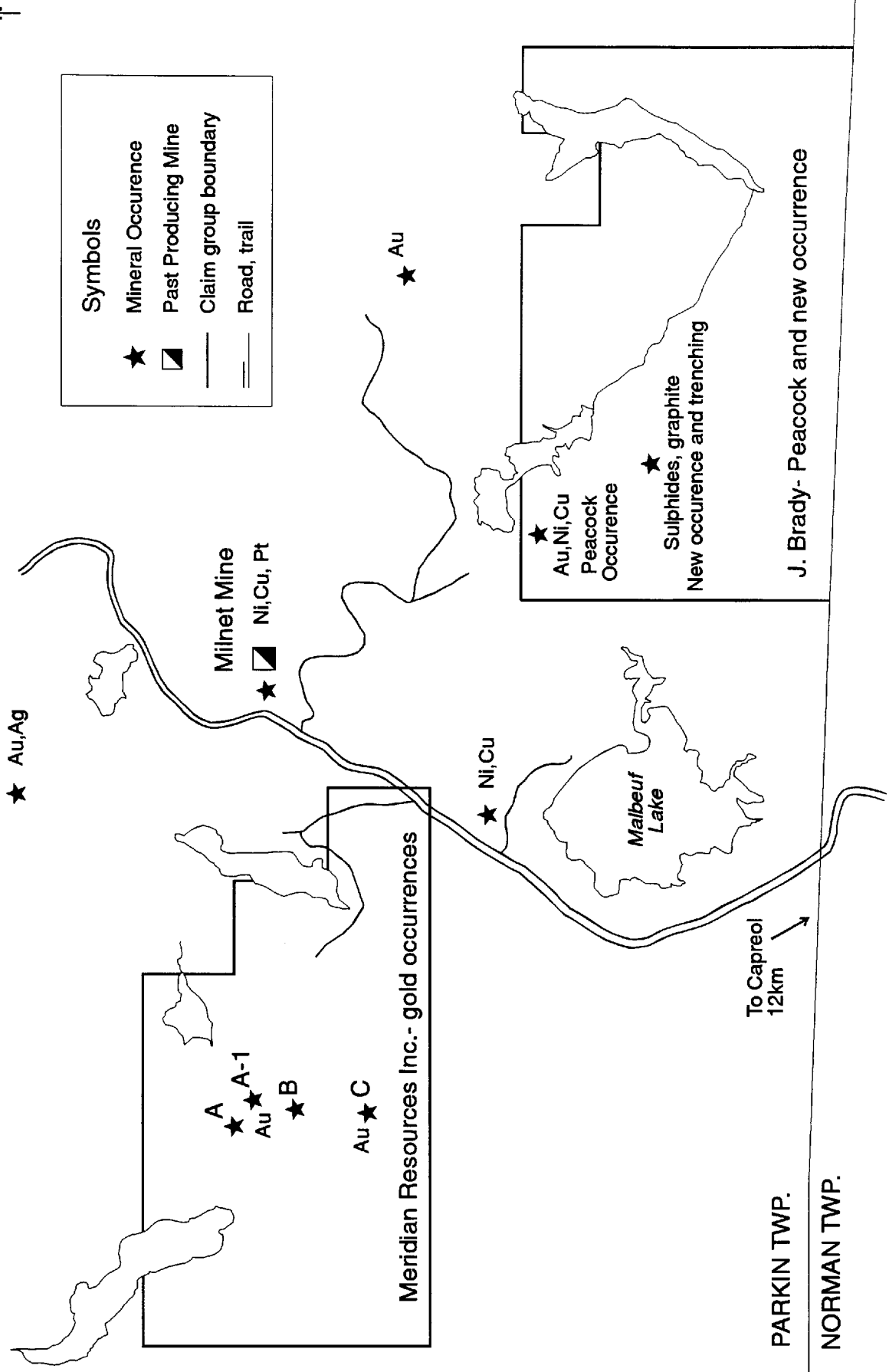
There are four gold-bearing occurrences in the claim group, and are identified as "A" (or "Leschishin"), "A-1", "B", and "C" occurrences. Refer to Figure 3.

The A occurrence is located near the centre of the northern boundary of claim S.631396. The mineralized zone contains disseminated pyrite, pyrrhotite, and chalcopyrite hosted in porphyritic felsic metavolcanic rocks. The best assay obtained from this occurrence was 0.426 ounce Au per ton over 7.55 feet (Tagliamonte 1994).

The A-1 occurrence is located approximately 250 feet southeast of the A occurrence. It consists of finely disseminated pyrite in a chloritized and silicified undifferentiated felsic metavolcanic rock. The best assays from this location yielded 0.31 ounce Au per ton over 5.5 feet and 4.59 ounces Au per ton over 1 foot (Tagliamonte 1994).

The B occurrence is located near the southeast corner of claim S.631396. It consists of an auriferous shear zone, over six feet wide, hosted in altered felsic metavolcanic rocks. The shear zone trends north. Alteration is chloritic, sericitic,

Figure 3. Location Map of Meridian Resources Inc. and J. Brady (Peacock) properties, Parkin Township.



Scale 1:20 000



and siliceous, while the sulphide-bearing mineral is exclusively pyrite. The sulphide zone extends into fractures and minor shear zones adjacent to the main shear zone. Assays from the B occurrence have yielded 0.252 ounce Au per ton over 4 feet and 0.426 ounce Au per ton over 2.5 feet (Tagliamonte 1994).

The C occurrence is approximately 400 feet south of the B occurrence, in the west-central part of claim S.682275. It contains weakly disseminated pyrite hosted in silicified felsic metavolcanic rocks. A grab sample from this location yielded 0.183 ounce Au per ton (Tagliamonte 1994).

It should be noted that only recent exploration resulted in the discovery of the last three occurrences, namely A-1, B, and C. Prior to the current work by Meridian Resources, only the A occurrence had been subject to exploration. This zone does not disclose any structural features that would assist in understanding the nature of this occurrence. Exploration conducted during 1994 on the new showings was able to reveal partially exposed shear and fracture structures. These structures should serve as targets for continued exploration.

G. Lahaie - Black Crystal Stone Prospect

Black, coarse- to medium-grained mafic intrusive rocks such as gabbros, and preferably anorthosites, are in high demand for use as building stone and similar products. Most often, these rocks possess several inherent flaws such as close jointing, chloritic alteration, or contain sulphides, all of which preclude their use in the decorative stone industry. The discovery and subsequent production of new sources of "black granite", which lack the above mentioned flaws, may prove to be economically rewarding in the long term.

G. Lahaie conducted prospecting for nickel, copper, and platinum group metals south of the Grenville Front during the 1960's, when he discovered an unmapped mafic intrusive complex in Struthers Township. The property failed to contain any significant sulphides, however the current exploration efforts centered on building stone.

The claim group consists of 18 units in northwest Struthers Township. Refer to Figure 4. Access is by travelling south on Highway 69 from Sudbury approximately 40 km to Highway 637 (Killarney Road), then west on Highway 637 for 15 km, then south on a well-travelled bush road for 14 km to the property.

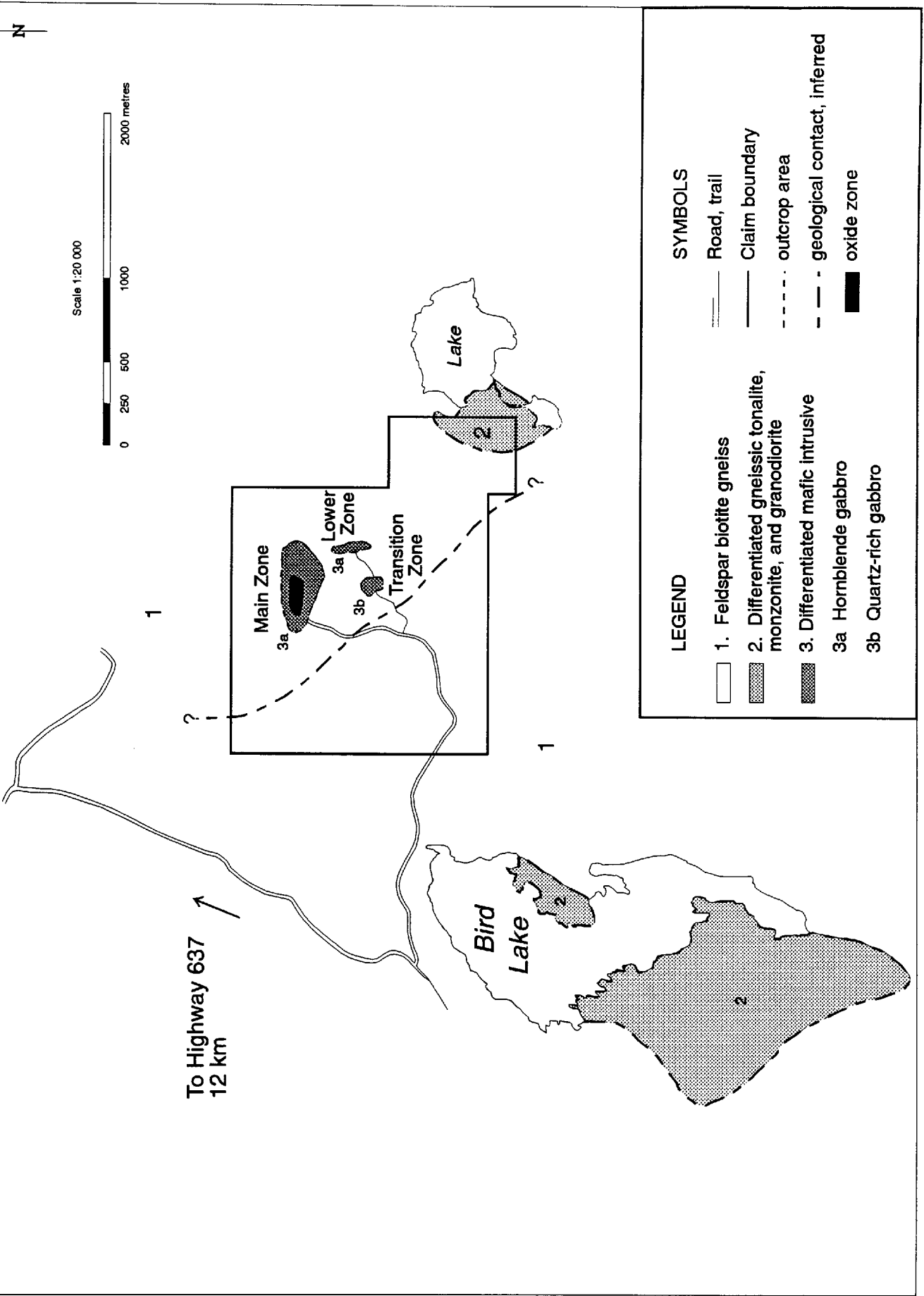
There is no record of previous work from the area on file at the Sudbury Resident Geologist's Office. Mafic intrusive rocks have been mapped south of Bird Lake, approximately 2 km to the south and also on the eastern edge of the claim group (Lumbers 1975), however there are no published maps or reports which indicate the actual extent, or variation within, the mafic complex currently being explored.

