

THESE TERMS GOVERN YOUR USE OF THIS DOCUMENT

Your use of this Ontario Geological Survey document (the “Content”) is governed by the terms set out on this page (“Terms of Use”). By downloading this Content, you (the “User”) have accepted, and have agreed to be bound by, the Terms of Use.

Content: This Content is offered by the Province of Ontario’s *Ministry of Northern Development and Mines* (MNDM) as a public service, on an “as-is” basis. Recommendations and statements of opinion expressed in the Content are those of the author or authors and are not to be construed as statement of government policy. You are solely responsible for your use of the Content. You should not rely on the Content for legal advice nor as authoritative in your particular circumstances. Users should verify the accuracy and applicability of any Content before acting on it. MNDM does not guarantee, or make any warranty express or implied, that the Content is current, accurate, complete or reliable. MNDM is not responsible for any damage however caused, which results, directly or indirectly, from your use of the Content. MNDM assumes no legal liability or responsibility for the Content whatsoever.

Links to Other Web Sites: This Content may contain links, to Web sites that are not operated by MNDM. Linked Web sites may not be available in French. MNDM neither endorses nor assumes any responsibility for the safety, accuracy or availability of linked Web sites or the information contained on them. The linked Web sites, their operation and content are the responsibility of the person or entity for which they were created or maintained (the “Owner”). Both your use of a linked Web site, and your right to use or reproduce information or materials from a linked Web site, are subject to the terms of use governing that particular Web site. Any comments or inquiries regarding a linked Web site must be directed to its Owner.

Copyright: Canadian and international intellectual property laws protect the Content. Unless otherwise indicated, copyright is held by the Queen’s Printer for Ontario.

It is recommended that reference to the Content be made in the following form: <Author’s last name>, <Initials> <year of publication>. <Content title>; Ontario Geological Survey, <Content publication series and number>, <total number of pages>p.

Use and Reproduction of Content: The Content may be used and reproduced only in accordance with applicable intellectual property laws. *Non-commercial* use of unsubstantial excerpts of the Content is permitted provided that appropriate credit is given and Crown copyright is acknowledged. Any substantial reproduction of the Content or any *commercial* use of all or part of the Content is prohibited without the prior written permission of MNDM. Substantial reproduction includes the reproduction of any illustration or figure, such as, but not limited to graphs, charts and maps. Commercial use includes commercial distribution of the Content, the reproduction of multiple copies of the Content for any purpose whether or not commercial, use of the Content in commercial publications, and the creation of value-added products using the Content.

Contact:

FOR FURTHER INFORMATION ON	PLEASE CONTACT:	BY TELEPHONE:	BY E-MAIL:
The Reproduction of Content	MNDM Publication Services	Local: (705) 670-5691 Toll Free: 1-888-415-9845, ext. 5691 (inside Canada, United States)	Pubsales@ndm.gov.on.ca
The Purchase of MNDM Publications	MNDM Publication Sales	Local: (705) 670-5691 Toll Free: 1-888-415-9845, ext. 5691 (inside Canada, United States)	Pubsales@ndm.gov.on.ca
Crown Copyright	Queen’s Printer	Local: (416) 326-2678 Toll Free: 1-800-668-9938 (inside Canada, United States)	Copyright@gov.on.ca

LES CONDITIONS CI-DESSOUS RÉGISSENT L'UTILISATION DU PRÉSENT DOCUMENT.

Votre utilisation de ce document de la Commission géologique de l'Ontario (le « contenu ») est régie par les conditions décrites sur cette page (« conditions d'utilisation »). En téléchargeant ce contenu, vous (l'« utilisateur ») signifiez que vous avez accepté d'être lié par les présentes conditions d'utilisation.

Contenu : Ce contenu est offert en l'état comme service public par le *ministère du Développement du Nord et des Mines* (MDNM) de la province de l'Ontario. Les recommandations et les opinions exprimées dans le contenu sont celles de l'auteur ou des auteurs et ne doivent pas être interprétées comme des énoncés officiels de politique gouvernementale. Vous êtes entièrement responsable de l'utilisation que vous en faites. Le contenu ne constitue pas une source fiable de conseils juridiques et ne peut en aucun cas faire autorité dans votre situation particulière. Les utilisateurs sont tenus de vérifier l'exactitude et l'applicabilité de tout contenu avant de l'utiliser. Le MDNM n'offre aucune garantie expresse ou implicite relativement à la mise à jour, à l'exactitude, à l'intégralité ou à la fiabilité du contenu. Le MDNM ne peut être tenu responsable de tout dommage, quelle qu'en soit la cause, résultant directement ou indirectement de l'utilisation du contenu. Le MDNM n'assume aucune responsabilité légale de quelque nature que ce soit en ce qui a trait au contenu.

Liens vers d'autres sites Web : Ce contenu peut comporter des liens vers des sites Web qui ne sont pas exploités par le MDNM. Certains de ces sites pourraient ne pas être offerts en français. Le MDNM se dégage de toute responsabilité quant à la sûreté, à l'exactitude ou à la disponibilité des sites Web ainsi reliés ou à l'information qu'ils contiennent. La responsabilité des sites Web ainsi reliés, de leur exploitation et de leur contenu incombe à la personne ou à l'entité pour lesquelles ils ont été créés ou sont entretenus (le « propriétaire »). Votre utilisation de ces sites Web ainsi que votre droit d'utiliser ou de reproduire leur contenu sont assujettis aux conditions d'utilisation propres à chacun de ces sites. Tout commentaire ou toute question concernant l'un de ces sites doivent être adressés au propriétaire du site.

Droits d'auteur : Le contenu est protégé par les lois canadiennes et internationales sur la propriété intellectuelle. Sauf indication contraire, les droits d'auteurs appartiennent à l'Imprimeur de la Reine pour l'Ontario.

Nous recommandons de faire paraître ainsi toute référence au contenu : nom de famille de l'auteur, initiales, année de publication, titre du document, Commission géologique de l'Ontario, série et numéro de publication, nombre de pages.

Utilisation et reproduction du contenu : Le contenu ne peut être utilisé et reproduit qu'en conformité avec les lois sur la propriété intellectuelle applicables. L'utilisation de courts extraits du contenu à des fins *non commerciales* est autorisée, à condition de faire une mention de source appropriée reconnaissant les droits d'auteurs de la Couronne. Toute reproduction importante du contenu ou toute utilisation, en tout ou en partie, du contenu à des fins *commerciales* est interdite sans l'autorisation écrite préalable du MDNM. Une reproduction jugée importante comprend la reproduction de toute illustration ou figure comme les graphiques, les diagrammes, les cartes, etc. L'utilisation commerciale comprend la distribution du contenu à des fins commerciales, la reproduction de copies multiples du contenu à des fins commerciales ou non, l'utilisation du contenu dans des publications commerciales et la création de produits à valeur ajoutée à l'aide du contenu.

Renseignements :

POUR PLUS DE RENSEIGNEMENTS SUR	VEUILLEZ VOUS ADRESSER À :	PAR TÉLÉPHONE :	PAR COURRIEL :
la reproduction du contenu	Services de publication du MDNM	Local : (705) 670-5691 Numéro sans frais : 1 888 415-9845, poste 5691 (au Canada et aux États-Unis)	Pubsales@ndm.gov.on.ca
l'achat des publications du MDNM	Vente de publications du MDNM	Local : (705) 670-5691 Numéro sans frais : 1 888 415-9845, poste 5691 (au Canada et aux États-Unis)	Pubsales@ndm.gov.on.ca
les droits d'auteurs de la Couronne	Imprimeur de la Reine	Local : 416 326-2678 Numéro sans frais : 1 800 668-9938 (au Canada et aux États-Unis)	Copyright@gov.on.ca

**Report of Activities
1984
Regional and
Resident Geologists**

**edited by
C.R. Kustra**

1985



**Ministry of
Natural
Resources**

**Hon. Michael Harris
Minister**

**Mary Mogford
Deputy Minister**

©1985 Government of Ontario
Printed in Ontario, Canada

ISSN 0704-2752 (Series)
ISBN 0319-9487 (Sub-series)

Publications of the Ontario Ministry of Natural Resources are available from the following sources. Orders for publications should be accompanied by cheque or money order payable to the *Treasurer of Ontario*.

Reports, maps, and price lists (personal shopping or mail order):

**Public Service Centre, Ministry of Natural Resources
Room 1640, Whitney Block, Queen's Park
Toronto, Ontario M7A 1W3**

Reports and accompanying maps only (personal shopping):

**Main Floor, 880 Bay Street
Toronto, Ontario**

Reports and accompanying maps (mail order or telephone orders):

**Publications Services Section, Ministry of Government Services
5th Floor, 880 Bay Street
Toronto, Ontario M7A 1N8**

Telephone (local calls) 965-6015

Toll-free long distance 1-800-268-7540

Toll-free from Area Code 807 0- ZENITH-67200

Every possible effort is made to ensure the accuracy of the information contained in this report, but the Ministry of Natural Resources does not assume any liability for errors that may occur. Source references are included in the report and users may wish to verify critical information.

Parts of this publication may be quoted if credit is given. It is recommended that reference to this report be made in the following form for each individual author:

Meyn, Hans, D.

1985: Bancroft Resident Geologist Area, Algonquin Region; p.247-253 in Report of Activities 1984, Regional and Resident Geologists, edited by C.R. Kustra, Ontario Geological Survey, Miscellaneous Paper 122, 297p.

Scientific Editor: Z.L. Mandziuk

1000-85-Thorn

Foreword

This report summarizes the activities of the Ontario Ministry of Natural Resources Regional and Resident Geologists for the period November 30, 1983, to November 30, 1984. It also includes accounts of mining, exploration, and geoscience activities in Ontario, prepared from information collected and filed by the Regional and Resident Geologists. Listings of new additions to the Assessment Files Records, and reports of government survey and sponsored projects are provided.

Regional and Resident Geologists are located in key centres of the Mining Divisions of the Province, to provide geoscience information and advice to the public on the geology and mineral deposits of Ontario. Each office maintains a library of published and unpublished reports, technical papers and monographs, publications of the Ontario Geological Survey and other government agencies, records of exploration activity submitted for assessment work credit, company prospectuses and reports from the files of the Ontario Securities Commission, reports of property visits made by the Regional or Resident Geologists staff, and information received directly from companies and individuals.

A wide variety of mineral resources related investigations undertaken by regional minerals staff are reported here. These range from geoscience data inventories to technical studies regarding petroleum resources, building stone, industrial minerals, aggregate resources, and metallic and non-metallic mineral deposits.

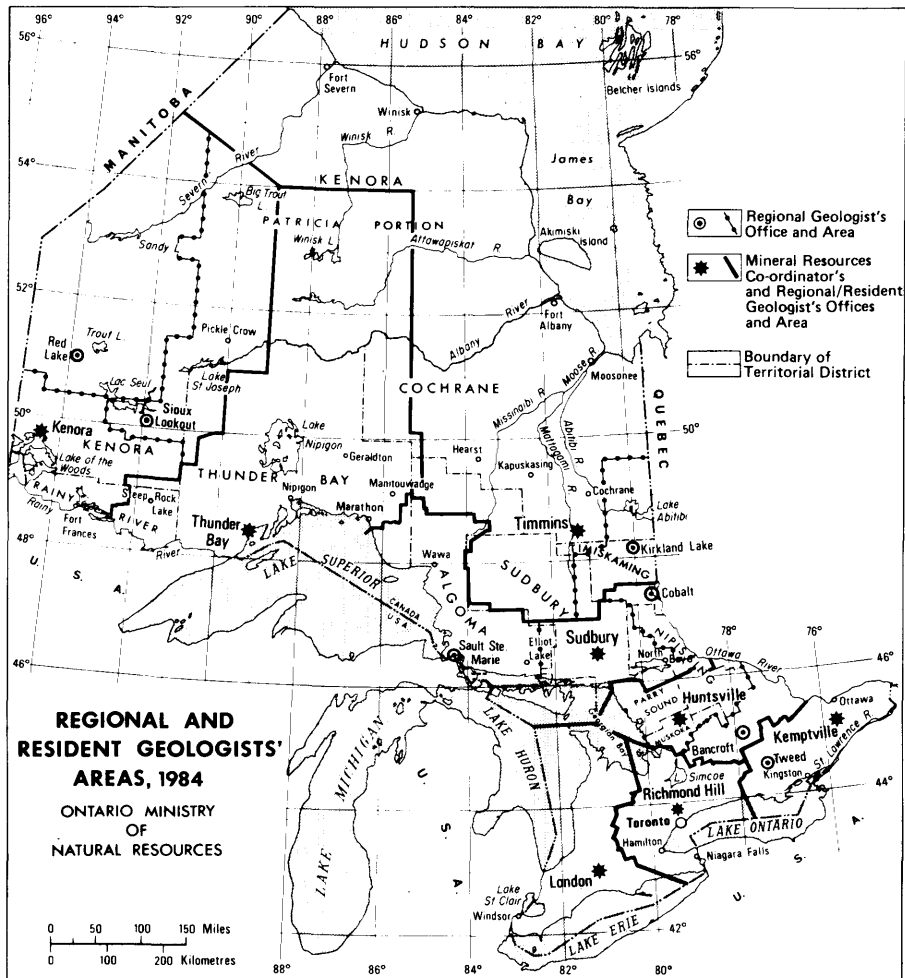
The Economic Geologist Programs, initiated some years ago in the North Central Region, continued in the Geraldton-Beardmore and the Schreiber-Terrace Bay areas, and have been incorporated in other regions. Economic Geologists have been assigned to the Dryden-Fort Francis, Wawa, and Kirkland Lake (Black River-Matheson Program) areas.

Core storage facilities were operative in 5 centres including Kirkland Lake, Timmins, Sault Ste. Marie, Bancroft, and Tweed. A core collection and cataloguing program developed by the Resident Geologists' staff at these centres has been highly successful insuring that as much as possible of the available diamond drill core is collected and stored.

M.E. Durocher, resigned from the position of Resident Geologist, Red Lake, and has been replaced by M.J. Lavigne, Jr.

C.R. Kustra
Regional Liaison Geologist
Ontario Geological Survey

FIELD OFFICES



**REGIONAL AND
RESIDENT GEOLOGISTS'
AREAS, 1984**
ONTARIO MINISTRY
OF
NATURAL RESOURCES

MINERAL RESOURCES CO-ORDINATORS' OFFICES

Northwestern Region	— R.C. Beard	810 Robertson St., Box 5160, Kenora P9N 3X9	(807) 468-3111
North Central Region	— K.G. Fenwick	435 James St. S., Thunder Bay P7C 5G6	(807) 475-1331
Northern Region	— W.O. Mackasey	60 Wilson Ave., Timmins P4N 2S7	(705) 267-1401
Northeastern Region	— P.E. Giblin	10th fl., 199 Larch St., Sudbury P3E 5P9	(705) 675-4128
Algonquin Region	— J.A. van der Meer	Brendale Sq., Box 9000, Huntsville P0A 1K0	(705) 789-9611
Eastern Region	— T.W. Fletcher	Concession Road, Kemptville K0G 1J0	(613) 258-3413
Central Region	— M. Groneng	10670 Yonge St., Richmond Hill L4C 3C9	(416) 884-9203
Southwestern Region	— P.A. Palonen	659 Exeter Rd., Box 5463, London N6A 4L6	(519) 681-5350

REGIONAL/RESIDENT GEOLOGISTS' OFFICES

Kenora	— C.E. Blackburn	808 Robertson St., Box 5080, Kenora P9N 3X9	(807) 468-3111
Red Lake	— M.J. Lavigne, Jr.	Ont. Govt. Bldg., Box 5003, Red Lake P0V 2M0	(807) 727-2253
Sioux Lookout	— D.A. Janes	Court House Bldg., Box 309, Sioux Lookout P0V 2T0	(807) 737-1140
Thunder Bay	— G.C. Patterson	435 James St. S., Thunder Bay P7C 5G6	(807) 475-1331
Timmins	— L.E. Luhta	60 Wilson Ave., Timmins P4N 2S7	(705) 267-1401
Kirkland Lake	— H.L. Lovell	4 Government Rd. E., Kirkland Lake P2N 1A2	(705) 567-5242
Sudbury	— J. Martins (Acting)	10th fl., 199 Larch St., Sudbury P3E 5P9	(705) 675-4128
Sault Ste. Marie	— G.A. Bennett	875 Queen St. E., Sault Ste. Marie P6A 2B3	(705) 949-1231
Cobalt	— L. Owsiacki	Box 230 Presley St., Cobalt P0J 1C0	(705) 679-8558
Huntsville	— D.J. Villard	Brendale Sq., Box 9000, Huntsville P0A 1K0	(705) 789-9611
Bancroft	— H.D. Meyn	Hwy. 28, Box 500, Bancroft K0L 1C0	(613) 332-3940
Tweed	— P.W. Kingston	255 Metcalf St., Box 70, Tweed K0K 3J0	(613) 478-2330
Richmond Hill	— M. Narain	10670 Yonge St., Richmond Hill L4C 3C9	(416) 884-9203
London	—	458 Central Ave., London N6B 2E5	(519) 433-8431



December 1984

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 ²	0.155 0	square inches	1 square inch	6.451 6	cm ²
1 m ²	10.763 9	square feet	1 square foot	0.092 903 04	m ²
1 km ²	0.386 10	square miles	1 square mile	2.589 988	km ²
1 ha	2.471 054	acres	1 acre	0.404 685 6	ha
VOLUME					
1 cm ³	0.061 02	cubic inches	1 cubic inch	16.387 064	cm ³
1 m ³	35.314 7	cubic feet	1 cubic foot	0.028 316 85	m ³
1 m ³	1.308 0	cubic yards	1 cubic yard	0.764 555	m ³
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 pennyweights/ton (short)	1.714 285 7	g/t
OTHER USEFUL CONVERSION FACTORS					
	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 cooperation with the Coal Association of Canada.