Work by G. Lahaie during 1994 included road upgrading, outcrop stripping, and the development of a quarry face. Small blocks were also removed to manufacture tiles for testing purposes.

Several phases of the mafic intrusive complex were observed. At the Main Zone, the rock is medium to coarse grained, black, with an extensive iron-oxide rind on the weathered surface. It is a hornblende gabbro with minor amounts of biotite, spinel(?), and pyrite. Much of the plagioclase has been saussuritized. The jointing in the Main Zone, for the most part, is closely spaced (less than 50 cm), but on some areas of the quarry face, the jointing may be as far apart as 2 m. The iron oxide weathering and close jointing in this zone may rule out its use as a building stone.

A limited amount of stripping was completed at the Lower Zone, approximately 600 m southeast of the Main Zone. This rock is medium grained, black, and weathers to a dark brown, but lacks the iron-oxide coating. It is also a hornblende gabbro, but does not exhibit the degree of alteration mentioned above. The texture is subhedral granular and some of the altered clinopyroxenes display composite dendritic branching. Quartz is present in quantities greater than expected, possibly due to contamination by the felsic host rocks (feldspar-biotite gneiss). Minor minerals include biotite and spinel(?). Insufficient stripping did not allow observations regarding the jointing to be made, however the absence of pyrite and the lesser amount of alteration may be positive factors in determining the suitability of building stone at this site.

Figure 4. Sketch map of the Lahaie Property, Struthers Twp.



A third variety of mafic intrusive rock was observed approximately 500 m south of the Main Zone. It is a fine-grained quartz-rich gabbro, subhedral granular in texture. Both clinopyroxene and plagioclase crystals appear in various degrees of alteration. Hornblende is the only other mineral observed in thin section. This rock may be indicative of a chill margin of the mafic intrusive, owing to fine-grained crystal size and the high quartz content due to contamination from the felsic host rocks (feldspar-biotite gneiss). The outcrop was insufficiently stripped at this site for jointing to be observed.

Lumbers (1975) reported a differentiated mafic intrusive structure west of the property near Bird Lake. However, he describes this stock as being a series of gneissic tonalite, granodiorite, and quartz monzonite. The mafic intrusive complex on the Lahaie claims does not exhibit regional metamorphic features such as gneissosity, is more mafic, and thus may be a later, unrelated intrusion. Attempts should be made to delineate this intrusion with detailed structural mapping to further evaluate its building stone potential.

J. Brady

An intriguing sulphide occurrence is located on a property owned by John Brady in southeast Parkin Township, Lot 4, Concession I. Access to the claims is by travelling approximately 12 km north of Capreol on Highway 545 (Moose Mountain Mine Road) to the Portelance Lumber Road, then in a northeasterly direction for 9.6 km. At this point, a bush road leads east, through a marble quarry, and to a skidder trail at 1.2 km. The main set of trenches is reached by following the skidder trail southeast for 720 m. Refer to Figure 3.

Several companies and individuals have completed exploration on the property since 1953. Diamond drilling has not been very extensive, and the most significant work to date was a program of mechanical stripping and trenching carried out by J. Brady in the mid- to late-1980's. Otherwise, there is no detailed geological report on the property in the Sudbury District Resident Geologist's Office.

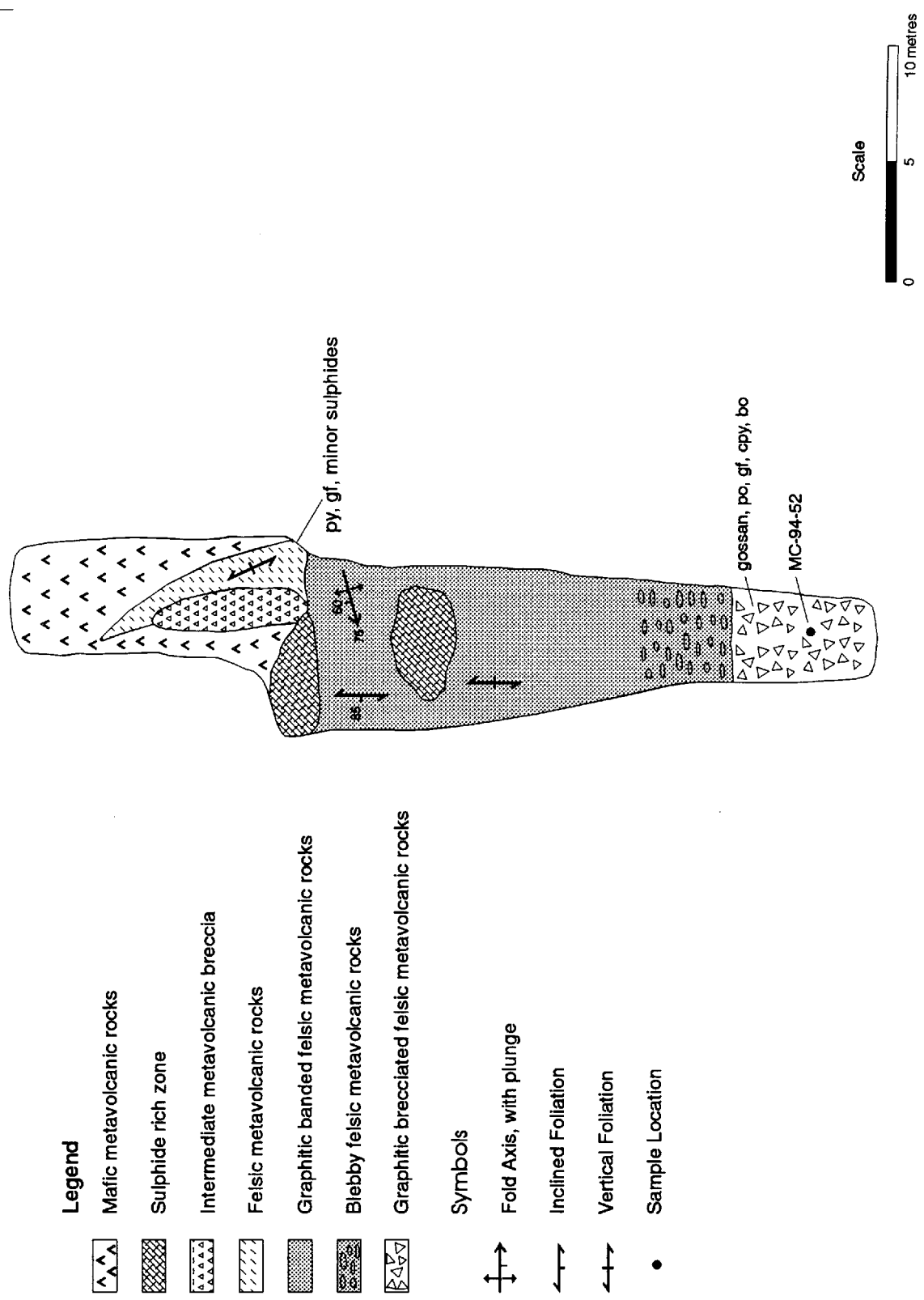
The areal geology is similar to that of the Meridian Resources Incorporated property located 3 km to the northwest. It consists of relatively massive metavolcanic units interfingering with several types of felsic metavolcanic units including massive rhyolite, rhyolite breccia, and porphyritic rhyolite. The metavolcanic rocks have been unconformably overlain by Mississagi Formation quartz arenite, and all units have in turn been intruded by Nipissing diabase.

The area of trenching is underlain by mafic metavolcanic rocks in contact with felsic metavolcanic rocks. The mafic units appear medium to coarse grained and are heavily chloritized. They are predominately massive, although felsic bands were also observed in close proximity to felsic metavolcanic units. Finely disseminated pyrrhotite is present (approximately 1 to 5%) in some samples, however it is not nickel-bearing (no reaction when dimethylglyoxime is applied).