Contents

Report of Activities 1984

NORTHWESTERN REGION

KENORA RESIDENT GEOLOGIST AREA

Introduction	2
Resident Geologist Staff Activities	2
Mining Activity	2
Quarrying Activity	3
Stone	3
Peat and Black Soil	3
Exploration Activity	3
Gold	8
Kakagi-Rowan-Straw Lakes Area	8
Manitou-Wabigoon-Eagle Lakes Area	19
Lake of the Woods-Shoal Lake Area	21
Mine Centre Area	21
Bee Lake Area	22
Base Metals	22
Other Minerals	22
Property Examinations	22
Dryden-Ignace Economic Geologist Program	23
Introduction	23
Property Examinations	23
Property Descriptions	23
Wilkinson Bob Lake Occurrence	23
Rognon and Wachman Prospects	24
Niemi and H.W. 123 Occurrences	25
Sovereign Peak Lake Prospect	26
Exploration Guidelines	26
Industrial Mineral Development Potential, Northwestern Ontario	27
History of Development	27
Commodities Studied	27
Conclusions	27
Ontario Geological Survey Activities	32
Ontario Mineral Exploration Program (OMEP)	32
Research by Other Agencies	33
University Theses	33
Ontario Geoscience Research Grant Program	33
Selected Publications Received 1984	33
References	33

Tables

1. Summary of Claims Recorded and Assessment Work Credit
2. Maps and Reports Issued by the Ontario Geological Survey
3. Exploration Activity
4. Assessment Work and Other Information Received
5. Industrial Mineral Commodities

Figures

- 1,2. Kenora Resident Geologist's Area
3. Quarrying Activity
4. Industrial Mineral Deposits

RED LAKE RESIDENT GEOLOGIST AREA

Introduction	35
Resident Geologist's Activities	35
Mining Activity	35
Exploration Activity	38
Ontario Geological Survey Activities	42
Ontario Mineral Exploration Program	42
Research by Other Agencies	42
Selected References and Recent Publications	43

Tables

1. Summary of Claims Recorded and Assessment Work Credit
2. Exploration Activity
3. Assessment Work and Other Information Received

Figures

- 1,2. Red Lake Resident Geologist Area

SIoux LOOKOUT RESIDENT GEOLOGIST AREA

Introduction	44
Resident Geologist's Activities	44
Mining Activity	45
Industrial Minerals	45
Potting Soil and Horticultural Products	45
Sand and Gravel	45
Rock Ballast	45
Mineral Exploration Activity	45
Recommendations for Exploration	50
Base Metals	50
Gold	50
Recent Publications and References	55

Tables

1. Exploration Activity
2. Summary of Claims Recorded and Assessment Work Credit
3. Assessment Work and Other Information Received
4. Ontario Mineral Exploration Programs Patricia Mining Division

Figures

- 1,2. Sioux Lookout Resident Geologist's Area

NORTH CENTRAL REGION

THUNDER BAY RESIDENT GEOLOGIST AREA

Introduction	56
Acknowledgments	56
Resident Geologist Staff Activities	56
Mining Activities	57
Metallic Minerals	57
Industrial Minerals	57
Claim Staking and Exploration Activity	57
Hemlo Area	57
Introduction	57
North Rim Properties	93
Pic River Properties	93
Barite Occurrences	94
Lytton Minerals Limited Property	94
Golden Sceptre, North Zone	94
Other Occurrences and Exploration Programs	94
Amethyst in the Thunder Bay Region	95
Introduction	95
Regional Geology	95
Amethyst and Its Properties	96
Property Descriptions	96
Amethyst Mine Panorama	96
Marino Mountain Property	96
Shebandowan Area	97
Jalna Resources Limited Gold Creek Property	97
Curran Bay Resources Limited	97
Beardmore-Geraldton Economic Geologist Program	97
Introduction	97
Producing Gold Mines and Major Exploration Programs	98
General Geology and Structure	100
Geology of the Southern Metavolcanic Sub-Belt	101
Structural Geology	101
Gold Mineralization	101
History	101
Shear Zones	101
Ironstone	101
Quartz-Carbonate Veins Hosted in Metavolcanic Rocks	102
Geochemistry	102
Alteration and Mineralogy	102
Conclusions	102
Geology of the Onaman-Tashota Metavolcanic Belt	103
Gold Mineralization	103
(1) Vein Type	105
Wascanna Prospect	105
King-Dodds Occurrence	106
(2) Chemical Metasediment Type	106
Paulpic Prospect	106
Recommendations for Exploration	106

Schreiber-Terrace Bay Economic Geologist Program	106
Introduction	106
General Geology	107
Economic Geology	107
Gold Mineralization	107
Type 1: Terrace Bay Batholith-Contact Zone	
Type	107
Harkness-Hays: Gold Range Properties	109
Type 2: Porphyry Contact Zone Type	111
Type 3: Metavolcanic Hosted Dilatent Zone Type	111
Little Bear (Little Bruin) Property	111
Type 4: Chemical Sediment-Stratabound Type	112
Simard-Swetz Property	112
Base Metals	113
Type 1: Volcanogenic Massive Sulphide Deposits	113
Dello Lake Occurrence	114
Type 2a: Zinc-Lead Silver Veins-Metavolcanic Type	114
Deadhorse Creek South Prospect (Hannam Property)	114
Type 2b: Lead-Zinc-Barite Veins-Unconformity Type	115
Gordon Occurrence	115
Type 3: Copper-Molybdenum Vein Type	115
Exploration Guidelines	116
Gold	116
Base Metals	116
Recent Exploration Activities	116
Research	
Activities-Schreiber-Terrace Bay Area	117
Atikokan Cobalt-Base Metals-Platinum Group Elements Project	117
Introduction	117
General Geology and Structure	118
Deposit Types	118
(1) The Quetico Fault Zone-Hosted Intrusions	118
Atikokan Iron Mine	120
(2) Quetico Intrusions	120
Abiwin Occurrence	120
Kawene Occurrence	120
(3) Chemical Sedimentary Rocks in Metavolcanic Terrain	120
(4) Shear Zones Within Metavolcanic Terrain	121
Anderson Occurrence	121
(5) Quartz Veins	121
Summary	121
Building and Monument Stone	122
Introduction	122
Terminology	122
Geological Criteria for Stone Deposits	123
Dimension Stone in the North Central Region	123

Sandstone	123
Vert Island Sandstone Quarry	123
Simpson Island Sandstone Quarry	124
Marble	125
Lunmac Marble Property	125
Granite	126
Quarries in the Marathon Area	126
Exploration and Market Potential	127
Quaternary Geology	127
Introduction	127
Geraldton Area	127
Terrace Bay Area	127
Historical Research Project Results	128
Geological Research in the North Central Region	128
Ontario Geological Survey Activities	128
Research by Other Organizations	129
Geological Survey of Canada	129
Lakehead University	129
Other Universities	130
References	130

Tables

1. Assessment Work and Other Information Received
2. Exploration Activity on Leased and Patented Mining Land
3. Summary of Claims Recorded and Assessment Work Credit
4. Exploration Programs in the Beardmore-Geraldton Area
5. Geochemistry of Gold Properties, Beardmore-Geraldton
6. Building Stone Quarries
 - 6a. Past-Producing Quarries
 - 6b. Prospects
 - 6c. Occurrences
7. Maps and Reports Issued by the Ontario Geological Survey

Figures

1. North Central Region, NTS Grid
2. Producing Mines; Mines and/or Properties Under Development
3. Property Visits - Beardmore-Geraldton Economic Geologist Program
4. Schreiber-Terrace Bay Economic Geologist Program
5. Property Visits - Schreiber-Terrace Bay Economic Geologist Program
6. Property Visits - Atikokan Cobalt-Base Metal-Platinum Group Element Study
7. Building and Monument Stone Inventory

NORTHERN REGION

TIMMINS RESIDENT GEOLOGIST AREA

Introduction	134
Core Library Program	134
Claim Staking Activity	134
Exploratory Licences of Occupation	134
Operating Mines	134
Base Metals	134
Precious Metals	135
Industrial Minerals	156
Property Evaluation and Development	156
Exploration Activity	158
Ontario Geological Survey Activities	160
Engineering and Terrain Geology Section	160
Geophysics/Geochemistry Section	161
Mineral Deposits Section	161
Ontario Geoscience Research Grants Program	161
Ontario Mineral Exploration Program (OMEP)	161

Tables

1. Maps and Reports Issued by the Ontario Geological Survey
2. Gold Production, Porcupine Mining Division
3. Assessment Work and Other Information Received

Figures

- 1.-4. Timmins Resident Geologist's Area
5. Timmins Area

KIRKLAND LAKE RESIDENT GEOLOGIST AREA

Introduction	162
Resident Geologist Staff Activities	162
Drill Core Storage Library	163
Operation Black River-Matheson (BRIM)	163
Introduction	163
General Geology	163
Ongoing Activities	166
Economic Potential	170
Mining Activity	170
Property Visits	184
C.M.B. Holdings "Beaver Dam" Gold Occurrence	184
Golden Harker Prospect	188
Sheldon Larder Mines Limited Gold Prospect	189
T. and W. Sullivan and W. Cooper Copper Occurrence	189
Recommendations for	

Exploration	189
Basal Till Sampling	189
Gold	189
Ontario Geological Survey	
Activities	190
Precambrian Geology Section	191
Engineering and Terrain	
Geology Section	191
Geophysics/Geochemistry	
Section	191
Mineral Deposits Section	191
Research by Other Organizations	191
Geoscience Research Grant	
Program	191
References	191
Publications Added to the	
Kirkland Lake Resident	
Geologist's Library 1984	193

Tables

1. Summary of Claims Recorded and Assessment Work Credit
2. Maps and Reports Issued by the Ontario Geological Survey
3. Gold Production From All Mines -Ontario's Larder Lake Mining Division to the End of 1983
4. Assessment Work and Other Information Received
5. Core Stored at Drill Core Library

Figures

1. Producing Mines, Major Property Evaluations and Property Visits, 1984
2. Drillhole Locations of Core Stored at the Drill Core Storage Library
3. Operation Black River-Matheson

NORTHEASTERN REGION

COBALT RESIDENT GEOLOGIST AREA

Introduction	197
Resident Geologist's Activities	197
Mining Activity	199
Beaver-Temiskaming Mine	
(Agnico-Eagle Mines Ltd.)	200
Sulpetro Minerals Ltd.	
(Canadaka Division)	200
Sherman Mine (Dofasco and	
Tetapaga Mining Co. Ltd.)	200
Langis Mine (Agnico-Eagle	
Mines Ltd.)	201
Silver Queen Mine (R.A.	
Gilson Associates and Starlight	
Energy Corp.)	201
Exploration Activity	201
Industrial Minerals	206
Ontario Geological Survey	
Activities	207
Engineering and Terrain	
Geology Section	207
Research by Other Organizations	207

Carleton University	207
McMaster University	207
Recent Publications and	
References	207

Tables

1. Maps and Reports Issued by the Ontario Geological Survey
2. Exploration and Claim Staking Activity
3. Assessment Work and Other Information Received

Figures

- 1,1a. Resident Geologist's Area
2. Exploration Diamond Drilling Activity—Cobalt Resident Geologist Area

SAULT STE. MARIE RESIDENT GEOLOGIST AREA

Introduction	209
Resident Geologist's Activities	209
Claim Staking Activity	209
Mining Activity	209
Exploration Activity	211
Gold	211
Base Metals	218
Sault Ste. Marie Drill Core	
Library	218
Sault Ste. Marie Reconnaissance	
Geology Project	219
Introduction	219
Geological Setting	219
Field Investigations	219
Wawa Economic Geologist's	
Report	221
Introduction	221
Mineral Exploration in the	
Wawa-Missinabie Area	221
Property Visits	221
Centennial Mine	221
Kustec Occurrence	221
Cline Mine	221
Desjardins Occurrence	224
Rowan Lake Occurrence	224
Edina Gold Prospect	226
Bingham-Holliday Showings	226
Boliden Prospect	226
Norwalk Mine	226
Current Research in the Wawa	
Area	227
Sault Ste. Marie Industrial	
Minerals	227
Ontario Geological Survey	
Activities	228
Publications and Theses Added to	
the Sault Ste. Marie Resident	
Geologist's Library	228
References	229

Tables

1. Exploration Activity
2. Assessment Work and Other Information Received
3. Maps and Reports Issued by the Ontario Geological Survey

Figures

1. Sault Ste. Marie Resident Geologist's Area
2. Number of Claims Recorded in the Sault Ste. Marie Mining Division
3. Sault Ste. Marie Reconnaissance Geology Project Area
4. Aeromagnetic Anomalies Examined in 1984
5. Regional Geochemical Anomalies
6. Wawa Economic Geologist's Area
7. Property Visits by the Wawa Economic Geologist
8. Industrial Minerals and Building and Ornamental Stone Resources in the Sault Ste. Marie Area

SUDBURY RESIDENT GEOLOGIST AREA

Introduction	230
Resident Geologist's Activities	230
Mining Activity	230
Nickel-Copper-Precious Metals	230
Gold	230
Industrial Minerals	231
Ontario Geological Survey	
Activities	231
Exploration Activities	231
Recent Publications and Theses	237

Tables

1. Maps and Reports Issued by the Ontario Geological Survey
2. Exploration Activity
3. Assessment Work and Other Information Received

Figures

- 1,2. Sudbury Resident Geologist's Area
3. Sudbury Mining Camp
4. Claim Staking Activity, Sudbury Mining Recorder's Office

ALGONQUIN REGION

HUNTSVILLE RESIDENT GEOLOGIST AREA

Introduction	242
Resident Geologist's Activities	242
Graphite Project	242
Aggregate Resources	244
Gold Project	244

Other Geological Activities	244
Ontario Geological Survey	244
Geological Survey of Canada	244
Exploration Activity	245
Gold	245
Graphite	245
Base Metals	245
Quartz	245
Mining Activity	245
Mineral Education Program	245
References and Recent Publications	245

Tables

1. Maps and Reports Issued by the Ontario Geological Survey
2. Exploration Activity
3. Assessment Work and Other Information Received

Figure

1. Huntsville Resident Geologist's Area

BANCROFT RESIDENT GEOLOGIST AREA

Introduction	247
Resident Geologist's Activities	247
Drill Core Library	247
Other Geological Activities	247
Algonquin Region, Ontario	
Ministry of Natural Resources	247
Leslie M. Frost Natural Resources Centre	247
Ontario Geological Survey	247
Geological Survey of Canada	249
Royal Ontario Museum	249
Universities	249
Exploration Activity	249
Mining Activity	250
Recommendations	251
Selected References	251

Tables

1. Maps and Reports Issued by the Ontario Geological Survey
2. Exploration Activity
3. Assessment Work and Other Information Received

Figure

1. Bancroft Resident Geologist's Area

EASTERN REGION

EASTERN RESIDENT GEOLOGIST AREA

Introduction	254
Resident Geologist's Activities	254
Mining Activity	255

Exploration Activity	258
Gold	258
Base Metals	260
Mica	260
Graphite	260
Industrial Minerals Program	260
Carbonate Rocks	260
Barite-Fluorite Veins	262
Aggregate Resources	263
Ontario Geological Survey Activities	263
Geological Mapping, Eastern Region	263
Drill Core Library	263
Mineral Education Program	263
Geotechnical Engineering Program	263
Seismic Survey	264
Pits Quarries - Napanee, Tweed, and Brockville Districts	270
Abandoned Pits and Quarries Study	270
Inactive Hazardous Mines Sites Inventory	270
Pits Quarries - Cornwall District	270
References	270

Tables

1. Assessment Work and Other Information Received
2. Exploration Activity
- 2a. Summary of Seismic Results
3. Licenced Pits and Quarries in Napanee, Tweed, and Brockville Districts
4. Reported Aggregate Production by Township from Licenced Operators in Napanee District Under The Pits and Quarries Control Act
5. Reported Aggregate Production by Township from Licenced Operators in Tweed District Under The Pits and Quarries Control Act
6. Reported Aggregate Production by Township from Licenced Operators in Brockville District Under The Pits and Quarries Control Act
7. Abandoned Pits and Quarries Study
8. Licenced Pits, Quarries and Pits/Quarries for 1984 -Cornwall District
9. Aggregate Production from Licenced Pits and Quarries During the Year 1981 - Cornwall District
10. Aggregate Production from Licenced Pits and Quarries During the Year 1982 - Cornwall District
11. Aggregate Production from

Licenced Pits and Quarries during the Year 1983 - Cornwall District

Figures

1. Eastern Region - Producing Mines, Assessment Work, and Claim Staking
2. Company Exploration Activity and O.G.S. Field Work
3. Claim Staking and Cancellation Activity in Eastern Ontario
4. Eastern Region Ministry Field Activities
5. Map of Seismic Survey with Bedrock Topography

CENTRAL REGION

CENTRAL REGIONAL GEOLOGIST AREA

Introduction	278
Regional Geologist's Activities	278
Resources and Land Use	
Planning	278
Consultation and Educational Services	278
Pits and Quarries	280
Property Examinations	280
Geology and Mining Related Activities	280
C. Mirza Engineering Incorporated	280
Franceschini Brothers Aggregates Limited	285
St. Marys Cement Company	285
Walker Brothers Quarries Limited	285
Vineland Quarries and Crushed Stone	285
National Sewer Pipe Limited	285
TRT Sand and Gravel	285
3M Canada Incorporated	286
Fred Nelson and Sons Ltd.	286
Lasir Gold Incorporated	286
Staking and Exploration	287
Regional Geological Evaluation Projects	287
Sandstone Resources Study	287
Shale and Clay Resources Related to Tile Manufacture	287
Township Aggregate Inventories	287
Canada Works Projects	287
Public Awareness Programs	287
Summary of Field Work by the Ontario Geological Survey	287
Ontario Geoscience Research Grant Program	287
Recent References	288

Tables

1. Licenced Pits and Quarries in the Central Region
2. Reported Aggregate Production by Township

3. Maps and Reports Issued by the Ontario Geological Survey

Figure

1. Central Regional Geologist's Area

SOUTHWESTERN REGION

SOUTHWESTERN REGIONAL GEOLOGIST AREA

Introduction	289
Regional Geologist Office Activities	289
Petroleum Resources Activities	289
Mineral Resources Activities	292
Construction Aggregate Resources	292
Mineral and Chemical	

Composition of Natural Quaternary Sands	293
Quaternary Geology	294
Ontario Geological Survey Activities	294
Engineering and Terrain Geology Section	294
Ontario Geoscience Research Grants	294
Petroleum Activity Statistics	294
Mineral Activity Statistics	295
Aggregates	295
Salt	296
Theses Projects	296
References	296

Tables

1. Summary of Wells Drilled in 1984
2. Lake Erie Drilling, for 1984
3. Maps and Reports Issued by the Ontario Geological Survey
4. Aggregate Production from Licensed Pits and Quarries, 1983

Figure

1. Southwestern Region, Petroleum Activity Highlights

LOCATION MAPS

Regional and Resident Geologists' Areas	iv
Location of Mining Recorders' Offices	v

Report of Activities 1984 Regional and Resident Geologists

**edited by
C.R. Kustra¹**

¹Regional Liaison Geologist, Ontario Geological Survey. This report is published with the permission of V.G. Milne, Director, Ontario Geological Survey.

Kenora Resident Geologist Area, Northwestern Region

C.E. Blackburn¹ and M.R. Hallstone²

¹Resident Geologist, ²Resource Geologist, Ontario Ministry of Natural Resources, Kenora

INTRODUCTION

Current permanent staff in the Resident Geologist Office include C.E. Blackburn, Resident Geologist, and M.R. Hallstone, Resource Geologist. Contract staff comprise the following: D. Danielson, clerk-typist; C.C. Storey, funded under the Northern Ontario Rural Development Agreement (NORDA) incentives program, conducted a survey outlining the potential for industrial mineral development in Northwestern Ontario, assisted by R. Schienbein; J. Parker, funded by the Ontario Ministry of Northern Affairs, commenced an Economic Geologist program in the general Dryden-Ignace area, assisted by A. Schottroff. Other Ontario Ministry of Natural Resources geologists housed in the office for periods of the year were J.C. Davies and P.M. Smith, funded under the NORDA incentives program, who continued their gold deposit characterization study of Lake of the Woods.

RESIDENT GEOLOGIST STAFF ACTIVITIES

The progress of a small mining and milling operation in the Mine Centre area was watched with much interest. A number of visits were paid by staff to the Mine Centre Gold Venture operation, a joint operation of Orotek Resources Corporation and Royal Gold and Silver Corporation.

A number of properties were visited that were undergoing development work or advanced evaluation, each on a number of occasions. These included the property of Union Carbide Exploration Corporation, which continued its option on Consolidated Professor Mines Limited's Dupont Mine gold property at Shoal Lake, the Cameron Lake Gold Property of Nuinsco Resources Limited, and the Olive Mine gold property optioned by Homestake Explorations Limited.

Numerous properties and areas undergoing active exploration were visited. These are: the

Petrunka-Moorehouse Tungsten Property near Mavis Lake, and the adjacent Fairservice Option, both under evaluation by Sanmine Exploration Incorporated, the latter for gold; the Fairservice Gold Property near Straw Lake, which during 1984 passed from Noranda Incorporated to Corporation Falconbridge Copper; the Gaudry Gold Prospect, being explored by Selco Incorporated as a joint venture with Gossan Resources Limited; the Monte Cristo Gold Prospect of Nuinsco Resources Limited and Lockwood Petroleum Incorporated; the Gold Hill and Black Jack, and associated gold prospects in Kirkup Township, under option to Bonzano Exploration Limited, and later in the year to Kidd Creek Mines Limited; the Scramble Gold Prospect, under evaluation by Boise Cascade Corporation's mineral resources unit; Noranda Incorporated's base metal exploration camp in the Oak Lake area; Armstrong's Swell Bay and Pocket Pond zinc-copper Prospects, under option to Corporation Falconbridge Copper; Esso Minerals Canada's Snake Bay Gold Prospect; Voyager Explorations Limited's Flambeau Lake gold option from Alex Kozy; the Pidgeon Hyndman Township and associated gold properties, under option to Teck Corporation; the Golden Star Gold Prospect, under option to Cleyo Resources Incorporated. Other prospects under evaluation and inactive mineral showings were examined and reported on during the year.

Geoscience lectures and field trips were provided for the Rough Rock and Gellay Lake Junior Ranger Camps, and for the local high school. Ontario Geological Survey field parties were visited and joint studies conducted on a number of local gold occurrences and prospects, in preparation for a field trip to be held in conjunction with the Institute on Lake Superior Geology, Kenora, in May 1985.

An information seminar oriented toward mining exploration company personnel, prospectors, and the general public was orga-

nized in Kenora in March. Ontario Geological Survey and Kenora-based Ontario Ministry of Natural Resources geoscience personnel presented talks in a 1-day session.

Talks on current mineral exploration trends and activities within Kenora Mining Division were presented to local service clubs. A talk on tectonic models for the Wabigoon Subprovince was given to the Winnipeg Branch of the Geological Association of Canada.

MINING ACTIVITY

A small milling operation was established in the Mine Centre area during 1984 (Figure 1). A 75 ton per day mill was placed on site at the Manhattan Prospect by Royal Gold and Silver Corporation in their Mine Centre Gold Venture with Orotek Resources Corporation. Feed for the mill was to come from various rock dumps, tailings, and gold-bearing quartz veins, a number of which were formerly exploited. Orotek obtained 67 claims in the surrounding area, encompassing a number of past-producing mines, notably the Foley, Manhattan, Decca, and Ferguson. Development work was done on the Lucky Joe, Bonanza, and Jumbo veins.

Union Carbide Exploration Corporation continued its joint venture with Consolidated Professor Mines Limited at the latter company's Dupont Mine gold property on Cameron Island, Shoal Lake. Under the agreement, Union Carbide can earn a 50% interest in the property by spending \$10 000 000 in stages, and by agreeing to put the property into production.

Following surface diamond drilling and metallurgical testing of a 1000 pound (455 kg) sample taken from the old mine dump during 1983, Union Carbide announced a reserve estimate of 1 927 000 tons at a grade of 0.30 ounce gold per ton, over an average width of 9.75 feet (3 m), to a depth of 1150 feet (350 m), and a strike length of 2400 feet (732 m), in 2 parallel

zones, the Main Zone and the East Zone. Late in 1983, Union Carbide commenced an underground development program, at which time it was announced that a decline would be driven 2000 feet (610 m) from Stevens Island to the East Zone at the 250-foot level, and in a second stage to go deeper and explore the Main Zone.

By early 1984, results of preliminary studies suggested that should the property come to production, a 500 ton per day flotation mill would be installed, at a capital cost of between \$35 and \$45 million, depending on whether a roasting facility would be incorporated (The Northern Miner, February 2, 1984). Stage 1 was completed over the winter, both the East and Main Zones being intersected at the 300- and 325-foot levels respectively. Nine hundred feet (274 m) of drifting was done on the Main and East Zones, 3400 feet (1036 m) of underground diamond drilling, and a bulk sample taken for metallurgical testing. Following completion of Stage 1, it was suggested that the production rate would be in the order of 180 000 tons, recovering 45 000 ounces of gold, per year (The Northern Miner, May 17, 1984). Stage 2 was conducted over the summer, and completed by the beginning of November. The decline was driven a further 1325 feet (404 m), to intersect the ore zones at the 440- and 530-foot levels. Eight hundred and two feet (244 m) and 312 feet (95 m) of drifting were carried out on the Main Zone on each level respectively, and in excess of 18 300 feet (5486 m) of underground diamond drilling done (G.R. Cunningham-Dunlop, personal communication, 1985).

Under the terms of the joint venture agreement, Union Carbide have until October 1985 to make a commitment to bring the property into production.

QUARRYING ACTIVITY

C.C. Storey

Project Geologist, Ontario Ministry of Natural Resources, Kenora.

STONE

Active bedrock quarries are of 2 types: crushed stone and dimension stone (Figure 3). Crushed stone is produced on an intermittent recurring basis by the Canadian National Railways at Watcomb and White, and the Canadian Pacific Railways at Hawk Lake in MacNicol Township and Melgund Lake in Avery Township. This latest quarry was initially investigated in late 1982 and began production in 1984. Rock is crushed by a contractor and stockpiled for use as required. Of these sites, only the Melgund Lake Quarry was active during 1984 although stockpiled material was removed from the others. Crushed stone for road construction, maintenance, and concrete aggregate was quarried by: contractors for the Ontario Ministry of Natural Resources at Bays Lake; Towland-Hewitson Construction from patented land in Jaffray Township; Degagne Brothers Limited in Jaffray Township just east of Hilly Lake.

Dimension stone was quarried by Nelson Granite and by Granite Quarriers (GQI) Incorporated from a small granite stock in Docker Township. Both quarries were in production all year. Nelson Granite installed a 90 ton stiff leg derrick in the Fall of 1984 and began construction of a small plant for cutting and polishing monuments. Universal Granite Centre (1976) Limited was bought by a group of granite companies from Quebec during the summer of 1984 and is now operated as Granite Quarriers (GQI) Incorporated. No major changes at the quarry have taken place.

Flagstone was quarried by Rush Bay Quarries from a sheared felsic tuff deposit in Forgie Township. A quarry permit to remove small amounts of soapstone from the dump at the Eagle Lake Soapstone Quarry was issued to Frank Thorgrimson of Keewatin.

Numerous nonoperating quarries are present in the area. These include many roadside quarries operated during highway construction, and quarries for railway bal-

last and concrete aggregate for major construction projects.

PEAT AND BLACK SOIL

Peat (Figure 3) is produced in the Fort Frances-Emo area by 2 companies, Arctic Peat Moss Limited of Barwick and Du-Nor Products of Fort Frances. Arctic Peat Moss operates at a bog in Carpenter Township and has 2 processing plants at Barwick. The main plant did not operate during 1984 but their top moss plant produced some horticultural moss. Du-Nor Products moved from Sioux Lookout to Fort Frances in September of 1984 and began producing potting soil from a bog in McIrvine Township, just north of Fort Frances. Du-Nor ships its product to horticultural markets in Winnipeg, Thunder Bay, and as far as Saskatchewan. Black soil is produced in small quantities for local use in landscaping and horticulture by several contractors (Figure 3), and quarry permits for its removal were issued for 4 sites in 1984. These are in Godson, Menary, and Tweedsmuir Townships and the Sand Lake Area northwest of Minaki.

EXPLORATION ACTIVITY

Despite the downturn in the price of gold over most of 1984, to the \$340 to \$350 per ounce mark, exploration activity for gold in Kenora Mining Division remained at a generally high level. Although claim staking was down substantially from the 11 000 range of 1983, it remained the second highest recorded year, with over 3000 claims staked (Table 1). Activity during 1984 was directed at exploration on the large number of active claims. The majority of this work was directed at 2 areas: the Kakagi-Rowan Lakes, and the Manitou Lakes areas. Activity continued to be high at Nuinsco Resources Limited's Cameron and Rowan Lakes Properties, while Teck Corporation, among others, carried out major programs at Lower Manitou Lake. Other areas of activity included eastern Lake of the Woods, Wabigoon and Ea-

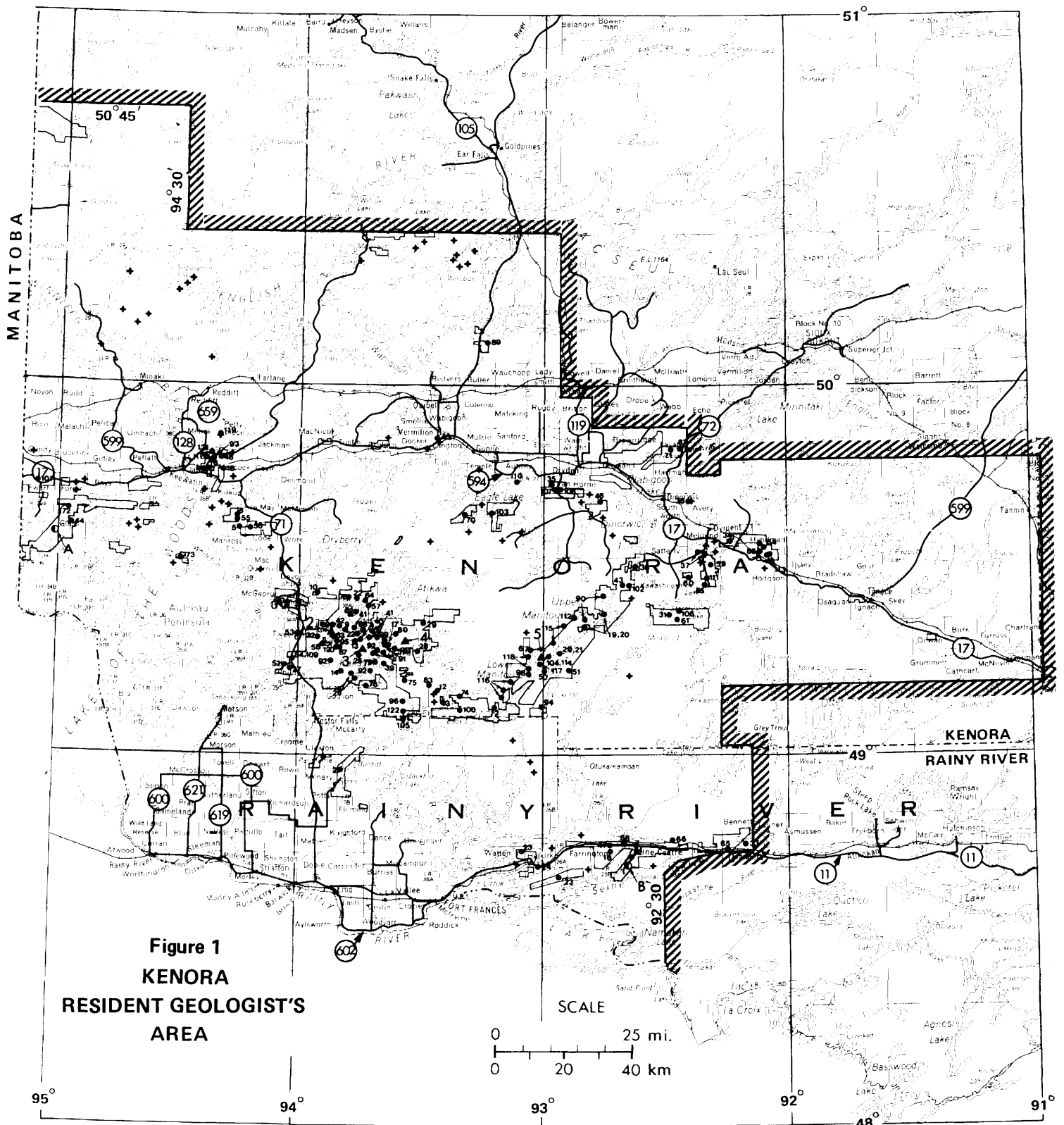
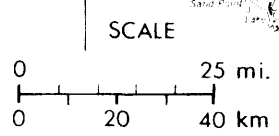