The felsic metavolcanic unit (rhyolite?) is foliated and highly brecciated through most of the trench. Refer to Figure 5. The foliation trends north and dips steeply to the east. The breccia fragments are angular to subrounded, vary in size from 0.3 to 5 cm and are composed of altered felsic material. The matrix is composed of very fine-grained graphite, calcite, pyrrhotite, pyrite, chalcocopyrite, and iron carbonate. The clasts are floating in the breccia with a matrix over 1 cm in thickness. The pyrrhotite does not appear nickeliferous, although assay results are pending. In some locations, massive graphite and pyrite are contained in distinct bands up to 50 cm wide. The felsic unit also displays a gentle fold structure with an axis of 275°, plunging 75° southwest. A brittle shear cuts the fold, roughly parallel to the earlier-developed north-trending foliation.

Several more trenches continue south of this area for several tens of metres. Similar lithologies as these mentioned above were observed, however much of the rock is heavily oxidized. Future exploration should include exposing fresh material to facilitate detailed mapping, and channel sampling, as well as stripping to determine the extent of the sulphide-rich felsic metavolcanic breccia.

Figure 5. Plan of Geology of the Main Trench, J. Brady property, Southeast Parkin Township.



RECOMMENDATIONS FOR EXPLORATION

The Sudbury Resident Geologist's District includes areas of granites and greenstones of the Archean Superior Province, shelf sedimentary and volcanic rocks of the Paleoproterozoic Huron Supergroup, the enigmatic Mesoproterozoic Sudbury Structure, high grade metamorphic rocks of the Mesoproterozoic Grenville Province, and Paleozoic limestones and dolostones on Manitoulin Island, which are part of the northern rim of the Michigan Basin.

The Sudbury area, being a mature nickel-copper-cobalt-precious metals mining camp, offers many exploration targets for prospectors, and junior and senior mining companies. Some of these targets, because of depth and cost are only within reach of well financed companies, but every year new surface showings worthy of further investigation are being found. These, and new ideas which are being developed on the geology, continue to make the Sudbury district a worthwhile place in which to invest mineral exploration dollars.

The two established companies, Inco Limited and Falconbridge Limited, have in the past few years explored deeper and deeper into the Footwall of the Sudbury Igneous Complex. This search has been quite successful, with economic deposits having been found up to 2000 feet below the Sublayer contact zone. Footwall ore tends to be high in copper and platinum group metals, and low in nickel. What is not known is how deep into the Footwall this mineralization extends, making the Footwall below the Sublayer contact zone a prime target for exploration.

The centre of the Wanapitei Magnetic Anomaly lies about 60 km northeast of Sudbury. Its size, about 60 by 30 km, and oval shape are similar to the size and shape of the magnetic anomaly that accompanies the Sudbury Structure. However, the intensity is several times greater than that of the Sudbury Structure. Due to an extensive cover of Paleoproterozoic Huron Supergroup sedimentary rocks, the anomaly can not be explained by any rocks exposed at surface. The few exploratory holes drilled so far indicate that the source lies deeper than 4500 feet below surface. Being so similar in size and shape, and close to the Sudbury Structure, suggests that the anomaly may be caused by a mafic intrusion at depth which is genetically related to the Sudbury event, and which, similarly, may host rich nickel-copper-precious metals deposits. Despite its depth, the source of the anomaly presents an attractive target, exploration for which could be immensely rewarding.

Several thick gabbroic anorthosite intrusions occur at the base of the Huron Supergroup. These intrusions have the potential to host magmatic segregation nickel-copper-precious metals deposits along their basal contacts.

Numerous zones of intense albite alteration are found in an area broadly coincident with that part of the Sudbury Structure which lies outside the Sudbury Igneous Complex, and which is characterized by intense brecciation thought to be related to a meteorite impact 1850 Ma. The albite alteration affects mostly Huron Supergroup sedimentary rocks and intrusive Nipissing diabase. It has been dated at 1700 million years, and is thus younger than the Sudbury event by about 150 million years. The alteration zones are mostly fine grained, and pink or tan coloured. They are easily recognized visually. The albite alteration is variably associated with brecciation, sometimes of several ages, and may itself be altered by coarse calcium-magnesium-iron carbonates, chlorite, and sulphides. Anomalous metal values in the altered rocks may be gold, copper, cobalt, nickel, and chromium. Two small deposits in albite alteration zones have been mined in the past ten years, one for gold, and the other for gold and copper.

The rocks to the south of Sudbury belong to the Central Gneiss Belt of the Grenville Province. This area has good potential for the discovery of industrial minerals such as feldspar, garnet, kyanite, graphite, and attractive dimensional stone, mostly granites and gneisses.

RESEARCH BY OTHER PARTIES

There were ten Ontario Geological Survey research projects conducted in the district in 1994. Six of these projects dealt with various aspects related to the Sudbury Igneous Complex while two projects, funded through the Northern Ontario Development Agreement, dealt with industrial minerals and aggregate resources of Manitoulin Island. Other work included a compilation study west of Sudbury and a geochemical examination of the Graphite Lake Mine area. Details of this work are described in Baker et al. 1994.

The Sudbury area continues to draw the attention of academic research worldwide, even after 111 years since the discovery of the rich nickel-copper deposits associated with the Sudbury Igneous Complex. Many of the articles that are published in various journals are kept on file at the Sudbury Resident Geologist's office.

In May, 1994, *Geophysical Research Letters*, Vol. 21, No. 10 published a series of articles detailing the results of the Sudbury LITHOPROBE transect. These results indicate the Sudbury Structure is highly deformed and asymmetric at depth with a series of northwest directed thrust faults in the South Range. This deformation is not manifested in the Chelmsford Formation, indicating its deposition post dates the major tectonic deformation events of the Sudbury Structure. (Wu et al 1994).

In April, 1995, Sudbury will host the Northeast Mines and Minerals Symposium, and in September a symposium on the geology of the northern margin of the Southern Province of the Canadian Shield.

STAFF AND ACTIVITIES

The following staff were assigned to the Sudbury Resident Geologist's office for 1994.

- 1) W. Meyer, Resident Geologist
- 2) M. Cosec, Staff Geologist
- 3) T. Livingstone, Administrative Assistant
- 4) B. Gates, Industrial Minerals Geologist. B. Gates was on contract from January to October as an Industrial Minerals Geologist in the NODA program. On October 31, 1994, B. Gates started his new position as a Geoscience Assessor with the Mining Lands Branch.
- 5) Geoffrey (Jeff) Janiuk, Experience '94. J. Janiuk was hired in June and worked until the end of August as an office/field assistant.

Staff responded to approximately 1300 office enquiries and 4100 telephone inquiries. Requests included historical information searches, queries regarding staking activity, land use planning issues, mineral occurrences, general geology, assessment work, sample identification, grant programs, and many other topics.

In March M. Cosec attended the annual Prospectors & Developers Association meeting in Toronto.

Staff presented another successful prospectors course in May. Thanks again to those who volunteered their time and resources, both internal and external to the Ministry.

Staff assisted with the corporate Mining Week display at the Southridge Mall in May. A display was created and presented by our office at the Annual Jamboree for Scouts and Guides at Fairbank Lake on May 22. Over a thousand children attended the event. A display was created and attended at the Annual Gem and Mineral Show held in Carmichael Arena in July.

A wide variety of international requests were filled this year, including requests from India, Scotland, Germany and U.S.A. Staff members led several geological tours across the Sudbury Structure. Specific tours were also conducted for building stone, and other areas of interest in the Sudbury district.

A geology display was created by B. Gates for the Manitoulin Tourist Association concerning Manitoulin Island. This display is housed in the Tourist Information Centre at Little Current. Signs were created and posted at various spots along the Cup and Saucer Nature Trail as well.

J. Janiuk and S. Johnson moved approximately 5000 feet of diamond drill core last summer. All core that has been donated to the Sudbury Office is stored at McFarlane Lake. Please call for an appointment to view the core.

W. Meyer was responsible for the poster session at the CIM 4th Annual Field Conference - Strategies for Success, held at the Sheraton Caswell this September. Nearly all major mining companies in Ontario and Quebec participated in this event.

M. Cosec attended the Mines and Minerals 94 Symposium in Toronto in December.

Our office received a donation of air photos (1973) from Techdel International Incorporated in December. The donation weighed in at approximately 120 lbs.

ACKNOWLEDGEMENTS

Staff would like to acknowledge the continued support provided by B. Gates concerning requests regarding Manitoulin Island. Staff would also like to acknowledge the cartographic support received from Audrey Robitaille.

SELECTED PUBLICATIONS RECEIVED

The Sudbury Resident Geologist office has available the most recent issues of the following periodicals: *The Northern Miner*, *Nikel*, *Canadian Mining Journal*, and *Dimensional Stone Magazine*.

Listed below are some of publications received by the office in 1994. Other books and periodicals are available to the interested reader for viewing at the office.

Bajc, A. F. 1994. Gold Grains in Surface Till Samples, Parkin and Norman Townships, Sudbury; Ontario Geological Survey, Open File Report 5893.

Bajc, A. F. 1994. Quaternary Geology of the Huntsville-Penetanguishene Area, Central Ontario; Ontario Geological Survey, Open File Report 5882.

Byron, M., Whitehead, R. E., and Davis, J. F. 1994. Lithochemical and Geological Compilation of the Archean Rocks of the Whiskey Lake Greenstone Belt, Algoma District, Ontario: Applications to Reconnaissance Mineral Exploration; Ontario Geological Survey, Open File Report 5902.