Figure 1
KENORA
RESIDENT GEOLOGIST'S
AREA



EXPLANATION

- ▲ Properties under evaluation in 1984
 1. Dubenski Gold Mines Limited
- Caswell Williams Prospect
 2. Falconbridge Nickel - McLennan Prospect
 3. Nuinsco Resources Ltd., Lockwood Petroleum
- Cameron Lake Prospect
 4. Nuinsco Resources Ltd. - Monte Cristo and
Victory Zone Prospect
 5. Teck Explorations - Gaffney Prospect
- Mines and/or Properties under development in 1984
 - A. Consolidated Professor/Union Carbide, Duport Mine
 - B. Mine Centre Gold Venture, Gold Mill
- * Heap Leach Operation, Sakoose Mine
- ▭ Extent of contiguous staking to Dec. 1, 1984
(may include patented claims in areas of intense staking)
- + Isolated active claim blocks as of Dec. 1, 1984
- Exploration Activities in 1984 (keyed to Table 3)

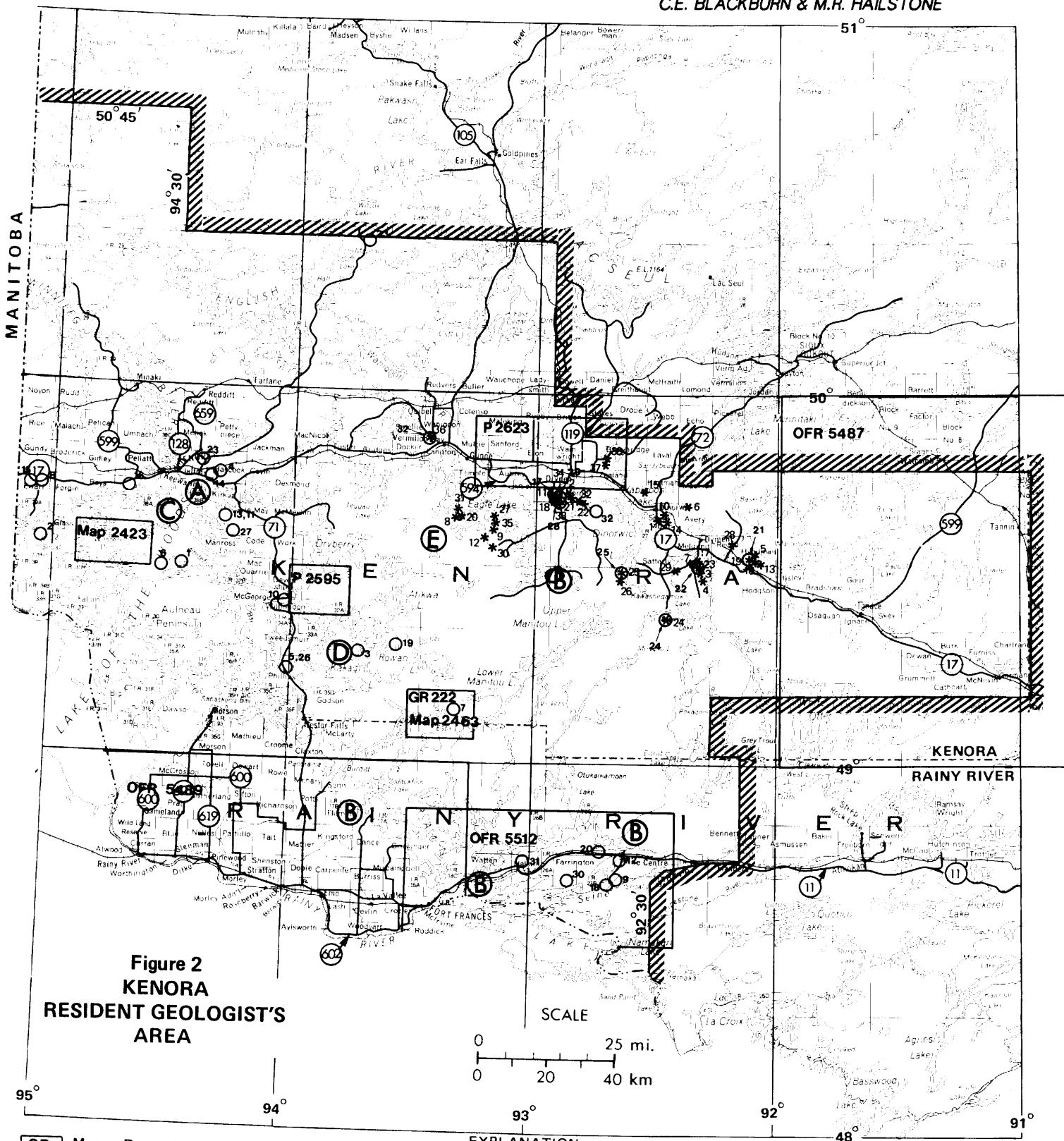


Figure 2
KENORA
RESIDENT GEOLOGIST'S
AREA

- GR 222** Map or Report issued by the Ontario Geological Survey, 1984 (keyed to Table 2)
- (A)** Location of OGS Field Party and /or Special Project, 1984 (keyed to text)
- *** Property visits, Dryden Economic Geologist Program (keyed to Table in text)

- EXPLANATION**
- Property visits, Resident Geologist's Office (keyed to Table in text)
- ////** Boundary of Resident Geologist's Area

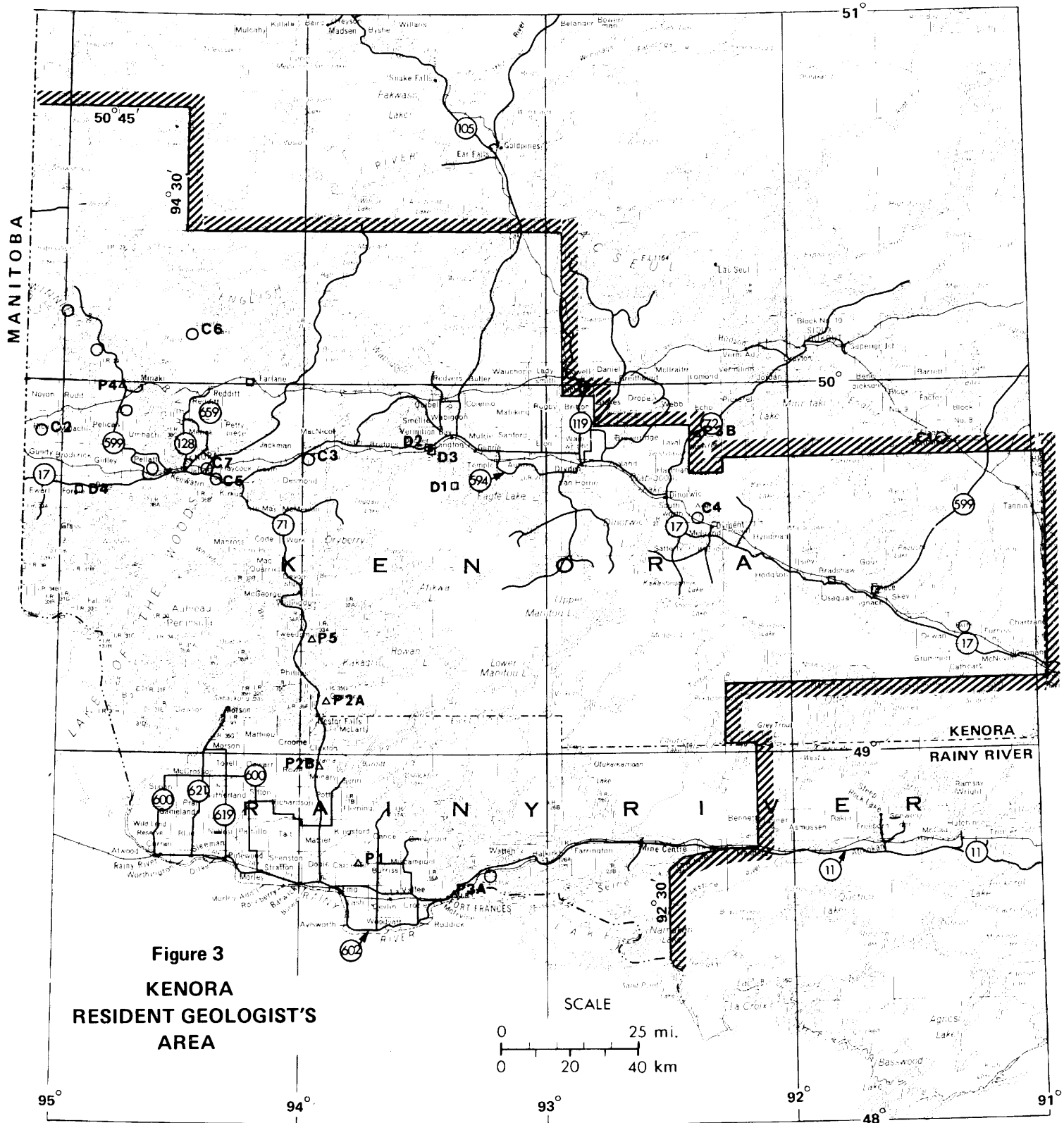


Figure 3
KENORA
RESIDENT GEOLOGIST'S
AREA

EXPLANATION

- Crushed Stone
- Dimension Stone
- △ Peat and black soil
- ▨ Boundary of Resident Geologist's Area

QUARRYING ACTIVITY

CRUSHED STONE

C1	CNR Watcomb	traprock (metavolcanic)	track ballast
C2	CNR White	granitoid rock	track ballast
C3	CPR Hawk Lake	granitoid rock	track ballast
C4	CPR Melgund Lake	traprock (metavolcanic)	track ballast
C5	Degagne Bros. Ltd.	granitoid rock	aggregate
C6	MNR Bays Lake	granitoid rock	road construction
C7	Towland-Hewitson Construction Ltd.	traprock (metavolcanic)	aggregate

Inactive quarries are shown by a symbol but no identifier

DIMENSION STONE

D1	Frank Thorgrimson (Keewatin)	soapstone	carving material
D2	Granite Quarriers (GQI) Inc. (Vermilion Bay)	granite	building and monumental stone
D3	Nelson Granite (Vermilion Bay)	granite	building and monumental stone
D4	Rush Bat Quarries (Kenora)	flagstone	building stone

Inactive quarries are shown by a symbol but no identifier

PEAT AND BLACK SOIL

P1	Arctic Peat Moss Ltd. (Barwick)	peat	Carpenter Township
P2A	Carl Bragg B (Emo)	black soil	Godson Township Menary Township
P3A	Du-Nor Products (Fort Frances)	peat	McIrvine Township
P3B	Du-Nor Products former peat extraction site		
P4	Lou Cordeiro (Minaki)	black soil	Sand Lake Area
P5	Penner Contracting Ltd. (Sioux Narrows)	black soil	Tweedsmuir Township

SUMMARY OF CLAIMS RECORDED AND ASSESSMENT WORK CREDIT

TABLE 1

Year	Claims Recorded	Claims Cancelled	Claims Active	Diamond Drilling (Man Days)	Geophysical Surveys (Man Days)	Geological Surveys (Man Days)	Total Man Days
1984*	5,199	2,917	13,917	35,675	268,059	29,350	345,521
1983	11,061	1,472	13,635	35,746	42,221	12,006	106,397
1982	1,577	1,609	4,046	23,525	26,270	5,350	60,439
1981	2,131	846	4,075	26,127	37,629	3,303	72,732
1980	1,877	788	3,208	15,426	3,149	859	21,568
1979	984	1,357	2,119	9,992	10,658	1,420	29,182
1978	808	1,357	2,300	22,299	7,576	2,143	34,934
1977	1,495	1,585	2,820	15,405	11,366	1,760	33,838
1976	1,380	2,125	3,234	25,030	21,367	5,960	55,042
1975	1,677	2,452	3,975	23,584	31,509	940	57,266
1974	2,653	1,076	4,727	29,496	18,049	3,070	52,134

*to Nov. 30

gle Lakes, Kawashegamuk and Stormy Lakes, the Mine Centre area, and Bee Lake. Exploration for base metals remained at a low level, in general confined to the English River Subprovince, and Rainy Lake, by Noranda Incorporated and Corporation Falconbridge Copper respectively, the latter spurred by their success at Winston Lake, east of Thunder Bay.

GOLD

Kakagi-Rowan-Straw Lakes Area

Nuinsco Resources Limited continued exploration on its Cameron Lake and Rowan Lake gold properties in 1984. Prior to this, diamond drilling over 71 holes totaling 65 819 feet (20 062 m) at Cameron Lake had led to the delineation of reserves variously estimated at 1.5 to 2 million tons grading 0.15 to 0.2 ounce gold per ton. At Rowan Lake, diamond drilling was done in 1983 over 12 holes totaling 5155 feet (1571 m) at the Monte Cristo Prospect. Induced polarization surveys have been performed on both properties. Before the beginning of 1984, Lockwood Petroleum Incorporated had completed their expenditure commitment to Nuinsco Resources Limited at Cameron Lake, to earn a 50% interest in the property. At

Rowan Lake, Nuinsco held a 100% interest on 92 unpatented claims surrounding 7 patented claims over the Monte Cristo Property. Under option agreement with Lakeport Gold Mines Limited, they were to earn an 80% interest in the 7 patented claims.

In January, 1984, Nuinsco Resources Limited announced a winter drilling program at the Monte Cristo Prospect, to test new anomalies delineated by the induced polarization survey, over a strike length of more than 1 mile (1.6 km) in the 400-foot (123 m) wide shear zone. A new option agreement was worked out in February with Lakeport, transferring 100% interest in the 7 patented claims to Nuinsco. Sixteen diamond-drill holes were put down at Rowan Lake over the winter, 6 of which tested a new zone, over a 500-foot (152 m) strike length, the Victor Zone, some 3200 feet (975 m) southwest of the Monte Cristo Prospect. One of these holes intersected a 26.6-foot (8.1 m) section grading 0.371 ounce gold per ton.

Drilling was continued over the summer months at both Cameron and Rowan Lakes. In July, a public meeting, organized by Nuinsco and Dubenski Gold Mines Limited was held at Sioux Narrows to discuss plans for a

road off Highway 71 south of Sioux Narrows to give access to both the Cameron Lake Property and to the Dubenski Gold Mines Limited property at Flint Lake. Drilling at the Cameron Lake Property was directed toward testing both the strike extension of the mineralized zone, and its depth continuity. In July, Nuinsco announced that this drilling had increased the strike length of the mineralized zone to 3000 feet (914 m), while detailed geological mapping and structural analysis around the discovery area showed that gold is hosted in siliceous pyritic breccia veins, that are up to 140 feet long by 30 feet wide (43 by 9 m), grading 0.275 ounce gold per ton. Drilling at Rowan Lake was directed toward the new Victor Zone.

The activity by Nuinsco Resources Limited has been paralleled by work on surrounding properties, some of which are on strike with or parallel to either the Cameron Lake Property or the Monte Cristo Prospect of Nuinsco. These include properties of the following companies: Bigstone Minerals Limited; Charger Resources Limited; Del Norte Chrome Corporation; Dejour Mines Limited; Falcon Resources Incorporated; Canolan Resources Limited; and

TABLE 2. MAPS AND REPORTS PERTAINING TO THE KENORA RESIDENT GEOLOGIST AREA PUBLISHED DURING 1984 BY THE ONTARIO GEOLOGICAL SURVEY, MINISTRY OF NATURAL RESOURCES

Ontario Geological Survey Reports Report 222	Open File Reports OFR 5522 OFR 5512 OFR 5520 OFR 5489 OFR 5518 OFR 5493 OFR 5487	Preliminary Maps - Geological Series P.2623 P.2595 Coloured Maps Map 2463 Map 2423	Mineral Resources Branch Publications MDC 16 MDC 25 Miscellaneous Papers MP 119 MP 117
--	--	---	---

Canadian Nickel Company Limited (Canico).

Bigstone Minerals Limited, and Anglo Canadian Mining Corporation, in a 50/50 joint venture on a 44-claim group immediately north of Nuinsco's Monte Cristo Prospect, reported in the George Cross News Letter, October 15, 1984, that they had found visible gold in a quartz vein in a shear zone that parallels that at the Monte Cristo. Two grab samples assayed 26.88 and 20.24 ounces gold per ton. Eleven holes were subsequently diamond drilled, totaling 1100 feet, and in 1 of the holes a 3-foot (1 m) section with visible gold assayed 0.121 ounce gold per ton (George Cross News Letter, November 16, 1984).