Chubb, P. T., Hannila, K. K., and Peck, D. C. 1994. Precambrian Geology, East Bull Lake Gabbro-Anorthosite Intrusion; Ontario Geological Survey, Preliminary Map P.3274, scale 1:20 000.

Harries, Karl J. C. 1994. Mining Exploration Agreements. A Guide to their Negotiations and Use; Centre for Resource Studies, Queen's University.

Jensen, L. S. 1994. Geology of the Whiskey Lake Greenstone Belt (West Half), District of Sault Ste. Marie and Sudbury; Ontario Geological Survey, Open File Report 5883.

Jensen, L. S. 1991. Precambrian Geology of the Whiskey Lake Area, West Half, District of Algoma; Ontario Geological Survey, Preliminary Map P.3186, scale 1:15 000.

Johns, C. W. 1994. Precambrian Geology, Garson Township; Ontario Geological Survey, Preliminary Map P.3306, scale 1:20 000.

Lightfoot, P. C., and Naldrett, A. J., editors. 1994. Proceedings of the Sudbury-Noril'sk Symposium; Ontario Geological Survey, Special Volume 5.

Paakki, Jari J. 1994. The Errington Zn-Cu-Pb Massive Sulphide Deposit, Sudbury, Ontario: Its Structural and Stratigraphic Setting and Footwall Alteration; masters thesis for Laurentian University.

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**SEDIMENTARY AND ENVIRONMENTAL
GEOSCIENCE SECTION**

SOUTHWESTERN RESIDENT GEOLOGIST'S DISTRICT - 1994

B.H. Feenstra¹, A.C. Wilson², and C. Tanglis³

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³Student Assistant, London, Sedimentary and Environmental Geoscience Section, Ontario Geological Survey

INTRODUCTION

Southwestern District provides much of Ontario's structural material and non-metallic mineral wealth. The district provides the entire provincial production of salt and gypsum and much of the brick shale; crushed stone for cement, lime, chemical and metallurgical products; and building stone from dolostone beds.

Exploration activity and recommendations focus on the very high-purity dolomite of the Guelph Formation in the district as a potential raw material resource for synthetic magnesia.

MINING ACTIVITY

During 1994, a total of 5 rock salt and gypsum mines and 3 brine fields were operational in the Southwestern District. Also active in the district were 27 quarry operations for building stone products, shale for the manufacture of bricks and other industrial clay products, and crushed stone for cement, lime, chemical, metallurgical and industrial filler products. The location of each active operation is indicated on Figure 1.

Gypsum

Gypsum is mined from the Salina Formation at: the Caledonia No. 3 Mine of Domtar Gypsum; the Hagersville Mine of CGC Gypsum; and the Drumbo Mine of Westroc Industries Limited. The primary use for gypsum is in the manufacture of wallboard for the construction industry.

Salt

Rock salt is also mined from the Salina Formation at the Goderich Mine by Sifto Canada Inc. and at the Ojibway Mine in the Windsor area by The Canadian Salt Company Ltd. The rock salt is used primarily for de-icing of roads. Other uses include water softening, feed salt and the chloralkali industry.

Saturated salt brines for the production of evaporated, high-purity, fine-granular salt for food-grade, chemical and agricultural applications are produced from brine well operations in the Salina Formation at Goderich by Sifto Canada Inc. and at Windsor by The Canadian Salt Company Ltd.

General Chemical Canada Ltd. continued to extract saturated salt brines from the Salina Formation at its brine well field in Anderdon Township, north of Amherstburg. The brines are used in combination with calcined high-purity limestone in the manufacture of soda ash and calcium chloride products at the company's Amherstburg plant facilities.

Building Stone

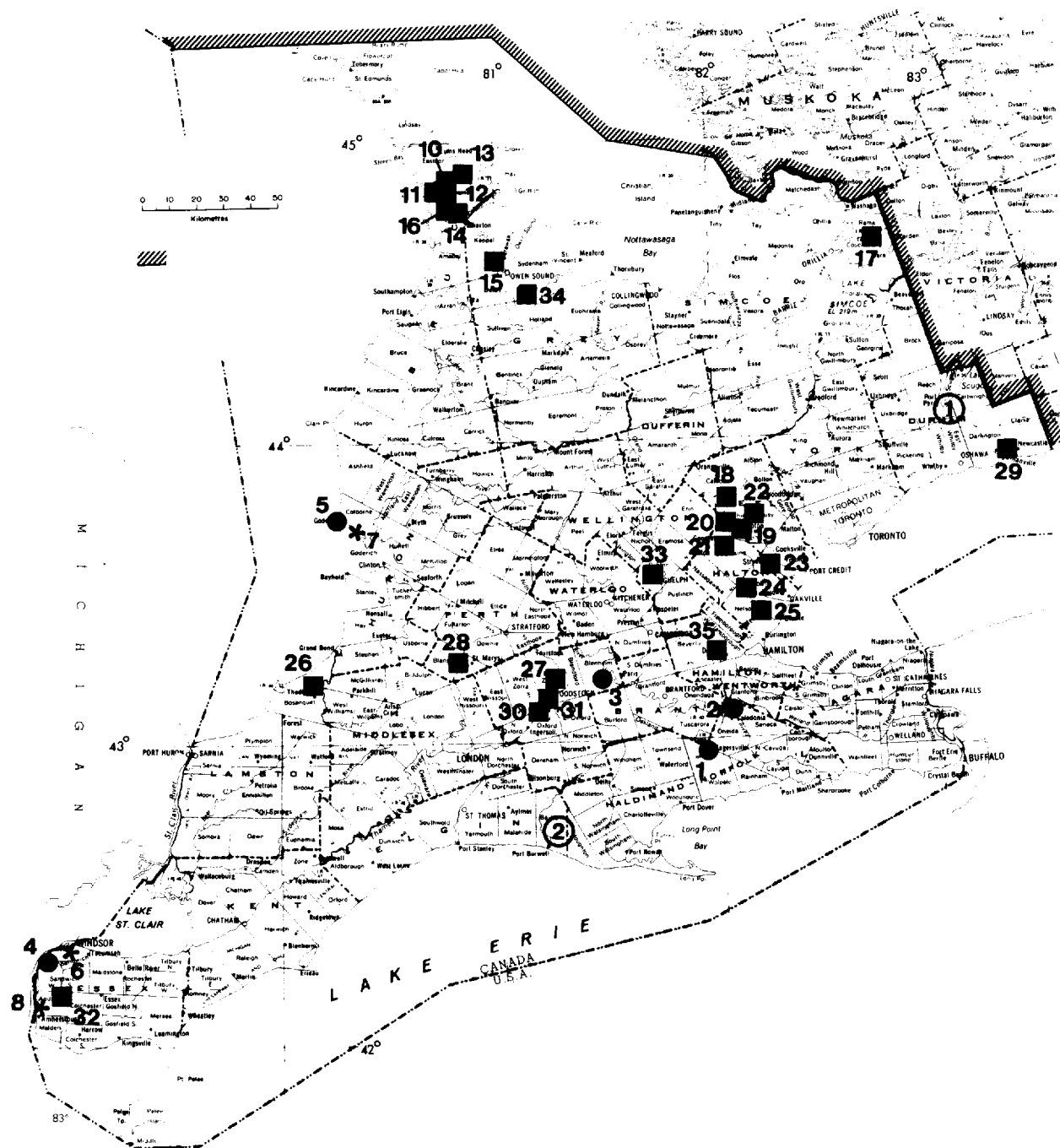


Figure 1. Southwest Resident Geologist's District - 1994

EXPLANATION

Mining/Quarrying Activity in 1994

● **Producing Mines**

Gypsum

1. Canadian Gypsum Company, Hagersville Mine
2. Domtar Gypsum, Caledonia No. 3 Mine
3. Westroc Industries Limited, Drumbo Mine

Rock Salt

4. The Canadian Salt Company Ltd., Ojibway Mine
5. Sifto Canada Inc., Goderich

* **Producing Brine Wells**

Fine Salt

6. The Canadian Salt Company Ltd., Windsor Field
7. Sifto Canada Inc., Goderich Field

Chemical Salt

8. General Chemical Canada Ltd., Anderdon Fiel

■ **Producing Quarries**

Building Stone - Dolostone

10. Allen Bridge Landscaping, Emerson McLay Quarry, Albemarle Tp.
11. Amsen Quarries Ltd., Mar Quarry, Albemarle Tp.
12. Amsen Quarries Ltd., Wiarton Quarry, Amabel Tp.
13. Arriscraft Corporation, Adair Marble Quarries, Albermarle Tp.
14. Ebel Quarries Inc., Ebel Quarry, Amabel Tp.
15. Owen Sound Ledgerrock Ltd., Owen Sound Quarry, Keppel Tp.
16. Owen Sound Ledgerrock Ltd., Wiarton Quarry, Amabel Tp.

Building Stone - Limestone

17. Speiran Quarries Ltd., Speiran Quarry, Rama Tp.

Building Stone - Sandstone

18. Deforest Brothers Quarry Ltd., Deforest Brothers Quarry, Caledon Tp.
19. Hilltop Stone and Supply Inc., Hilltop Stone & Supply Quarry, Esquesing Tp.
20. Rice and McHarg Quarries Ltd., Rice and McHarg Quarry, Esquesing Tp.

Clay Products - Shale

21. A.C. Martin Ltd., Georgetown Quarry, Esquesing Tp.
22. Brampton Brick Ltd., Cheltenham Quarry, Chinguacousy Tp.
23. Canada Brick, Britannia Quarry, Mississauga
24. Canada Brick, Milton Quarry, Esquesing Tp.
25. Canada Brick, Tansley Quarry, Nelson Tp.
26. Coultis and Sons Ltd., Thedford Quarry, Bosanquet Tp.

Cement - Limestone, clay and shale

27. Lafarge Canada Inc., Woodstock Quarry, Zorra Tp.
28. St. Marys Cement Company, St. Marys Quarry, Blanshard Tp.
29. St. Marys Cement Company, Bowmanville Quarry, Darlington Tp.

Lime - Chemical, metallurgical, filler grade limestone

30. BeachviLime Limited, Beachville Quarries, Zorra Tp.
31. Global Stone (Ingersoll) Ltd., Ingersoll Quarry, Zorra Tp.
32. General Chemical Canada Ltd., McGregor Quarry, Anderdon Tp.

Lime - Chemical, metallurgical, filler grade dolomite

33. Guelph DoLime Limited, Guelph Quarry, Guelph Tp.
34. Owen Sound Dolomite, Sydenham Quarry, Sydenham Tp.
35. Redland Quarries Inc., West Flamborough Tp.

① Location of OGS Field Party in 1994

1. P. J. Barnett
2. R. I. Kelly

During 1994, a total of 12, mainly seasonal, building stone quarry operations were active in the district. These worked: dolostone beds of the Amabel and Guelph (Eramosa Member) formations in the Owen Sound - Albemarle Township area of the Bruce Peninsula; sandstone beds of the Whirlpool Formation in the Georgetown - Inglewood area of the Niagara Escarpment west of Toronto; and limestone beds of the Gull River Formation in Ramara (formerly Rama) Township north of Lake Simcoe.

Adair Marble Quarries, a division of Arriscraft Corporation, extracted mainly bluish-grey Amabel dolostone in large blocks from the company's main quarry near Hope Bay in the Bruce Peninsula. The mill blocks are transported to the company's finishing plant in Cambridge. Adair Marble is marketed as an architectural stone throughout North America.

Owen Sound Ledgerrock operates 3 quarries in the Owen Sound and Wiarton areas of the Bruce Peninsula on a year-round basis; the only building stone company to do so in the district. The company extracts light and dark grey-brown Eramosa dolostone, in the form of large mill blocks, for further processing (cutting, polishing, etc.) at its Owen Sound Quarry plant facilities. Cut stone products are for exterior masonry uses or as Eramosa marble for interior residential uses such as fireplaces and counters. The products are marketed throughout northeastern North America.

Amsen Quarries Limited, Ebel Quarries Inc., and Allan Bridge Landscaping also operated quarries which worked the Eramosa dolostone of the Bruce Peninsula for various landscaping, masonry and paving stone products.

The Whirlpool sandstone was actively worked during 1994 for landscaping, paving and interior or exterior masonry stone products at 3 small quarries in the Niagara Escarpment west of Toronto by: Deforest Brothers Quarry Ltd. (grey, red, and mottled varieties) near Inglewood; Hilltop Stone and Supply Inc. (grey variety) in the Georgetown area; and Rice and McHarg Quarries Limited (grey variety).

The Gull River limestone was actively worked for landscaping stone products in a small quarry operated by Speiran Quarries Ltd. in Ramara (formerly Rama) Township north of Lake Simcoe.

Shale

The structural clay products industry of Ontario is dominated by brick manufacturing using Queenston Formation shale from deposits located in the western part of the Greater Toronto Area (GTA). In 1994, Canada Brick was the largest brick producer operating the Milton Quarry, the Tansley Quarry near Burlington, and the Britannia Quarry at Streetsville in Mississauga. Brampton Brick operated the Cheltenham Quarry during the year.

Other structural clay products made largely of Queenston shale from deposits located in the western part of the GTA include flue lining, sewer pipe, structural tile, filter tile, drain tile, and flower pots.

Cement Limestone

Three Portland cement plants and on-site crushed limestone quarry operations were in production during 1994 in the Southwestern District: 1) Lafarge Canada Inc., Woodstock. The operation blends limestones of the Lucas Formation (high-purity; with less than 1% MgO), Amherstburg Formation (more shaly and cherty; with up to 1.5% Al₂O₃ and 7% SiO₂, and less than 5% MgO), and the Bois Blanc Formation (very cherty; up to 41% SiO₂ and less than 5% MgO); 2) St. Marys Cement Company, St. Marys. The company blends limestones of the Dundee Formation (up to 1.5% MgO) and the Lucas Formation (less than 4% MgO); 3) St. Marys Cement Company, Bowmanville. Shaly and non-shaly limestones of the Lindsay Formation are blended at this location.

Limestone and Dolomite for Lime, Chemical, Metallurgical, and Pulverized Stone Products

During 1994, high-purity limestones of the Lucas Formation (less than 1% $\text{SiO}_2 + \text{Al}_2\text{O}_3 + \text{Fe}_2\text{O}_3$) were quarried in the district by:

- 1) BeachviLime Limited at Beachville for on-site production of quicklime, hydrate, metallurgical flux stone, cement limestone, and pulverized stone for agricultural, glass, and off-white filler applications;
- 2) Global Stone (Ingersoll) Ltd. at Ingersoll for on-site production of quicklime, metallurgical flux stone, agricultural limestone, and aggregates for asphalt, concrete, and road base construction;
- 3) General Chemical Canada Ltd. at McGregor in Anderdon Township northeast of Amherstburg for the manufacture of soda ash and calcium chloride products at the company's Amherstburg plant.

High-purity dolomites of the Guelph and Eramosa formations (more than 21% MgO ; less than 3% $\text{SiO}_2 + \text{Al}_2\text{O}_3 + \text{Fe}_2\text{O}_3$) are blended at the quarry operations of Guelph DoLime Limited (subsidiary of BeachviLime Limited) at Guelph and Redland Quarries Inc. at Dundas for on-site production of various dolime, doloma, metallurgical flux stone, and pulverized stone products.

Small tonnages of similar high-purity Amabel Formation dolomite screenings from the Sydenham Quarry of E.C. King Contracting Ltd. near Owen Sound are processed at the company's Owen Sound Dolomite plant for use as flux sand at the local glass plant of PPG Industries Canada Limited.

EXPLORATION ACTIVITY

One individual received an Ontario Prospectors Assistance Program (OPAP) grant for copper prospecting work to be carried out in a sandstone formation in the district in 1994, and one company received Ontario Mineral Incentive Program (OMIP) assistance for a dolomite industrial mineral project.

A major manufacturer of brine-based chemicals is assessing the Guelph Formation dolomite in the district to develop a captive source of the very high purity raw material required in the production of dead-burned magnesia refractories used in steel making. The company sampled cores of the dolomite formation taken by the Ontario Geological Survey and stored at the London Resident Geologist's facilities.

LAND USE PLANNING ACTIVITY

Changes to the Planning Act (Bill 163) in Ontario have affected the role that the Ministry of Northern Development and Mines and the Resident Geologists' offices play in the land-use planning process. The Planning Act regulates surface use of private land and, because most of southern Ontario falls into this category, the staff of the London Resident Geologist's office is spending a large amount of their time responding to various land use planning documents and issues.

During 1994, the London office was involved in preparing "mineral planning interest" maps for a co-operative review project involving the Ministry of Municipal Affairs and the Ministry of Northern Development and Mines. This project is discussed in the 1994 Summary of Field Work and Other Activities (Wilson 1994).

The staff geologist provided responses to 39 separate Official Plans and Official Plan Amendments during 1994. The majority of these land use planning documents were concentrated in the Essex, Perth and Wellington county areas.

These documents are reviewed to ensure that the goals and policies expressed within the plan are consistent with the Comprehensive Set of Policy Statements put forward by the Ministry of Municipal Affairs in conjunction with Bill 163. More specifically, the review ensures that mineral and petroleum resources and operations as well as areas of potential mineral and petroleum resources are protected from incompatible land uses.

RESIDENT GEOLOGIST STAFF & ACTIVITIES

The London Resident Geologist's office is staffed by B. H. Feenstra, Resident Geologist; A. C. Wilson, Staff Geologist and P. I. Smith, Administrative Assistant. Additional staff for the year included J. Laplante, summer student geological assistant, (Experience '94 Program); B. Van Dooren, volunteer summer student geological assistant, and C. Tanglis, student assistant for the fall and winter months.

Senior staff provided geoscience and mineral resource related advisory and information services to 300 clients visiting the office, and responded to 1100 telephone inquiries. The office also sells maps and reports published by the Mines and Minerals Division and provides services required to obtain prospector's licences.

In addition to providing all of the land use planning input for the southwestern Resident Geologist's District, A. C. Wilson also served on the Planning Reform Steering Committees for Southwestern and Central Ontario and was the Ministry liaison for two inter-ministerial planning projects (see Wilson 1994). She also prepared and staffed a mineral display at the Ontario Science Centre's annual Geofest. In February and November, she presented a career day seminar to groups of grades 6 to 8 and grades 3 to 5 students in Hamilton and Ilderton.

B.H. Feenstra prepared a detailed bedrock limestone resource potential map for Oxford County that was included in the Official Plan. He also completed, with the assistance of C. Tanglis, input to the Environmental Assessment and re-lated preliminary studies of 9 landfill, highway, and trunk sewer project proposals.