Charger Resources Limited, following geological mapping and induced polarization surveys in 1983, conducted a 2500-foot (762 m) diamond-drill hole program over 4 holes on its Rowan Lake Property, west of Nuinsco's Monte Cristo Prospect. Targets were "carbonate-sericite-silicified sections" and an induced polarization anomaly, and gold values up to 0.228 ounce gold per ton were reported (The Northern Miner, April 26, 1984).

Del Norte Chrome Corporation, in a joint venture with Silver Lake Resources Incorporated, in which the latter company can earn a 50% interest by expending \$250 000 by March 1985, announced a drilling and geophysical survey program on its 25-claim block adjoining Nuinsco's Monte Cristo Prospect to the west (George Cross News Letter, January 16, 1984). As part of this program a joint

diamond-drill hole with Nuinsco was put down along their mutual boundary, to test the extension of the shear zone outlined by the latter company (George Cross News Letter, August 6, 1984).

Dejour Mines Limited and Nova-Co Exploration Limited, in a 72/28 joint venture on 57 claims in the Rowan and Lawrence Lakes areas, announced (The Northern Miner, November 29, 1984) that bulldozer stripping and 4400 feet (1341 m) of diamond drilling had been completed. This was done as follow-up to geophysical surveys performed in the Fall of 1983, and subsequent geochemical sampling. The property, about 6.4 km north-east of and possibly on strike with Nuinsco's Monte Cristo Prospect, has yielded low gold values of up to 0.1 ounce gold per ton, according to the announcement. Brinco Limited entered into the agreement in 1984 by spending \$175 000 to earn a 35% interest.

Falcon Resources Incorporated, following an option granted to Kerr Addison Mines Limited in 1983, in which the latter company could earn a 60% interest in 48 claims situated along the Pipestone-Cameron Fault, south-east of Nuinsco Resources Limited's Cameron Lake Prospect, by spending \$1 million in stages, announced (George Cross News Letter, March 5, 1984) that ground geophysical surveys were completed over the Winter. Two diamond-drill holes, along the Pipestone-Cameron Fault, were completed subsequently (M.N.R. Assessment Files: Northclaim Resources Limited).

Canolan Resources Limited carried out geophysical surveys, and a basal till geochemical survey, and Canico carried out diamond drilling (M.N.R. Assessment Files). These properties adjoin Nuinsco's Cameron Lake ground to the east and northwest respectively.

Further afield, Falconbridge Limited, under an option agreement with Welcome North Mines Limited, completed diamond drilling of 22 holes on the McLennan Prospect in the Dogpaw Lake area (George Cross News Letter, November 7, 1984). Surface trenching yielded 0.21 ounce gold per ton across a 6 m width, and 4 sub-parallel geochemical gold anomalies, each with a strike length of over 500 m, constituted exploration targets, according to the same news release. Twelve holes were put into the main showing, and 10 explored induced polarization anomalies.

In a second joint venture, with Canico, Welcome North Mines Limited announced (George Cross News Letter, October 30, 1984) that "two major sub-parallel 1000 metre long zones of strong carbonate-silica alteration with coincident gold soil anomalies" had been delineated in an exploration program by Canico. This program included geological mapping and geophysical surveys. Samples taken from previous bedrock trenches yielded assay values of up to 0.18 ounce gold per ton over 10 m.

Selco Incorporated, under their joint venture with Gossan Resources Limited, continued diamond drilling on their Gaudry Occurrence at Sioux Narrows. By the

EXPLORATION ACTIVITY DURING THE YEAR.

TABLE 3

Number on Figure	Individual or Company	Activity
1	Agassiz Resources Limited	Geophysical Surveys, Menary Township
2	Agassiz Resources Limited	Geological Survey, Senn Township
3	Barker, Hank	Manual Labour, Bluffpoint Lake area
4	Bernier, I.	Geological Survey, Rowan Lake area
5	Bigstone Minerals Ltd.	Geophysical Survey, Bigstone Bay and Whitefish Bay areas
6	Boise Cascade Canada	Geological Survey, Jaffray Township
7	Bond, James	Geological Survey, Jaffray Township
8	Bonzano Exploration Limited	Geophysical Survey, Kirkup Township
9	Booth, Brian Robert	Geological and Geochemical Survey, Dogpaw Lake area
10	BF Resources Canada Limited	Stripping, Soil and Channel Sampling, Geochemical Survey, Manual Labour, Lobstick Bay area
11	BF Resources Canada Limited	Diamond Drilling, Willingdon Township
12	Canadian Nickel Company Limited	Geophysical Survey, Bluffpoint Lake area
13	Canadian Nickel Company Limited	Diamond Drilling, Dogpaw Lake area
14	Canadian Nickel Company Limited	Geophysical and Geological Surveys, Heronry Lake area
15	Canolan Explorations Limited	Geophysical Survey and Basal Till Survey, Rowan Lake area
16	Central Crude Ltd.	Diamond Drilling, Bad Vermilion Lake area
17	Charger Resources Inc.	Diamond Drilling, Geophysical Survey, Rowan Lake area
18	Clark, Greg, and Karwacki, J.	Geophysical Survey, Haycock Township
19	Cochrane Oil and Gas Ltd.	Geophysical, Geological and Geochemical Surveys, Boyer and Harper Lakes areas
20	Cochrane Oil and Gas Ltd.	Diamond Drilling, Lower Manitou, Harper and Boyer Lakes areas
21	Cochrane Oil and Gas Ltd.	Geological, Geophysical and Geochemical Surveys, Lower Manitou Lake area
22	Cominco Ltd.	Geophysical Survey, Atikwa and Rowan Lakes areas
23	Corporation Falconbridge Copper	Geophysical Survey, Watten and Halkirk Townships
24	Cousineau, Louis E.	Manual and Mechanical Labour, Halkirk and Farrington Townships
25	Cream Silver Mines Limited	Geochemical, Geological and Geophysical Surveys, Rowan Lake area
26	Cusano, P., and Thor, D.	Geophysical Survey, Phillips Township
27	Cymbal Explorations Inc.	Geophysical, Geological Surveys, Phillips Township
28	D. K. Platinum Corporation	Airborne Geophysical Survey, Rowan Lake area
29	Dejour Mines Ltd.	Geophysical Survey, Lawrence and Rowan Lakes areas
30	Duval, Gordon P., Barkman, Levi and Moore, Fred	Geophysical Survey, Willingdon Township
31	Esso Resources Canada Ltd.	Airborne Geophysical Survey, Kawashegamuk and Boyer Lakes areas
32	Falconbridge Limited	Soil Analyses, Dogpaw Lake area
33	Fernberg, Peter	Geological, Airborne Geophysical Survey, Bennett Township
34	Glatz, Alexander	Geophysical Survey, Revell Township
35	Glatz, Alexander	Geophysical Survey, Aubrey Township
36	Glatz, Alexander	Geological Survey, Avery Township
37	Glatz, Alexander	Power Stripping, Melgund Township
38	Golden Range Resources Inc.	Geophysical Survey, Turtlepond Lake area

TABLE 3 Continued

Number on Figure	Individual or Company	Activity
39	Golden Transit Resources Inc.	Geophysical Survey, Brooks Lake area
40	Grant, John C., Collin, Y. and Korpela, D.	Magnetometer Survey, Rowan Lake area
41	Great Cameron Lake Resources Inc.	Geological, Geophysical Surveys, Rowan Lake area
42	Great Cameron Lake Resources Inc.	Airborne Geophysical Survey, Dogpaw Lake area
43	Hall, Evald Monty	Geophysical Survey, Boyer Lake area
44	Hansen, Jens E.	Geophysical Survey, Shoal Lake area
45	Hansson, Earl	Manual Labour, Assays, Lington Township
46	Hawes, James	Diamond Drilling, Contact Bay area
47	Homestake Explorations Limited	Diamond Drilling, Little Turtle Lake area
48	Issigonis, Michael	Manual Labour, Power Stripping, Haycock Township
49	Issigonis, Michael	Manual Labour, Power Stripping, Jaffray Township
50	Jalna Resources Limited	Geophysical Survey, Mang Lake area
51	Jalna Resources Limited	Geophysical Survey, Mang and Lower Manitou Lakes areas
52	Kalrock Developments Ltd.	Geophysical Survey, Phillips Township
53	Kalrock Developments Ltd.	Geophysical Survey, Tweedsmuir Township
54	Keeba Resources Ltd.	Airborne Geophysical Surveys, Hyndman Township
55	Kidd Creek Mines Ltd.	Airborne Geophysical Survey, Kirkup and Manross Townships
56	Knox, William T.	Geophysical Survey, Code Township
57	Knox, William T.	Geophysical, Geological Surveys, Atikwa Lake area
58	Kriese, Karl	Geophysical Survey, Dogpaw Lake area
59	Kuryliw, Chester J.	Diamond Drilling, Tabor Lake area
60	Labrador Exploration Limited	Geophysical, Geological Surveys, Kawashegamuk Lake area
61	Labrador Exploration Limited	Geological Survey, Assays, Snake Bay area
62	Labrador Exploration Limited	Geophysical Survey, Lobstick Bay area
63	LaFleche, G.	Stripping, Geophysical, Geological Surveys, Dogpaw Lake area
64	Leane, Jolin	Geological Survey, Atikwa Lake area
65	Lynx-Canada Explorations Limited	Diamond Drilling, Geological Survey, Bennett Township
66	Lynx-Canada Explorations Limited	Geophysical Survey, Bennett and Little Turtle Lakes areas
67	Mackeracher, James D.	Geological Survey, Barker Bay area
68	McMillen, Robert Lynn	Trenching, Little Turtle Lake area
69	Micham Exploration Inc.	Geophysical Survey, Dogpaw Lake area
70	Mistango Consolidated Resources Ltd.	Airborne Geophysical Survey, Garnet Bay area
71	Mistango Consolidated Resources Ltd.	Airborne Geophysical Survey, Laval Township
72	Morrison, Murray S.	Geological, Geophysical Survey, Glass Township
73	New Ambrose Resources Inc.	Manual and Mechanical Labour, Stripping, Whitefish Bay area
74	Noranda Exploration Company Limited	Diamond Drilling, Bluffpoint Lake area
75	Noranda Exploration Company Limited	Assays, Brooks Lake area
76	Noranda Exploration Company Limited	Geological, Geophysical Surveys, Brooks Lake area
77	Noranda Exploration Company Limited	Assaying, Geological Survey, Napanee Lake area
78	Noranda Exploration Company Limited	Geological, Geophysical, Geochemical Surveys, Assays, Power Stripping, Lobstick Bay area
79	Northclaim Resources Ltd.	Diamond Drilling, Geophysical Survey, Brooks Lake area

TABLE 3 Continued

Number on Figure	Individual or Company	Activity
80	O'Donnell, John F.	Airborne Geophysical Survey, Rowan Lake area
81	Petrunka, D., and Moorhouse, Wm. D.	Geophysical Survey, Laval Township
82	F.I.R.P. Holdings Inc.	Diamond Drilling, Bad Vermilion and Little Turtle Lakes areas
83	Pitkanen, R. W.	Manual and Mechanical, Bluffpoint Lake area
84	Pitkanen, Tom,	Diamond Drilling, Phillips Township
85	Recoski, Frank	Airborne Geophysical Survey, Kawashegamuk Lake area
86	Recoski, Frank, and Hodge, Jack	Airborne Geophysical Survey, Hyndman Township
87	Regal Goldfields Ltd.	Geophysical Survey, Dogpaw Lake area
88	Rosenthal, Alex M.	Geophysical Survey, Rowan Lake area
89	Rosenthal, Lorne	Diamond Drilling, Geological, Geophysical Surveys, Clay Lake area
90	St. Joe Canada Inc.	Geological, Geophysical Surveys, Harper and Boyer Lakes areas
91	Sault Meadows Energy Corp.	Geophysical Survey, Rowan Lake area
92	Sault Meadows Energy Corp.	Airborne Geophysical Survey, Dogpaw Lake area
93	Schienbein, Randy	Geophysical Survey, Jaffray Township
94	Sennoi Resources Ltd.	Geological Survey, Vista Lake area
95	Sherritt Gordon Mines Limited	Geological, Geophysical, and Geochemical Surveys, Diamond Drilling, Dogpaw Lake area
96	Sherritt Gordon Mines Limited	Geological, Geochemical Surveys, Schistose Lake area
97	Silver Lake Resources Inc.	Geophysical Survey, Dogpaw Lake area
98	Silver Lake Resources Inc.	Geophysical, Geological Surveys, Napanee Lake area
99	Soteroplos, Theodore	Geophysical Survey, Rowan Lake area
100	Sparton Resources Inc.	Geophysical Survey, Bluffpoint Lake area
101	Stephens, Gladys Anne	Geophysical, Geological and Geochemical Survey, Ewart Township
102	Sulpetro Minerals Limited	Geophysical Survey, Boyer Lake area
103	Tasu Resources Ltd.	Diamond Drilling, Assaying, Buchan Bay area
104	Teck Corporation	Diamond Drilling, Lower Manitou Lake area
105	United States Borax Chemical Corp.	Geophysical Survey, Dash Lake area
106	Voyager Explorations Limited	Geophysical, Geochemical Surveys, Kawashegamuk Lake area
107	Voyager Explorations Limited	Geophysical Survey, Aubrey Township
108	Voyager Explorations Limited	Diamond Drilling, Van Horne Township
109	Wasabi Resources Ltd.	Diamond Drilling, Phillips Township
110	Whymark, W., and O'Donnell J.F.	Geophysical Survey, Buchan Bay area
111	Wright, R. J.	Diamond Drilling, Kawashegamuk Lake area
112	Wright, R. J.	Geophysical Survey, Harper Lake area
113	Wright, R. J.	Geophysical Survey, Diamond Drilling, Hyndman Township
114	Wright, R. J.	Geophysical Survey, Diamond Drilling, Lower Manitou Lake area
115	Wright, R. J.	Geophysical Survey, Lower Manitou Lake area
116	Wright, R. J.	Geophysical Survey, Napanee Lake area
117	Wright, R. J.	Geophysical Survey, Mang Lake area
118	Wright, R. J.	Geophysical Survey, Barker Bay area
119	Zroback, N.	Power Stripping, Pettypiece Township
120	539258 Ontario Limited	Geophysical Survey, Dogpaw Lake area
121	553215 Ontario Limited	Geophysical Survey, Jaffray Township
122	559536 Ontario Limited	Geophysical Survey, Dash Lake area

TABLE 4

ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.