B.H. Feenstra and/or C. Tanglis completed visits to more than 20 building stone, chemical stone, brick shale, and construction aggregate stone quarry operations in the district.

B.H. Feenstra completed a geological evaluation and report on the Grimsby Formation sandstone at a quarry source in western New York currently used in the restoration of the legislative buildings at Queen's Park in Toronto. He also provided information and recommendations to industry clients on: proposed exploration of the Sylvania Member sandstone in the west Essex County as a potential source of very high-grade silica/silicon metal products; the Guelph Formation as a potential source of refractory grade dolomite; and the Lucas Formation, under Lake Erie, as a potential high-calcium limestone resource.

At the invitation of the Grand River Heritage Mines Society, the Resident Geologist gave a public talk in Brantford on past and present gypsum mining activities in the Grand River area, and participated in a gypsum mining exhibit at a show in Paris.

Drill Core Library

The relocation of the London Resident Geologist's office to new premises, in April 1994, provided an opportunity to open a new drill core storage facility adjacent to the Ministry of Natural Resources Petroleum Resources Laboratory. Before April, all of the diamond drill core had been inaccessibly stored at a local public storage facility.

Core from 77 diamond drill holes is currently stored in the outdoor storage facility. Most of the core was collected by geologists from the Sedimentary and Environmental Geoscience Section of the Ontario Geological Survey and represents a good cross section of the subsurface geology of southern Ontario. Approximately 4500 m of core is stored at the London site.

Over the course of the summer staff organized and tagged all of the drill core boxes. A paper database of all diamond drill core stored on the premises was also completed. A computerized inventory of the diamond drill core will be available to interested clients in mid-1995.

Anyone interested in viewing the core, or wishing to donate additional core to the facility, should contact the London Resident Geologist.

RECOMMENDATIONS FOR EXPLORATION

High-purity dolomite from the Guelph Formation is currently quarried and processed in the district for iron and steel industry uses as blast furnace fluxstone, slag conditioning dolime (calcined dolomite: $\text{CaO} + \text{MgO}$), or doloma

(dead-burned dolomite: CaO + MgO) for refractories. The level of the SiO₂, Fe₂O₃, and Al₂O₃ impurities in the raw dolomite varies respectively as follows: 0.05 - 0.40%, 0.10 - 0.20%, and 0.05 - 0.20%.

The synthetic magnesia - from - brines process, however, requires that the levels of the SiO₂, Fe₂O₃, and Al₂O₃ impurities are at a minimum in the dolomite raw material, i.e. 0.10%, 0.07%, and 0.08% or less respectively. Caustic-calcined synthetic magnesia is used in magnesium metal production, paper industry, magnesium chemicals, plastics and rubber; dead-burned magnesia refractories are used in the steel industry.

The chemical composition of samples from outcrop and drillcore of the very high-purity Guelph dolomite in Puslinch Township, West Luther Township, and St. Edmunds Township suggest synthetic magnesia raw material potential.

ONTARIO GEOLOGICAL SURVEY ACTIVITIES

A detailed account of the field work conducted by the Ontario Geological Survey in the Southwestern Resident Geologist's District can be found in Summary of Field Work and Other Activities - 1994, Ontario Geological Survey, Miscellaneous Paper 163. The location of the following pertinent projects are shown on Figure 1.

Oak Ridges Moraine area - parts of Peterborough and Victoria counties and Part of Durham Regional Municipality

P.J. Barnett completed the third year of a multi-year investigation of the Oak Ridges Moraine. This study is designed to examine the Quaternary sediments of the moraine and the area surrounding it. Results of the investigation will provide a better understanding of the formation and benefit and/or resolve land use planning issues that may arise in the Oak Ridges Moraine area.

Aggregate Resource Mapping - eastern Elgin County and Norfolk Township

R.I. Kelly completed the evaluation of sand, gravel and bedrock resources of 6 townships in Elgin County and the township of Norfolk in the regional municipality of Haldimand-Norfolk. The results of this investigation will be useful for the evaluation of resource potential and land use planning decisions.

REFERENCES

Wilson, A.C. 1994. The role of the resident geologist's office in land-use planning in Summary of Field Work And Other Activities - 1994; Ontario Geological Survey, Miscellaneous Paper 163, p.186-187.

Table 1. Publications, London Resident Geologist's District

TITLE	AUTHOR	TYPE OF PUBLICATION/YEAR
Hydrogeologic implications of a buried linear morphological feature in Essex County, Ontario	Ainslie, A.M.	Unpublished MSc thesis, University of Windsor, Windsor, Ontario 114p., 1991
Paleozoic geology, Fenelon Falls area, southern Ontario	Armstrong, D.K. and Rheaume, P.	OGS-OFR 235, 1994
Quaternary geology of the Huntsville-Penetanguishene area, central Ontario	Bajc, A.F.	OGS-OFR 5882, 134p.

Quaternary geology, Markdale area, Markdale- Owen Sound, southern Ontario	Feenstra, B.H.	OGS Preliminary Map P.3251, 1994
The geochemical map of Ontario pilot project - Part I: Report on the 1992 80th Meridian Traverse	Fortescue, J.A. and Dyer, R.D.	OGS-OFR 5907, 298p., 1994
Groundwater recharge investigation of a linear morphological feature east of Belle River, Ontario	Ibrahim, O.	Unpublished MSc thesis, University of Windsor, Windsor, Ontario, 233p., 1992
Results of a Quaternary geology hollow stem augering program, Woodbridge, Ontario	Kelly, R.I.	OGS-OFR 5887, 52p., 1994
Quaternary geology of Essex County, southwestern Ontario	Morris, T.F.	OGS-OFR 5886, 130p., 1994
Aggregate resources inventory of the Township of Southwest Oxford, Oxford County		OGS-ARIP 62, 61p., 1994
Aggregate resources inventory of Tiny, Tay and Medonte Townships, Simcoe County		OGS-ARIP 79, 73p., 1994
Aggregate resources inventory of the Orillia and Matchedash Townships, Simcoe County		OGS-ARIP 80, 61p., 1994
Aggregate resources inventory of Ramara Township, Simcoe County		OGS-ARIP 155, 69p. 1994
Mafic-ultramafic intrusions, base-metal sulphides, and platinum group element potential of the Grenville province in southeastern Ontario	Wilson, G.C.	OGS-OFR 5880, 196p., 1994

PETROLEUM RESOURCES CENTRE, MINISTRY OF NATURAL RESOURCES - 1994

T.R.CARTER

Subsurface Geologist
Petroleum Resources Centre
Ministry of Natural Resources
London

INTRODUCTION

Oil and gas drilling activity in Ontario in 1994 continued at a steady pace compared to the previous year. Highlights of the year include; the completion of 25 new gas wells in the Innerkip gas pool (Cambrian), several successful exploratory wells drilled in the vicinity of the Rochester 1-17-II EBR oil and gas pool (Ordovician), and 22 new gas wells completed in Lower Silurian sandstone reservoirs beneath Lake Erie. In addition, oil production in Ontario in 1994 totalled 263 242.8 m³. This is a 4% increase in volume from the previous year and is another record for annual production for Ontario. The previous record was set in 1993.

EXPLORATION ACTIVITY

A total of 143 permits to bore, drill or deepen a well were issued by the Ministry of Natural Resources in 1994, compared to 147 in 1993. Statistics on leasing and geochemical and geophysical surveys are not yet available.

Drilling was completed at 108 wells in 1994. These consisted of 56 exploratory wells, 51 development wells and 1 in other classes ("service"). This is considerably more than the previous year when 42 exploratory, 43 development and 20 service wells were drilled. The 1994 exploratory drilling resulted in 25 wells completed as gas producers, 2 wells completed as oil producers and 4 wells completed for production of both oil and gas. (Table 1). Development drilling resulted in 3 wells reported to be oil producers and 35 as gas producers. This is an impressive success rate of 55% for exploratory drilling and 75% for development drilling.

Drilling was reported to be complete at 15 exploratory wells and 8 development wells testing Ordovician targets in 1994. The Ordovician exploratory drilling is reported to have resulted in 2 new oil producers, 4 wells capable of production of both oil and gas and one well suspended pending further evaluation. As in the previous year Essex County was the focus of most of the exploratory drilling, accounting for all of the successful exploratory wells. PPC Rochester #15 Rochester 7-17-IV EBR was completed as an oil producer in an apparent new pool discovery just 2 km east-northeast of the Rochester 1-17-II EBR pool operated by Paragon Petroleum Corporation. Two additional wells, one of which was a horizontal well, were

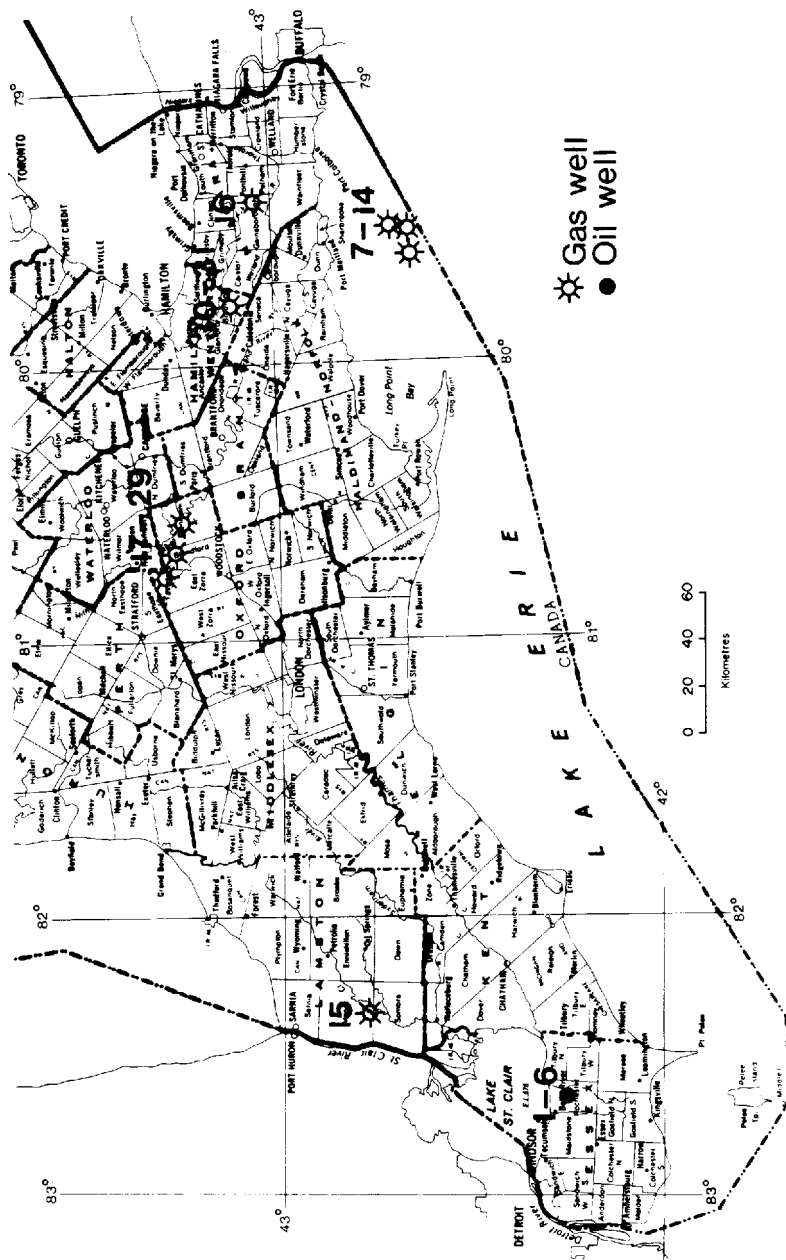


Figure 1. Location of successful oil and gas exploratory wells drilled in southern Ontario in 1994. See Table 1.

TABLE 1. Successful exploratory wells in southwestern Ontario, 1994. See Figure 1 for well locations.

Map No.	Latitude Longitude	Well Name	Target	Metres Drilled	Class Status	Compl. Date
ESSEX						
1	42 15 54.7 82 41 46.8	Paragon et al 14 Rochester 4-8-1EBR	Ordovician	1016.0	NPW OPGP	1994 09 05
2	42 15 55.0 80 42 26.2	PPC Rochester #12 Rochester 8-8-1 EBR	Ordovician	1012.0	NPW OPGP	1994 09 13
3 05	42 15 38.6 82 41 2.3	Paragon et al #16H Rochester 8-14-II EBR	Ordovician	1228.0	NPW OPGP	1994 10
4	42 15 9.1 80 40 01.1	Paragon Rochester #17 Rochester 8-15-111 EBR	Ordovician	891.0	NPW OPGS	1994 09 19
5	42 14 39.2 82 38 56.6	PPC Rochester #15 Rochester 7-17-IV EBR	Ordovician	1102.0	NPW OPGP	1994 03 11
6	42 13 06.2 82 37 06.9	SEC Exploration #4 Rochester 8-21-VI	Ordovician	930.0	NPW OP	1994 02 25
HALDIMAND						
7	42 41 20.0 79 32 45.0	Pembina Lake Erie 39-R-3	Clinton-Cataract	423.0	NPW GP	1994 08 16
8 20	42 41 10.0 79 31 45.0	Pembina Lake Erie 39-S-3	Clinton-Cataract	434.0	NPW GP	1994 09
9	42 40 45.0 79 30 45.0	Pembina Lake Erie 39-U-2	Clinton-Cataract	439.0	NPW GP	1994 08 09
10	42 44 10.0 79 37 15.0	Pembina Lake Erie 40-C-4	Clinton-Cataract	376.0	NPW GP	1994 05 23
11	42 43 15.0 79 36 15.0	Pembina Lake Erie 40-1-I	Clinton-Cataract	382.0	NPW GP	1994 10 02
12	42 38 45.0 79 44 40.0	Pembina Lake Erie 69-F-2	Clinton-Cataract	425.0	NPW GP	1994 07 08
13	42 38 20.0 79 30 45.0	Pembina Lake Erie 71-J-3	Clinton-Cataract	470.0	NPW GP	1994 06 21
14	42 37 50.0 79 32 15.0	Pembina Lake Erie 71-M-1	Clinton-Cataract	469.0	NPW GP	1994 06 28
LAMBTON						
15	42 46 3.4 82 20 41.7	Ram 102 Moore 5-15-I	Salina-Guelph	681.4	NPW GP	1994 09 26
LINCOLN						
16	43 02 49.5 79 24 41.0	Comfort #1 Gainsborough 6-24-IV	Clinton-Cataract	152.4	NPW GP	1994 08 16

OXFORD

17	43 17 44.2 80 40 23.9	DGC Blandford 7-1-XIII	Cambrian	880.0	NPW GP	1994 07 06
18	43 16 13.8 80 42 48.4	Blandford 4-8-XI	Cambrian	892.0	NPW GP	1994 03 17
19 10	43 16 8.7 80 36 3.6	DGC Blenheim 7-17-X	Cambrian	866.6	NPW GP	1994 07
20	43 12 18.5 80 36 27.5	Blenheim 7-21-V	Cambrian	887.7	NPW GP	1994 03 08

TABLE 1 CONT'D

21	43 17 20.4 80 38 24.1	DGC Blenheim 7-21-XII	Cambrian	873.0	NPW GP	1994 06 25
22	43 16 11.5 80 38 12.0	DGC "H" (Ryers) Blenheim 4-22-X	Cambrian	870.0	NPW GP	1994 01 24
23	43 16 36.3 80 45 51.5	DGC E.Zorra 1-25-XV	Cambrian	896.9	NPW GP	1994 05 12
24	43 17 03.0 80 44 59.5	DGC #7 East Zorra 2-25-XVI	Cambrian	887.0	NPW GP	1994 02 16
25	43 16 47.0 80 47 04.0	DGC #9 (Tolsma) East Zorra 2-26-XIV	Cambrian	905.2	NPW GP	1994 03 06
26	43 17 43.4 80 45 51.5	DGC E. Zorra 2-30-XIII	Cambrian	902.6	NPW GP	1994 04 29
27	43 19 24.0 80 46 16.0	DGC P2-6 East Zorra 1-33-XVI	Cambrian	894.6	NPW GP	1994 02 03

PERTH

28	43 20 59.0 80 51 54.0	DGC S. Easthope 1-26-III	Cambrian	923.0	NPW GP	1994 10 02
29	43 19 52.1 80 52 42.3	DGC S. Easthope 1-29-V	Cambrian	937.5	NPW GP	1994 08 03

WENTWORTH

30	43 07 56.8 79 49 11.0	Kinsman #1 Binbrook 5-4-III Blk.4	Clinton-Cataract	140.0	NPW GP	1994 09 09
31	43 09 36.0 79 45 33.0	Postmus #1 Binbrook 4-5-Block 2-1	Clinton-Cataract	72.8	NPW GP	1994 09 20

completed as oil and gas producers in exploratory extensions northwest of the discovery well. To the northwest of the Rochester 1-17-II EBR pool, PPC Rochester #12 Rochester 8-8-I EBR was reported as an oil and gas producer in a new pool exploratory test and Paragon et al #14 Rochester 4-8-I EBR was also reported as an oil and gas producer in an exploratory test immediately east of the Rochester 8-8-I EBR location. Accurate delineation of the inter-relationships of these new discoveries in Rochester Township will require further drilling. One other exploratory well, SEC Exploration #4 Rochester 8-21-VI, was completed as an oil producer in a possible extension to the Rochester 1-20-V EBR oil pool.

Ordovician development drilling is reported to have resulted in 2 new oil producers and 4 wells suspended pending further evaluation. Pembina et al. (Horizontal No.1) Romney 3-11-IV was completed as an oil producer in the northwest end of the Romney 6-13-III pool (Renwick) and Pembina et al. Mersea 5-240-NTR was completed as an oil producer in the Mersea 3-6-V oil pool. Pembina et al. Mersea 5-3-V was reported to be an oil producer in the Mersea 3-4-IV oil pool but is suspended pending completion. Three additional wells reported oil shows and are currently suspended.

The Cambrian was the most popular target for oil and gas exploration and development drilling in 1994. Thirty-six wells were drilled to test Cambrian targets in 1994, 22 exploratory and 14 development wells, compared to 28 wells the previous year. All of these wells were drilled in the vicinity of the Innerkip gas field, making this by far the most active play in the province. Twenty-five of the wells, 12 development and 13 exploratory, were completed as gas producers. Six wells encountered shows of gas and are currently suspended pending further evaluation. Three wells were plugged and abandoned. Two wells encountered oil on the down-dip edge of the field and have been suspended pending further assessment. Gas production in the pool is derived from a thin horizon of porous Cambrian sandstones lying directly on the Precambrian basement. The pool was discovered in 1961 and was originally developed by a total of 9 wells.