KENORA MINING DIVISION SYMBOLS AND ABBREVIATIONS									
AMag	- Airborne Magnetometer Survey								
AEM	- Airborne Electromagnetic Survey								
Ag	- Silver	EM	- Electromagnetic Survey	Pet	- Petrography				
Assess	- Assessment Work	Expend	- Expenditure Credits	Pt	- Platinum				
Au	- Gold	Geochem	- Geochemical Survey	SA	- Sampling, Assays				
BM	- Base Metals	GL	- Geological Survey or Report	Seism	- Seismic Geophysical				
BS	- Beneficiation Studies	HEM	- Horizontal Loop Electromagnetic Survey	SP	- Self Potential				
Cons Rpt	- Consultant's Report	IP	- Induced Polarization	STr	- Stripping				
Cu	- Copper	Mag	- Magnetometer Survey	Tr	- Trenching				
DD	- Diamond Drilling (where shown, the number following "DD" indicates the number of holes drilled and the total length drilled respectively)	Mech	- Mechanical	W	- Tungsten				
		Mo	- Molybdenum	Zn	- Zinc				
		MS	- Monument Stone						
		Ni	- Nickel						
Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number	
Aubrey Township	52F/10 NW	Glatz, Alexander	Au	Assess	Mag	1984	2.6453	LL-2	
	52F/14 SE	Hoban, Michael John	Au	Assess	STr	1982-83	-	B-5	
	52F/10 NW	Voyager Explorations Limited	Au	Assess	Manual	1983	-	00-2	
Avery Township	52F/9 NW	Glatz, Alexander	Au	Assess	STr, Mech	1983	-	K-1	
Bad Vermilion Lake	52C/10 NE	Central Crude Limited	Au	Assess	AMag	1983	2.5837	00-1	
	52C/10 NE	Central Crude Limited	Au	Assess	DD 6-652'	1984	-	-	
	52C/10 NE	P.I.R.P. Holdings Inc.	Au	Assess	EM, Mag	1983	2.5638	MM-4	
Bad Vermilion Lake	52C/10 NE	P.I.R.P. Holdings Inc.	-	Assess	DD 2-800'	1984	-	-	
Barker Bay	52F/6 SE	Mackeracher, James D.	Au	Assess	GL	1984	2.7167	C-1	
	52F/6 SE	Wright, R. J.	Au	Assess	EM, Mag	1984	2.7255	-	
Barker Bay Napanee Lake	52F/6 SE	Wright, R. J.	Au	Assess	EM, Mag	1984	2.7257	-	
	52F/3 NE	Wright, R. J.	Au	Assess	EM, Mag	1984	2.7293	D-2	
Beadie Lake	52C/13 NW	Agassiz Resources Ltd.	BM, Au	Assess	STr	1983	-	D-1	
Bennett Lake	52C/16 SW	Coloma Resources Ltd.	Au	Assess	EM, Mag	1983	2.6272	R-1	
	52C/16 SW	Redden, J. W.	Au	Assess	Cons Rpt	1981	-	D-2	
Bennett Township	52C/16 SE	Lynx-Canada Exploration Ltd.	Au	Assess	EM, Mag	1983	2.6552	B-1	
	52C/16 SE	Lynx-Canada Exploration Ltd.	Au	Assess	DD 4-1242'	1984	-	B-2	
Bliss Lake	52C/10 NW	Steep Rock Iron Mines Ltd.	BM, Au	Assess	EM, Mag	1982	2.5543	S-1	
Bad Vermilion Lake	52C/10 NE								
Little Turtle Lake	52C/15 SE								
Bliss Lake	52C/10 NW	Steeprock Resources Inc.	Au	Assess	EM, Mag	1983	2.6083	-	
Bluffpoint Lake	52F/3 NW	Barker, Hank	Au	Assess	Manual	1984	-	M-1	
	52F/3 NW	Canadian Nickel Company Limited	Au	Assess	EM, Mag	1984	2.7247	K-1	
	52F/3 NW	Noranda Exploration Company Limited	Au	Assess	GL	1983	2.5777	I-4	
	52F/3 NW	Noranda Exploration Company Limited	Au	Assess	STr	1983	-	I-5	
	52F/3 NW	Noranda Exploration Company Limited	Au	Assess	SA	1982	2.5375	I-6	
	52F/3 NW	Noranda Exploration Company Limited	Au	Assess	DD 1-342'	1983	-	I-7	
	52F/3 NW	Noranda Exploration Company Limited	Au	Assess	DD 1-302'	1984	-	I-8	
	52F/3 NW	Pitkanen, R. W.	Au	Assess	Manual, Mech	1984	-	L-1	
	52F/3 NW	Sparton Resources Inc.	Au	Assess	EM, Mag	1983-84	2.6617	N-1	
Boyer Lake	52F/7 NE	Hall, Evald Monty	Au	Assess	EM, Mag	1984	2.7139	NN-1	
	52F/7 NE	Sulpetro Minerals Limited	Au	Assess	EM	1984	2.6391	HH-3	
	52F/7 NE	Sulpetro Minerals Limited	BM, Au	Assess	GL	1981	2.6235	HH-2	

TABLE 4 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Brooks Lake	52F/4 NE	Golden Transit Resources Inc.	Au	Assess	EM, Mag	1984	2.7062	-
	52F/4 NE	Fairservice, Robert	Au, Ag	Assess	EM, Mag	1983	2.6108	N-2
	52F/4 NE	Noranda Exploration Company Limited	Au	Assess	EM, Mag	1984	2.6781	I-2
	52F/4 NE	Northclaim Resources Ltd.	Au	Assess	Mag, DD 2-1034'	1984	2.7000	P-1
Brooks Lake Rowan Lake	52F/4 NE 52F/5 SE	Northclaim Resources Ltd.	Au	Assess	DD 2-1034'	1984	-	P-2
Brownridge Township	52F/15 SE	Sanmine Explorations Inc.	W	Assess	Tr	1982	2.5770	R-4
Buchan Bay	52F/11 NE	Hames, C. Marshall	Au, Ag,	Assess	DD 7-1459'	1983	-	Z-3
	52F/11 NE	Raleigh Minerals Ltd.	Au	Assess	SP	1983	2.6611	Z-4
	52F/11 NE	Tasu Resources Ltd.	Au	Assess	DD 3-309.6m	1984	-	AA-2
	52F/11 NE	Tasu Resources Ltd.	Au	Assess	SA DD core	1984	-	AA-3
	52F/11 NE	Whymark, W., O'Donnell, J.F.	Au	Assess	EM, Mag	1983-84	2.6799	CC-1
Butler Lake	52F/10 NE	Euro-Dollar Development Limited	BM	Assess	Acid Tests	1982	2.5250	K-17
	52F/10 NE	Euro-Dollar Development Limited	BM	Assess	SA	1981-82	2.5379	K-18
Clearwater Bay	52E/10 NE	Hames, Marshall	Au, Ag	Assess	DD 5-1000'	1983	-	R-4
	52E/10 NE	Whymark, Wayne	Au	Assess	GL	1983	2.6754	Y-1
Contact Bay	52F/10 NW	Hawes, James	Cu, Ni, Pt	Assess	DD 1-455'	1984	-	RR-2
	52F/10 NW	Hawes, James	Cu, Ni, Pt	Assess	DD 1-275'	1984	-	RR-1
	52F/10 NW	Sovereign, Wm. J.	Au, Ag, Cu, Mo	Assess	SA	1983	2.6204	SS-1
Dash Lake	52F/4 SE	Loydex Resources Ltd.	Au	Assess	Manual, Tr	1983	-	I-1
	52F/4 SE	559536 Ontario Ltd.	Au	Assess	EM, Mag	1983-84	2.6663	J-1
Docker Township	52F/13 SE	Nelson, Carter	MS	Assess	STr, Tr	1983	-	N-1
Dogpaw Lake	52F/5 SW	Booth, Brian Robert	Au	Assess	GL, Geochem	1984	2.7125	-
	52F/5 SW	Canadian Nickel Company Limited	Au	Assess	DD 4-640.07m	1984	-	C-3
Dogpaw Lake Heronry Lake Tweedsmuir Township	52F/5 SW 52F/4 NW 52E/8 SE	Canadian Nickel Company Limited	Au	Assess	AEM, AMag	1958	2.6977	-
Dogpaw Lake	52F/5 SW	FTM Resources Inc.	Au	Assess	GL	1983	2.6305	TT-2
	52F/5 SW	Kriese, Karl	-	Assess	EM	1984	2.7266	BBB-1
	52F/5 SW	LaFleche, G.	-	Assess	STr	1984	-	-
	52F/5 SW	Martin, Jack D.	Au	Assess	EM, Mag, Geochem	1983	2.6210	U-3
	52F/5 SW	Martin, Roy A.	Au, Ag, Cu, Mo	Assess	SA	1983	2.5760	RR-3
	52F/5 SW	Martin, Roy A.	Au	Non Assess	SA, BS	1983	-	RR-4
	52F/5 SW	Micham Exploration	Au	Assess	AEM, AMag	1984	2.6863	YY-1
	52F/5 SW	Riocanex Inc.	Au, BM	Assess	DD 2-3814'	1983	-	SS-2
	52F/5 SW	Sherritt Gordon Mines Limited	Au	Assess	DD 7-3051'	1983-84	-	PP-5
	52F/5 SW	Sherritt Gordon Mines Limited	Au	Assess	GL, Geochem, Mag, IP	1984	2.6983	-
	52F/5 SW	Van Enk, R.	Au	Assess	GL, Geochem	1983	2.6261	ZZ-1
	52F/5 SW	551970 Ontario Ltd.	Au	Assess	EM, Mag	1983	2.6995	WW-1
	Echo Bay Boys Township	52E/10 NW 52E/10 NW	BP Exploration Canada Limited	Au	Assess	DD 1-136'	1983	-
52E/10 NW		Tasu Resources Ltd.	Au	Assess	SA, DD 3-315m	1983	2.6196	Y-10

TABLE 4 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Ewart Township	52E/11 NE	Busch, David J.	Au	Assess	BS	1983	2.6004	NN-1
	52E/11 NE	Stephens, Gladys Anne	Au, Cu	Assess	EM, Mag, Geochem, GL	1983-84	2.6294	00-1
Factor Lake	52C/9 NE	Kroocmo, David	Au	Assess	STr	1983	-	B-3
Garnet Bay	52F/11 NW	Mistango Consolidated Resources Ltd.	Au	Assess	EM, Mag, GL	1983	2.6252	N-1
Glass Township	52E/10 NW	Morrison, Murray S.	Au	Assess	EM	1984	2.7066	-
Gundy Township	52E/14 SE	Etherington, Robert	Mo	Assess	STR	1983	-	C-1
Halkirk Township	52C/11 NE	Armstrong, George	Cu, Ni	Assess	DD 1-182'	1983	-	A-9
	52C/11 NE	Kalrock Developments Ltd.	BM	Assess	DD 3-866.4'	1983	-	00-1
Harper Lake	52F/7 NW	St. Joe Canada Inc.	Au	Assess	Seism	1982	2.5590	H-2
	52F/7 NW	St. Joe Canada Inc.	Au	Assess	EM, Mag	1984	2.6889	H-4
	52F/7 NE	St. Joe Canada Inc.	Au	Assess	EM, Mag	1984	2.7291	-
Haycock Township	52E/16 SW	Clark, G., Karwacki, J. Sr.	Au	Assess	Mag	1984	2.7365	-
	52E/16 SW	Issigonis, M.	Au	Assess	Manual, STR	1983-84	-	Y-1
	52E/16 SW	Karwacki, Patricia M. Clark, Greg H.	Au	Assess	Geochem SA	1983	2.6290	X-1
	52E/16 SE	Karwacki, Patricia M. Clark, Greg H.	Au	Assess	EM	1983	2.6205	X-2
Haycock Township	52E/16 SW	President Mines Ltd.	Au	Assess	STR	1983	-	W-2
Heronry Lake	52F/4 NW	Canadian Nickel Company Limited	Au	Assess	EM, Mag, GL	1984	2.7429	-
	52F/4 NW	Cusano P, Thor, D.	Au	Assess	EM, Mag	1984	2.6585	W-1
	52F/4 NW	Francis Resources	Au	Assess	SA, Geochem, GL	1983	2.5680	V-1
	52F/4 NW	Martin, Jack D. (Welcome North Mines Option)	Au	Assess	GL, Geochem	1983	2.5959	R-2
Hyndman Township	52F/9 SE	Glatz, Alexander	Au	Assess	Expend	1983	-	-
	52F/9 SE	Keeba Resources Ltd.	-	Assess	AMag, AEM	1984	2.7389	-
	52F/9 SE	Wright, R. J.	Au	Assess	DD 1-255.4'	1984	-	J-1
	52F/9 SE	Wright, R. J.	Au	Assess	EM	1983	2.6287	J-2
	52F/9 SE	Wright, R. J.	Au	Assess	Mag	1984	2.6869	-
Jaffray Township	52E/16 SW	Bond, James	Au	Assess	GL	1984	2.7425	-
	52E/16 SW	Issigonis, Michael	Au	Assess	Str, Manual	1983-84	-	Y-2
	52E/16 SW	Schienbein, Randy	Au	Assess	Mag	1984	2.6890	-
Kawashegamuk Lake Boyer Lake	52F/8 NW	Eso Resources Canada Ltd.	Au	Assess	AMag	1984	2.6767	R-1
Kawashegamuk Lake	52F/8 NW	Labrador Exploration (Ontario) Limited	Au	Assess	GL, Geochem	1984	2.7297	-
	52F/8 NW	Labrador Exploration (Ontario) Limited	Au	Assess	Mag	1983-84	2.6610	Q-1
	52F/8 NW	Voyager Explorations Limited	Au	Assess	Geochem, Pet	1984	2.7153	-
	52F/8 NW	Voyager Explorations Limited	Au	Assess	EM	1984	2.7121	-
Kawashegamuk Lake Tabor Lake	52F/8 NW	Wright, R. J. Limited	Au	Assess	EM, Mag	1983	2.6129	EE-1
	52F/9 SW	Wright, R. J. Limited	Au	Assess	DD	1984	-	-
Kirkup Township	52E/9 NW	Bonzano Exploration Ltd.	Au	Assess	GL	1984	2.6537	-
	52E/9 NW	Bonzano Exploration Ltd.	Au	Assess	Mag	1983-84	2.6885	AAA-2

TABLE 4 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Kirkup Township	52E/9 NW	Bonzano Exploration Ltd.	Au	Assess	GL	1983	2.5943	AAA-1
Langton Township	52F/14 SW	Hansson, Earl		Assess	Manual	1984	-	-
Laval Township	52F/15 NE	Petrunka David, Moorhouse Wm. D. (Mustango Consolidated Resources Ltd.)	Au	Assess	Mag	1984	2.6650	-
Little Turtle Lake Porter Inlet Bad Vermilion Lake	52C/15 SE 52C/15 SW 52C/16 NE	Homestake Explorations Ltd.	Au	Assess	GL, EM, Mag	1983	2.6230	BB-1
Little Turtle Lake	52C/15 SE	Homestake Explorations Ltd.	Au	Assess	UD 44-8286	1984	-	-
Little Turtle Lake Bennett Lake	52C/15 SE 52C/16 SW	Lynx-Canada Exploration Ltd.	Au	Assess	EM, Mag	1984	2.6748	AA-1
Little Turtle Lake	52C/15 SE	McMillen, Robert Lynn	Au	Assess	Tr	1984	-	T-3
Lobstick Bay	52F/5 NW	BP Resources Canada Ltd.	Au	Assess	Manual	1984	-	-
	52F/5 NW	Fairservice, Robert (Esso Resources Canada Option)	Au	Assess	STr, Tr, SA	1983	-	K-1
	52F/5 NW	Fairservice, Robert (Esso Resources Canada Option)	Au	Assess	SA, EM, Mag, GL	1983	2.6336	K-2
	52F/5 NW	Labrador Exploration Limited	-	Assess	EM, Mag	1983-84	2.6584	L-1
	52F/5 NW	Noranda Exploration Company Limited	Au	Assess	GL	1984	2.7391	-
	52F/5 NW	Noranda Exploration Company Limited	Au	Assess	SA, Expend	1984	2.7300	-
	52F/5 NW	Noranda Exploration Company Limited	Au	Assess	STr	1984	-	M-1
Lower Manitou Lake Harper Lake Boyer Lake	52F/7 SW 52F/7 NW 52F/7 NE	Cochrane Oil & Gas Ltd.	Au	Assess	DD 16-2793.5	1984	-	X-1
Lower Manitou Lake Harper Lake Boyer Lake	52F/7 SW 52F/7 NW 52F/7 NE	Cochrane Oil & Gas Ltd.	Au	Assess	EM, Mag, Geochem, GL, Expend	1983	2.6542	-
Lower Manitou Lake Harper Lake	52F/7 SW 52F/7 NW	St. Joe Canada Inc.	Au	Assess	DD 12-1366m	1983	-	U-2
Lower Manitou Lake	52F/7 SW	Teck Corporation	Au	Assess	DD 3-1400	1984	-	W-2
	52F/7 SW	Wright, R. J.	Au	Assess	DD 1-347	1984	-	W-2
	52F/7 SW	Wright, R. J.	Au	Assess	EM, Mag	1984	2.7294	-
	52F/7 SW	Wright, R. J.	Au	Assess	EM, Mag	1984	2.7230	-
	52F/7 SW	Wright, R. J.	Au	Assess	EM, Mag	1984	2.7229	-
	52F/7 SW	Wright, R. J.	Au	Assess	EM, Mag	1984	2.7287	-
	52F/7 SW	Wright, R. J.	Au	Assess	EM, Mag	1984	2.7258	-
	52F/7 SW	Wright, R. J.	Au	Assess	EM, Mag	1984	2.7226	-
	52F/7 SW	Wright, R. J.	Au	Assess	EM, Mag	1984	2.7290	-
	52F/7 SW	Wright, R. J.	Au	Assess	EM, Mag	1984	2.7256	W-3
	52F/7 SW	Wright, R. J.	Au	Assess	EM, Mag	1984	2.7259	W-4
	52F/7 SW	Wright, R. J.	Au	Assess	EM, Mag	1984	2.7285	W-5
	52F/7 SW	Wright, R. J.	Au	Assess	EM, Mag	1984	2.7227	-
	52F/7 SW	Wright, R. J.	Au	Assess	DD 1-407	1984	-	W-1
Manross Township	52E/9 SW	Bigstone Minerals Ltd.	Au	Assess	Mag	1984	2.7048	Q-1
Meggisi Lake	52F/7 SE	Renders, Pete	Au	Assess	Manual, Tr	1983	-	C-1
	52F/7 SE	Renders, Pete	Au	Assess	Geochem, SA	1983	-	C-2