There were 4 exploratory and 4 development tests of Silurian Guelph-Salina targets in 1994. One of the exploratory wells was reported to be a gas producer; Ram 102 Moore 5-15-I. Development drilling resulted in 1 new oil producer in the Camden 6-10-IX Gore pool, and one well in the Chatham 7-17-XII gas pool was successfully deepened and recompleted as a gas producer. All the remaining Salina-Guelph tests were plugged and abandoned.

Place Resources Corporation and Pembina Exploration Limited both had drilling programs on Lake Erie in 1994. All these wells were targeted on Lower Silurian sandstones of the Clinton and Cataract Groups. Place drilled 4 development wells, all of which were completed as gas producers. Pembina completed 10 of 13 development wells as gas producers, and 8 of 12 exploratory wells as gas producers. In onshore activity development drilling of Silurian Clinton-Cataract sandstone targets resulted in 8 new gas wells; 7 in the Haldimand field, and 1 in the Aldborough 4-Z-II gas pool. In addition 2 exploratory wells were successfully completed as gas wells in exploratory extensions of the Haldimand gas field and one in the Welland pool.

There were no tests of Devonian targets in 1994.

No natural gas injection/withdrawal wells or observation wells were completed in 1994. There are presently 22 former gas pools in the subsurface of southwestern Ontario which have been designated as natural gas storage pools by the Ontario Energy Board. Twenty-one storage pools were in operation at the time of writing. Winter demand for natural gas in Ontario exceeds the capacity of the natural gas pipelines from western Canada. The shortfall is made up by injection of natural gas into the storage pools in the summer, and withdrawal of the stored gas in winter to meet winter peak demand. Total working capacity of the active storage pools in Ontario is approximately 5.8 billion m³ (203 bcf).

The other classes of wells drilled in 1994 consisted only of 1 solution mining well. Brine Well D-10 Anderdon 6-33-I was completed as a solution mining well by General Chemical at their solution mining site near Amherstburg. This is the fewest recorded number of service wells drilled in Ontario since records began to be kept in 1955.

Oil production in Ontario in 1994 totalled 263 242.8 m³ valued at \$39.2 million according to figures supplied by Esso Resources. This is a 4% increase in volume from the previous year and is another record for annual production for Ontario. The previous record was set in 1993. The increase is principally due to production from the recently discovered Rochester 1-17-II EBR pool. Annual oil production has tripled since 1983, and is due entirely to production from Ordovician pools in Essex and Kent Counties.

Totals for production of natural gas in Ontario are not available. It is likely that natural gas production increased compared to the previous year due to new production from the Innerkip gas field and solution gas from Ordovician oil pools. Natural gas production in 1993 totalled 473 634.0 10³ m³.

Telesis Oil and Gas, a major operator in Ontario, was purchased by Pembina Exploration Limited and NAL Resources in a transaction which closed on April 7, 1994. Pembina now owns all of Telesis' onshore assets and 65% of its Lake Erie gas assets. Pembina is the operator of all the onshore and offshore assets and has integrated these into its existing Ontario operations based in Port Colborne, Ontario.

There were a considerable number of inquiries about investment and exploration opportunities in Ontario from companies and investors from outside the province in 1994, especially from small Calgary-based companies. Some new exploration or acquisition activity is expected to result from these inquiries in the coming year.

RECOMMENDATIONS FOR EXPLORATION

Ordovician reservoirs are still the focus of exploration directed at discovery of new oil reservoirs. Oil production in Ontario has tripled since 1983 due to production from new Ordovician pools and a new record was set for annual oil production in 1994 due to these pools. Essex County and southern Kent County still are the most favourable areas for exploration.

The highly successful drilling programs completed by Pembina and Place on Lake Erie in 1994 have reemphasized the importance of Silurian sandstone gas reservoirs beneath the waters of Lake Erie. There still remains considerable untested potential in this often overlooked part of Ontario. The western part of the lake is also a very prospective area for Silurian Guelph Formation reef reservoirs. Leasing of the Crown lands beneath Lake Erie is administered by the Petroleum Resources Centre.

The Cambrian gas pool at Innerkip has undergone very rapid development over the past 2 years in a very successful drilling program. The pool is a stratigraphic trap with some structural control by faults. There is considerable potential for discovery of similar Cambrian gas or oil pools along the pinch-out edge of the Cambrian sandstone in the subsurface.

Silurian pinnacle reefs still are an attractive target for oil or gas exploration, even though there has been a decline in activity. Lambton County remains the most prospective area for exploration. Any discoveries in this area have potential for conversion to natural gas storage due to their proximity to natural gas pipelines and existing storage pools.

STAFF AND ACTIVITIES

Oil and gas exploration and production, subsurface storage of hydrocarbons in geological formations, and solution-mining of salt are all regulated by the Ontario Ministry of Natural Resources (MNR) as part of its petroleum resources program. The Petroleum Resources Centre in London plays a key role in delivery of the petroleum resources program of MNR, with 12 staff including: a manager, supervisor, geologist, two engineers, draftsperson, and technical, clerical and systems support staff. Reports and data on all activities conducted in Ontario under the Petroleum Resources Act are required to be reported to the Centre. This data, including drill cuttings and core samples, are available for industry and general public access at the Petroleum Resources Laboratory in London.

Until recently, as part of its mandate, the Petroleum Resources Centre periodically published a map of oil and gas pools and pipelines in the province and a publication series summarising annual oil and gas exploration, drilling and production in Ontario. Due to constraints on budget and staffing the last annual summary published was for 1988, and the pool and pipeline map was last updated in 1982.

Concerns about the lack of up-to-date publications have been expressed by the industry and in 1993 the Ontario Petroleum Institute (OPI) offered to assist the Ministry. The OPI is an association which represents a cross-section of companies and individuals which are involved in the oil, gas, and storage industries in Ontario. The OPI represents and promotes the interests of its members in all matters pertaining to oil and gas industries in Ontario, holds meetings and conferences and publishes technical papers and reports.

By letter of understanding, in early 1993 the OPI and the MNR agreed to form a partnership for compilation, printing and distribution of a revision of the 1982 Oil and Gas Pools and Pipelines Map of Southwestern Ontario, OGS Map P.2499. Staff of the Petroleum

Resources Centre are responsible for data compilation and mapping, preparation of a suitable digital base map and digital drafting. The Ontario Petroleum Institute is responsible for printing, distribution, and sales of the map. Revenue from sales of the map would be retained by OPI, with copies provided to MNR for its internal use. The map is scheduled for release early in 1995.

**CONVERSION FACTORS FOR MEASUREMENTS IN ONTARIO
GEOLOGICAL SURVEY PUBLICATIONS**

Conversion from SI to Imperial			Conversion from Imperial to SI		
<i>SI Unit</i>	<i>Multiplied by</i>	<i>Gives</i>	<i>Imperial Unit</i>	<i>Multiplied by</i>	<i>Gives</i>
LENGTH					
1 mm	0.039 37	inches	1 inch	25.4	mm
1 cm	0.393 70	inches	1 inch	2.54	cm
1 m	3.280 84	feet	1 foot	0.304 8	m
1 m	0.049 709 7	chains	1 chain	20.116 8	m
1 km	0.621 371	miles (statute)	1 mile (statute)	1.609 344	km
AREA					
1 cm@	0.155 0	square inches	1 square inch	6.451 6	cm@
1 m@	10.763 9	square feet	1 square foot	0.092 903 04	m@
1 km@	0.386 10	square miles	1 square mile	2.589 988	km@
1 ha	2.471 054	acres	1 acre	0.404 685 6	ha
VOLUME					
1 cm#	0.061 02	cubic inches	1 cubic inch	16.387 064	cm#
1 m#	35.314 7	cubic feet	1 cubic foot	0.028 316 85	m#
1 m#	1.308 0	cubic yards	1 cubic yard	0.764 555	m#
CAPACITY					
1 L	1.759 755	pints	1 pint	0.568 261	L
1 L	0.879 877	quarts	1 quart	1.136 522	L
1 L	0.219 969	gallons	1 gallon	4.546 090	L
MASS					
1 g	0.035 273 96	ounces (avdp)	1 ounce (avdp)	28.349 523	g
1 g	0.032 150 75	ounces (troy)	1 ounce (troy)	31.103 476 8	g
1 kg	2.204 62	pounds (avdp)	1 pound (avdp)	0.453 592 37	kg
1 kg	0.001 102 3	tons (short)	1 ton (short)	907.184 74	kg
1 t	1.102 311	tons (short)	1 ton (short)	0.907 184 74	t
1 kg	0.000 984 21	tons (long)	1 ton (long)	1016.046 908 8	kg
1 t	0.984 206 5	tons (long)	1 ton (long)	1.016 046 908 8	t
CONCENTRATION					
1 g/t	0.029 166 6	ounce (troy)/ ton (short)	1 ounce (troy)/ ton (short)	34.285 714 2	g/t
1 g/t	0.583 333 33	pennyweights/ ton (short)	1 pennyweight/ ton (short)	1.714 285 7	g/t

OTHER USEFUL CONVERSION FACTORS

	<i>Multiplied by</i>	
1 ounce (troy) per ton (short)	20.0	pennyweights per ton (short)
1 pennyweight per ton (short)	0.05	ounces (troy) per ton (short)

Note: Conversion factors which are in bold type are exact. The conversion factors have been taken from or have been derived from factors given in the Metric Practice Guide for the Canadian Mining and Metallurgical Industries, published by the Mining Association of Canada in co-operation with the Coal Association of Canada.

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