TABLE 4 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Melgund Township	52F/9 SW	Glatz, Alexander	Au	Assess	STr	1984	-	FF-1
Menary Township	52C/13 NW	Agassiz Resources Limited	BM	Assess	EM, Mag	1984	2.7149	-
Napanee Lake	52F/3 NE	Van Enk, Rein	Au	Assess	GL, Cons Rpt	1984	2.6083	-
	52F/3 NE	Wright, R. J.	Au	Assess	EM, Mag	1984	2.7284	-
	52F/3 NE	Wright, R. J.	Au	Assess	EM, Mag	1984	2.7286	J-1
Faterson Lake et al	52L/7 SE et al	Noranda Exploration Company Limited	BM	Assess	AMag	1983	2.5956	F-5
Pettypiece Township	52E/16 SW	Zroback, N.	Au	Assess	STr	1984	-	A-1
Phillips Township	52F/4 NW	Archibald Consulting	Au	Assess	EM, Mag	1983	2.5999	T-1
	52F/5 WW	Cymbal Explorations Inc.	Au	Assess	EM, Mag	1983-84	2.6403	U-1
	52F/5 SW	Cymbal Explorations Inc.	Au	Assess	GL, EM, Mag	1984	2.6856	U-2
	52F/4 NW	Kalrock Developments Ltd.	Au	Assess	EM, Mag	1984	2.7169	-
	52F/4 NW	Pitkanen, Tom	Au	Assess	DD 1-102'	1984	-	D-1
52F/4 NW	Wasabi Resources Ltd.	Au	Assess	DD 7-580.9'	1984	-	-	
Revell Township	52F/9 SE	Glatz, Alexander	Au	Assess	EM, Mag	1984	2.7393	-
Rowan Lake	52F/5 SE	Atikwa Resources Inc.	Au	Assess	AMag, AEM	1983	2.6540	YY-1
Lawrence Lake	52F/6 SW	(Bigstone Minerals Ltd.						
Brooks Lake	52F/4 NE	Canolan Resources Ltd.						
Dogpaw Lake	52F/5 SW	Gold Fields Canadian Mining Limited, Knappett, Rodney, Langelaar, Joop McGowan, Robert Nuinsco Resources Ltd. O'Donnell, John F. Whymark, Wayne 579878 Ontario Inc.)						
Rowan Lake	52F/5 SE	Bernier, K.	Au	Assess	GL	1984	2.7264	-
	52F/5 SE	Calaveras Exploration Ltd.	Au	Assess	DD 2-798'	1983	-	-
	52F/5 SE	Canolan Explorations Limited	Au	Assess	EM, Mag	1983-84	2.6404	QQ-1
	52F/5 SE	Canolan Resources Limited	Au	Assess	Geochem	1984	2.6651	TT-1
	52F/5 SE	Charger Resources (U.S.) Inc.	Au	Assess	DD 4-2497'	1984	-	00-1
	52F/5 SE	Charger Resources Inc.	Au	Assess	IP	1984	2.6773	00-2
52F/5 SE	Charger Resources (U.S.) Inc.	Au	Assess	Mag	1984	2.6772	00-3	
Rowan Lake	52F/5 SE	Cominco Ltd.	Au	Assess	EM, Mag	1984	2.7061	XX-1
Atikwa Lake	52F/5 NE							
Rowan Lake	52F/5 SE	Dejour Mines Ltd.	Au	Assess	EM, Mag	1983-84	2.6626	VV-1
	52F/5 SE	Grant, John, Collin, Y. Korpela	Au	Assess	Mag	1984	2.7133	AAA-1
	52F/5 SE	Great Cameron Lake Resources Inc.	Au	Assess	EM, Mag	1984	2.6780	U-1
	52F/5 SE	Nolan Lake Explorations Inc.	Au	Assess	IP	1982	2.5595	II-7
	52F/5 SE	Nolan Lake Explorations Inc.	Au	Assess	GL	1982	2.5596	II-8
	52F/5 SE	Nuinsco Resources Limited	Au	Assess	DD 9-6193'	1983	-	JJ-5
	52F/5 SE	Nuinsco Resources Limited	Au	OMEF	GL	1980	-	JJ-4
	52F/5 SE	Rosenthal, Alex	Au	Assess	EM	1984	2.7113	-
	52F/5 SE	Sault Meadows Energy Corp.	Au	Assess	EM, Mag	1984	2.6841	SS-1

TABLE 4 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Rowan Lake	52F/5 SE	Sawyer, Jacques Thibault A.	Au	Assess	GL, Geochem, IP	1983	2.6297	PP-1
	52F/5 SE	Soteroplos, Theodore	-	Assess	EM, Mag	1984	2.6658	-
Senn Township	52C/13 NW	Agassiz Resources Limited	BM	Assess	GL	1984	2.7245	-
Shoal Lake	52E/10 SW	BP Resources Canada Limited	Au	Assess	DD 4-1689'	1983	-	KK-1
	52E/10 SW	Hansen, Jens E.	Au	Assess	EM, Mag	1984	2.6911	LL-1
	52E/10 SW	Selco Inc.	Au	Assess	EM, Mag	1983	2.5858	II-3
Smellie Township	52F/13 NE	MacLeod, James	BM	Assess	DD 3-504'	1982	-	B-3
Snowshoe Bay	52E/11 SE	BP Exploration Canada Limited	Au	Assess	DD 1-394'	1983	-	P-1
	52E/11 SE	BP Exploration Canada Limited	Au	Assess	DD 2-1298'	1983	-	P-2
	52E/11 SE	BP Exploration Canada Limited	Au	Assess	DD 1-682'	1983	-	P-3
Snowshoe Bay Moosin Bay	52E/11 SE 52E/6 NE	Mickelson, A	Au	Assess	SA	1982-83	2.5560	Q-1
Snowshoe Bay	52E/11 SE	Mickelson, A.	Au	Assess	GL	1982-83	2.5751	Q-2
	52E/11 SE	Selco Inc.	Au, BM	Assess	EM, Mag	1983	2.6053	Q-5
Squint Lake	52K/3 SE	Noranda Exploration Company Limited	Cu, Zn	Assess	Geochem	1981	2.5642	B-10
Tabor Lake Kawashegamuk Lake	52F/9 SW 52F/8 NW	Wright, R. J.	Au	Assess	EM, Mag	1983	2.6690	EE-2
Tabor Lake	52F/9 SW	Kuryliw, Chester J.	Au, Cu, Zn	Assess	DD 3-926'	1983	-	DD-2
	52F/9 SW	Redden, J. W.	Au	Assess	Tr	1983	-	X-8
Turtlepond Lake Boyer Lake	52F/10 SE 52F/7 NE	Asamera Inc.	Au	Assess	GL, Geochem, Mag EM	1983	2.6023	Z-3
Tweedsmuir Township	52E/8 SE	Kalrock Developments Ltd.	Au	Assess	EM, Mag	1984	2.7170	-
Van Horne Township	52F/15 SW	Voyager Explorations Limited	Au	Assess	DD 1-407'	1984	-	F-1
	52F/15 SW	Van Horne Gold Exploration Inc.	Au	Assess	GL	1983	2.6680	E-2
	52F/15 SW	Van Horne Gold Exploration Inc.	Au	Assess	GL	1983	2.6679	E-3
	52F/15 SW	Van Horne Gold Exploration Inc.	Au	Assess	EM, Mag, GL	1983	2.6491	E-4
Vista Lake	52F/3 SE	Sennol Resources Ltd.	Au	Assess	GL	1984	2.7191	-
Wapageisi Lake	52F/8 SW	Essex Minerals Company	Au	Assess	EM, Mag	1982	2.4828	PP-1
Wabigoon Township Redvers Township	52F/14 NW 52K/3 SW	Noranda Exploration Company Limited	BM	Assess	EM, Mag	1981	2.5446	E-2
Watten Township	52C/11 NE	Corporation Falconbridge Copper (G. Armstrong Opt.)	BM, Ag, Au	Assess	DD 7-1480'	1984	-	PP-1
Watten Township Halkirk Township	52C/11 NE 52C/10 NW	Corporation Falconbridge Copper	BM	Assess	HEM, Mag	1984	2.6761	-
Wiley Bay	52E/10 SE	Tasu Resources Ltd.	Au, Ag, Mo	Assess	Tr, STR	1983	-	N-3
	52E/10 SE	Tasu Resources Ltd.	Au, Ag, Cu, Mo	Assess	Geochem, STR, Tr, SA	1983	2.6452	N-4
Willingdon Township	52E/8 NE	BP Resources Canada Limited	Au	Assess	DD 17-5020'	1983	-	N-1
	52E/8 NE	Duval, Gordon F. Barkman, Levi, Moore, Fred	-	Assess	EM, Mag	1984	2.7263	-
	52E/8 NE	Selco Inc.	Au	Assess	Mag	1983	2.6309	M-2
	52E/8 NE	Selco Inc.	Au	Assess	DD 1-171'	1983	-	M-1

TABLE 4 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Zealand Township	52F/15 SE	Campbell, Bill	W, Au	Assess	STr	1983	-	S-3
	52F/15 SE	Sanmine Explorations Inc.	W	Assess	Mech	1983	-	R-5
	52F/15 SE	Sanmine Explorations Inc.	W	Assess	Expend	1983	-	R-6
	52F/15 SE	Sanmine Explorations Inc.	W	Assess	Manual, Mech, STR	1983	-	R-7
	52F/15 SE	Sanmine Explorations Inc.	W	Assess	STr	1983	-	R-8
	52F/15 SE	Van Koughnet, C.D.	W	Assess	STr	1983	-	V-1

end of January, 1984, 18 holes had been drilled, testing a silicified and carbonatized gold-bearing zone (M.N.R. Assessment Files: BP Canada Incorporated; Selco Incorporated).

Following a protracted exploration program in 1983 on the Kakagi Lake (East Group) and Martin Gold Occurrences, at the southeastern end of Kakagi Lake, Barrier Reef Resources Limited were inactive on these properties.

Dubenski Gold Mines Limited, which was incorporated in 1983 to acquire an interest in the Caswell-Williams (or Dubenski) Prospect at Flint Lake, carried out a diamond drill program and surface stripping. A contract for 10 000 feet (3048 m) of diamond drilling was let (J.P. Sheridan, personal communication, 1984).

Other companies and individuals known to have done exploration on the ground for gold in the general Kakagi - Rowan - Cameron Lakes area in 1984 include: a geological survey by Loydex Resources Incorporated under K. Bernier in the Rowan Lake area; geological and geochemical surveys by Sherritt Gordon Mines Limited under Brian Booth in the Dogpaw Lake area; a geophysical survey by Cominco Limited in the Atikwa and Rowan Lakes areas; geochemical, geological, and geophysical surveys by Cream Silver Mines Limited in the Rowan Lake area; a geophysical survey by P. Cusano and O. Thor in Phillips Township; geophysical and geological surveys in Phillips Township by Cymbal Explorations Incorporated; a geophysical survey

by Dejour Mines Limited in the Lawrence and Rowan Lakes areas; a geophysical survey by G.P. Duval, L. Barkman, and F. Moore in Willingdon Township; a geophysical survey by Golden Transit Resources Incorporated in the Brooks Lake area; a magnetometer survey by Excics Exploration Limited under J.C. Grant, Y. Collin and D. Korpela in the Rowan Lake area; a geological and geophysical surveys by Great Cameron Lake Resources Incorporated in the Rowan Lake area; geophysical surveys by Kalrock Developments Limited in Phillips and Tweedsmuir Townships; a geophysical survey by K. Kriese in the Dogpaw Lake area; a geophysical survey by Labrador Mining and Exploration Company Limited in the Lobstick Bay area; stripping, geophysical, and geological surveys by G. LaFleche in the Dogpaw Lake area; a geological survey by J. Leane in the Atikwa Lake area; a geophysical survey by Micham Exploration Incorporated in the Dogpaw Lake area; geological and geophysical surveys, and sampling for assay by Noranda Incorporated in the Brooks Lake area; geological, geophysical, and geochemical surveys, assaying, and stripping by Noranda Incorporated on an option from R.J. Fairservice at Mushkasu Lake in the Lobstick Bay area; diamond drilling by T. Pitkanen and by Wasabi Resources Limited on the Combined Prospect in Phillips Township; a geophysical survey by Regal Goldfields Limited in the Dogpaw Lake area; a geophysical survey by A.M. Rosenthal in the Rowan Lake area; a geophysical survey by Sault Meadows Energy Corporation in

the Rowan Lake area; geological, geophysical, and geochemical surveys and diamond drilling by Sherritt Gordon Mines Limited in a joint venture with Gossan Resources Limited at Stephen Lake in the Dogpaw Lake area; geological and geochemical surveys by Sherritt Gordon Mines Limited in the Schistose Lake area; a geophysical survey by T. Soteroplos in the Rowan Lake area; a geophysical survey by United States Borax Chemical Corporation in the Dash Lake area; a geophysical survey by 539258 Ontario Limited in the Dogpaw Lake area; and a geophysical survey by 559536 Ontario Limited in the Dash Lake area.

Manitou-Wabigoon-Eagle Lakes Area

Following the purchase in 1983 of ground on Manitou Island, Lower Manitou Lake, encompassing the Gaffney and Bee-Hive Gold Prospects, Teck Corporation and Noxe Petroleum Corporation, in a 50/50 joint venture, conducted diamond drilling on the property in the early part of 1984. In addition, as reported in *The Northern Miner* (March 1, 1984), at least 20 other junior mining companies, holding 654 claims, surrounded the Teck-Noxe Property. Exploration was conducted by Teck Corporation on these claims, in the form of geophysical surveys over the Winter (listed under R.J. Wright in Table 3), and follow-up ground checking in the Summer months. On Manitou Island, 21 diamond-drill holes were put down on the Gaffney Property, both to intersect trenches perpendicular to the northeast-

trending shoreline, and to test the zone near and parallel to the shoreline. Assays from the best drill holes ranged from 0.122 ounce gold per ton over 4 feet (1.2 m) to 0.292 ounce gold per ton over 13.5 feet (4.1 m) (George Cross News Letter, August 1, 1984). At year end, no work was being conducted by Teck Corporation in the area.

Cochrane Oil and Gas Limited announced in February (The Northern Miner, February 9, 1984) the commencement of a 5000-foot (1524 m) diamond drilling program on their 3 claim groups totaling 230 claims in the general Manitou Lakes area. Claims were originally staked on the basis of a regional airborne geophysical survey conducted for the Ontario Geological Survey (1981). Drilling was conducted as follow-up to geological, geochemical, and geophysical surveys, and prospecting all carried out in the Summer of 1983. According to an article in North American Gold Mining Industry News (July 6, 1984), approximately 4000 feet (1220 m) of drilling was done over 25 holes, and assays obtained from trenching at the old Giant Mine Prospect gave gold values up to 0.6 ounce gold per ton.

Jalna Resources Limited, as part of the Goldore Joint venture in which they are operators with Pecos Resources Limited, GLE Resources Limited, Sutherland Resources Limited, and Austin Resources Incorporated, as partners, continued work on their 626 claim, 20 mile (32 km) long block in the general Manitou Lakes area in 1984. Work during 1983 had outlined 6 specific targets, with assays of up to 0.662 ounce gold per ton obtained in 1 area of pyritic felsic tuff float. According to an article in The Northern Miner (May 31, 1984), follow-up ground geophysical surveying and trenching was underway on a pyritic chert zone.

Monte Christo Resources Limited, with Chester Kuryliw as operator, conducted a diamond drill program on a 20 claim property surrounding the past produc-

ing Sakoose Mine in the Tabor Lake area. Three holes were put down to test 3 ground electromagnetic conductors. According to an article in The Northern Miner (April 12, 1984), no significant gold values were encountered.

Silverside Resources Incorporated continued work near Flambeau Lake in the Contact Bay area, with Voyager Explorations Limited as operator. In 1983, according to an article in The Northern Miner (December 1, 1983), a 16-foot (5 m) surface section assayed 0.249 ounce gold per ton, and stripping revealed a 200-foot (61 m) wide zone in which an average grade of 0.636 ounce gold per ton was obtained on assay, across an 8-foot (2.4 m) section. A 4000-foot (1220 m) drill program was commenced during the Summer (George Cross News Letter, July 5, 1984).

Sparton Resources Incorporated completed a 6-hole diamond drill program late in 1983 on their 243 claim property encompassing the past producing Straw Lake Beach Mine in the Bluffpoint Lake area (The Northern Miner, March 29, 1984). Further work has not been done on this property. Previous work had consisted of geophysical (including induced polarization), geochemical, and geological surveys, and prospecting, stripping, and detailed rock sampling. Exploration was also done on 3 claim groups totaling 93 claims in the general Lower Manitou Lakes area, according to The Northern Miner (November 8, 1984). In this work, assays of up to 0.35 ounce gold per ton were obtained in trenching and sampling.

Tasu Resources Limited continued assessment of its W.W. Smith and Magdalena Gold Prospects at Eagle Lake. Following diamond drilling over 6 holes in 1983, further drilling was done in 3 holes during February, 1984 (George Cross News Letter, March 20, 1984). According to this release, gold mineralization is contained in a 120-foot (36.6 m) thick sequence of sulphidic siliceous rock and mafic tuffs, that has a strike length of at least 1200 feet

(366 m), and to a depth of at least 288 feet (87.8 m).

Van Horne Gold Exploration Incorporated and Teck Corporation, in a joint venture, carried out diamond drilling on a 74-claim group over the Pidgeon-Hyndman Occurrences in Hyndman Township. According to an article in The Northern Miner (September 20, 1984), 10 holes totaling 2500 feet (762 m) were planned. Bulk samples weighing 50 pounds (23 kg) assayed up to 0.14 ounce gold per ton. In another joint venture with Van Horne, Teck drilled 5 holes totaling 650 feet (198 m) under a high grade gold zone in a quartz vein at Church Lake on their New Klondike 96-claim property near Kawashegamuk Lake; no economically significant gold values were encountered, according to the same article.

Other companies and individuals known to have done exploration on the ground for gold in the general Manitou - Wabigoon - Eagle Lakes area in 1984 include: a geophysical survey by Canadian Nickel Company Limited in the Bluffpoint Lake area; geophysical and geological surveys, and stripping by Alexander Glatz on various properties in Revell, Avery, Melgund, and Aubrey Townships; a geophysical survey by Golden Range Resources Incorporated in the Turtlepond Lake area; a geophysical survey by E.M. Hall in the Boyer Lake area; geophysical and geological surveys by Labrador Mining and Exploration Company Limited at Kawashegamuk Lake and Snake Bay; a geological survey by J.D. MacKeracher in the Barker Bay area; diamond drilling by Noranda Incorporated on their R.J. Fairservice option in the Bluffpoint Lake area, and assaying and geological survey in the Napanee Lake area; a magnetometer survey by D. Petrunka and W.D. Moorehouse in Laval Township; manual and mechanical work by R.W. Pitkanen in the Bluffpoint Lake area; geological and geophysical surveys by St. Joe Canada Incorporated in the Harper and Boyer Lakes areas; a geological survey by Sennol Resources Limit-

ed in the Vista Lake area; geophysical and geological surveys by Silver Lake Resources Incorporated in the Napanee Lake area; a geophysical survey by Sparton Resources Incorporated in the Bluffpoint Lake area; an electromagnetic survey by Sulpetro Minerals Limited in the Boyer Lake area; geophysical and geochemical surveys by Voyager Explorations Limited at Snake Bay in the Kawashegamuk Lake area; and a geophysical survey by W. Whymark and J.F. O'Donnell in the Buchan Bay area.

Lake of the Woods-Shoal Lake Area

A regional exploration program in 1983 that Selco Incorporated (now B.P. Resources Canada Limited) conducted as a joint venture with Consolidated Professor Mines Limited was inactive in 1984.

Barrier Reef Resources Limited, on a property near High Lake held under option by Falcon Resources Incorporated, a 53% owned subsidiary company, reported the intention to do further work following geological, geophysical, and geochemical surveys commenced in 1983. This property includes the Electrum Prospect, held under lease by R. Longe. Other crown land held under option on which geological, geophysical, and geochemical surveys were done in 1984 includes that of Gladys A. Stephens (Table 3).

Boise Cascade Canada, a subsidiary of the forestry company, carried out detailed mapping, geochemical, and geophysical surveys, and surface stripping on their wholly-owned Scramble Prospect, and a geological survey on unpatented claims under the names of Boise Cascade Canada, and James Bond (Table 3) in Jaffray Township, near Kenora. In an article in *The Northern Miner* (October 25, 1984), it was reported that the occurrence lies in a zone characterized by overlapping magnetic and induced polarization anomalies which has been traced for more than 3000 feet (914 m). Favourable assays have been ob-

tained from the immediate former shaft area, where the surface stripping, detailed mapping, and geochemical sampling was carried out.

President Mines Limited carried out an underground sampling program late in the year on its Pine Portage Prospect in the Bigstone Bay area, following an announcement in *The Northern Miner* (November 15, 1984).

Other gold exploration known to have been carried out in the Lake of the Woods-Shoal Lake Area, in 1984, included: a geophysical survey by Bigstone Minerals Limited in the Bigstone Bay and Whitefish Bay areas; a magnetometer survey by Bonzano Exploration Limited in Kirkup Township, on the Black Jack, Gold Hill, and associated prospects; a magnetometer survey by G. Clark and J. Karwacki on claims encompassing the Sweden Occurrence in Haycock Township; a geophysical survey by Jens Hansen in the Shoal Lake area; manual and power stripping by M. Issigonis on the Island Lake Occurrence in Haycock Township, and on the Wimar Occurrence in Jaffray Township; geophysical surveys by W.T. Knox near the Witch Bay Occurrence in Code Township; geological and geophysical surveys by M.S. Morrison in Glass Township; manual and mechanical labour and stripping by New Ambrose Resources Incorporated on the Ambrose Prospect, Gull Island, Lake of the Woods; a magnetometer survey by Randy Schienbein in Jaffray Township; and a magnetometer survey by 553215 Ontario Limited in Jaffray Township.

Mine Centre Area

Homestake Explorations Limited, a Harbinson Group company, completed initial evaluation commenced in 1983 of the former Olive Mine, with a 44 hole, 8286-foot (2526 m) diamond drill program. As reported in *The Northern Miner* (December 6, 1984), Homestake intends to process 3000 tons of ore grading 0.34 ounce gold per ton at the nearby modular mill of Royal

Gold and Silver Corporation (see "Mining Activity").

Central Crude Limited, another Harbinson Group company, continued an exploration program commenced in 1983 at the site of the former Stellar Mine, on the northern shore of Bad Vermilion Lake. Six hundred and fifty two feet (199 m) of diamond drilling was carried out over 6 holes (M.N.R. Assessment Files).

Cleyo Resources Incorporated, under an option agreement with P.I.R.P. Holdings Incorporated, at the end of the year were carrying out a diamond drill program (S. Ciglen, Cleyo Resources, personal communication, 1984) at the past-producing Golden Star Mine in the Bad Vermilion Lake area, as follow-up to geophysical surveys, stripping, and trenching reported in *The Northern Miner* (October 18, 1984).

Sparton Resources Incorporated, in a 50/50 joint venture with Lynx Canada Explorations Limited, carried out surface stripping and trenching and geological mapping in the vicinity of the former Independence Mine, near Bennett Lake, in Bennett Township. Grab samples assaying 0.71 ounce gold per ton and 12.5 ounces of silver per ton were obtained by the company in a 150-foot (46 m) long trench over which there is a coincident 1000-foot (305 m) long magnetic anomaly (*The Northern Miner*, November 8, 1984). On a separate claim block to the south, 1242 feet (378.6 m) of diamond drilling was done over 4 holes in January, 1984 (M.N.R. Assessment Files). On another claim block to the west, in the Bennett Lake and Little Turtle Lakes areas, geophysical surveys were carried out.

Other activity known to have been carried out in the Mine Centre area for gold in 1984 included: a geological survey for Argor Explorations, under the name of Peter Fernberg, in Bennett Township; trenching by R.L. McMillen on the Saundry Occurrence in the Little Turtle Lake area; and other work in a joint venture by Lynx Canada

Explorations Limited, Campbell Resources Incorporated, and Lacana Mining Corporation at Burditt Lake in the Beadle Lake area northwest of Fort Frances.

Bee Lake Area

In recent years considerable exploration for gold has been proceeding immediately west of the Ontario border in Manitoba, in the Gem Lake area, and northwestward toward the San Antonio Mine at Bissett. In the continuation of this Rice Lake "greenstone" belt in Ontario, Manwa Resources, among others, conducted exploration for gold in 1984. In a press release in the George Cross News Letter (December 10, 1984), Magna Ventures Limited and Maralgo Mines Limited reported on progress made in a 20 km long group of properties straddling the Ontario-Manitoba border. On the Ontario side of the border, Maralgo holds a 369-claim block, and reports that prospecting and reconnaissance geological mapping have been carried out. The company considers that gold-bearing structures identified on the Manitoba side extend into Ontario.

BASE METALS

Exploration for base metals, as has been the pattern for a number of years, has been at a low level, and mainly carried out by major companies.

Noranda Incorporated continued its regional exploration program in the English River Sub-province, in the vicinity of Oak Lake, straddling the boundary with the Red Lake Mining Division, with follow-up ground work to regional airborne geophysical surveys.

Corporation Falconbridge Copper conducted base metal exploration programs on 2 properties near Fort Frances optioned from George Armstrong, one at Pocket Pond in Halkirk Township, and the other at Swell Bay in Farrington and Halkirk Townships. Geophysical, geological, and geochemical surveys have been completed on both properties (B. Boily, Cor-

poration Falconbridge, personal communication, 1984).

Agassiz Resources Limited continued exploration begun in 1983 near Burditt Lake northwest of Fort Frances, conducting geological and geophysical surveys in Senn and Menary Townships.

Other exploration for base metals included diamond drilling by James Hawes in the vicinity of copper-nickel occurrences in the Contact Bay area south of Dryden.

OTHER MINERALS

Titan Titanium International Incorporated conducted a diamond drill program on the titaniferous magnetite occurrences in a gabbro at Bad Vermilion Lake east of Fort Frances, formerly investigated by Stratmat Limited in the 1960s.

Following extensive surface stripping in 1983, Sanmine Explorations Incorporated did some follow-up at their scheelite prospect near Mavis Lake, in Zealand and Brownridge Townships.

PROPERTY EXAMINATIONS

In 1984, the following mining and exploration properties, and mineral occurrences and prospects were examined by staff of the Kenora Resident Geologist Office as part of the regular program:

GOLD

1. Bath Island Occurrence - Whitefish Bay area, Lake of the Woods
2. Cameron Island Mine (Duport Mine) - Snowshoe Bay area
3. Cameron Lake Prospect - Rowan Lake area
4. Champion Mine - Kirkup Township
5. Combined Prospect - Phillips Township
6. Deadbroke Occurrence - Astron Bay area, Lake of the Woods
7. Edwards-Fairservice Prospect - Bluffpoint Lake area
8. Electrum Occurrence (Arsenic Zone)- Ewart Township

9. Foley Mine-Bad Vermilion Lake area
10. Gaudry Prospect - Willingdon Township
11. Golden Gate Occurrence - Kirkup Township
12. Golden Star Mine - Bad Vermilion Lake area
13. Gold Hill Occurrence - Kirkup Township
14. Howmandale Occurrence - Haycock and Jaffray Townships
15. Kenopo Prospect (Conglomerate Showing) - Ewart Township
16. Kenricia Mine - Clearwater Bay area
17. Kozowy Flambeau Lake Prospect - Aubrey Township
18. McKenzie-Gray Occurrence - Bad Vermilion Lake area
19. Monte Cristo Prospect - Rowan Lake area
20. Olive Mine - Little Turtle Lake area
21. Pidgeon Prospect - Hyndman Township
22. Sakoose Mine - Tabor Lake area
23. Scramble Prospect - Jaffray Township
25. Sovereign Peak Lake Prospect - Turtlepond Lake area
26. Trojan Occurrence - Phillips Township
27. Wendigo Mine - Manross Township
28. Wilkinson Bob Lake Occurrence - Contact Bay area
29. Wilkinson Flambeau Lake Occurrence - Van Horne Township.

BASE METALS

30. Armstrong Gagne Lake Zinc-Copper Prospect - Farrington Township
31. Armstrong Pocket Pond Zinc-Copper Prospect - Halkirk Township
32. Harrison Copper-Nickel Prospect - Contact Bay area
33. Noranda Oak Lake property -

Burden Lake area.

SULPHIDE OCCURRENCE

34. Hanson Property - Langton Township.

DRYDEN-IGNACE ECONOMIC GEOLOGIST PROGRAM

J. Parker

Economic Geologist, Ontario Ministry of Natural Resources, Kenora.

INTRODUCTION

The Dryden-Ignace Economic Geologist Program, initiated in 1984 and funded by the Ontario Ministry of Northern Affairs, encompasses an area from Eagle Lake east to Ignace, north to Vermilion Bay, and south to Lower Manitou Lake. The objective of the program is to encourage and promote mineral exploration in this general area by providing assistance and advice to prospectors and mining companies, assisting anyone who wants to start prospecting, facilitating contact between prospectors and the mining industry, monitoring local exploration activities, and establishing a database by documenting and investigating old and new mineral occurrences.

Gold exploration around Dryden began as early as 1888, the first mines producing gold from 1895 to 1912 at Eagle Lake, Wabigoon Lake, and Upper Manitou Lake. A resurgence of gold exploration and production began in the early 1930s, but had terminated by the late 1940s. Base metal and uranium exploration occurred throughout the area from the late 1950s to the late 1970s, but no significant deposits were discovered. Tungsten and rare elements have been the focus of exploration immediately north of Dryden, in Brownridge and Zealand Townships, since the 1950s. During 1984, exploration was directed toward gold. A small heap leach pad and recovery circuit was being tested by J. Redden at the former Sakoose Mine, near Tabor Lake.

PROPERTY EXAMINATIONS

In 1984, the following mineral occurrences, prospects, past producing mines and mining and exploration properties were examined:

Gold

1. Big Ruby Occurrence - Southworth Township
2. Bonanza Mine - Van Horne Township
3. Brockman Prospect - Tabor Lake area
4. Church Lake Prospect - Kawashegamuk Lake area
5. Dumond Occurrence - Hyndman Township
6. Pidgeon, G.L., Prospect - Avery Township
7. Glatz, A., Occurrence - Melgund Township
8. Grace Prospect - Garnet Bay area
9. Harrison, J., Occurrence - Buchan Bay area
10. HW123 Occurrence - Southworth Township
11. Kozowy, A., Flambeau Lake Prospect - Aubrey Township
12. Meridian Bay Occurrence - Osbourne Bay area
13. New Showing Prospect - Hyndman Township
14. Niemi Occurrence - Southworth Township
15. Northern Queen Prospect - Zealand Township
16. Old Showing Occurrence - Hyndman Township
17. Pathfinder Prospect - Melgund Township
18. Pidgeon, G.L., Bob Lake Occurrence - Contact Bay area
19. Pidgeon, G.L., Prospect - Hyndman Township
20. Pioneer Island Prospect - Garnet Bay area
21. Redeemer Mine - Van Horne Township
22. Rognon Prospect - Contact Bay area
23. Sakoose Mine - Tabor Lake area
24. Snake Bay Prospect -

Kawashegamuk Lake area

25. Sovereign Peak Lake Prospect - Turtlepond Lake area
26. Starr, E., Occurrence - Boyer Lake area
27. Sulphide Island Occurrence - Buchan Bay area
28. Swamp Occurrence - Revell Township
29. Tabor Lake Prospect - Tabor Lake area
30. Van Koughnett, C., Property - Osbourne Bay area
31. Viking Prospect - Garnet Bay area
32. Wachman Prospect - Contact Bay area
33. Wilkinson, D., Bob Lake Occurrence - Contact Bay area
34. Wilkinson, D., Flambeau Lake Occurrence - Van Horne Township.

Base Metals

35. Sukava, A., Occurrence - Buchan Bay area.

Sulphide Occurrence

36. Hanson, E., Property - Langton Township.

Tungsten

37. Campbell, B., Property - Zealand Township
38. Zealand-Brownridge Tungsten Prospect - Zealand and Brownridge Townships.

PROPERTY DESCRIPTIONS

Following are descriptions of a number of properties that are located in areas where more prospecting and exploration is recommended.

Wilkinson Bob Lake Occurrence

The Wilkinson Bob Lake Occurrence, Contact Bay area, is located immediately south of Bob Lake, at the northwestern corner of claim K754711, approximately 9 km southwest of Dryden. Stripping, trenching, and sampling were carried out by D. Wilkinson during 1983 and 1984. The Bob Lake Oc-

currence is immediately south of Fiambeau Lake, where Voyager Explorations Limited has recently done extensive exploration for gold.

The property is underlain by northwest facing pillowed basalts and mafic pyroclastic rocks metamorphosed to amphibolite facies, intruded discordantly by a 3.0 to 5.0 m wide felsite dike, striking 095° to 100° for at least 800 m. Gold mineralization occurs in the portion of the dike which intrudes the metabasalts. The dike is very fine grained, pale green-grey and siliceous, with disseminated euhedral pyrite ($\leq 2\%$) throughout. The dike is sericitic and weakly to moderately carbonatized, whereas the surrounding mafic rocks are chloritized, and moderately carbonatized. Two sets of quartz veins have filled fractures within the felsite dike. The first set are milk white, rusty veins containing small clots of chlorite, with minor pyrite and tourmaline. The veins are 2 to 10 cm wide, strike 140° and terminate at the intrusive contact. The second set of veins strike 040° and are composed of white quartz and iron carbonate hosting blebs of sphalerite and chalcopyrite. There is no obvious shearing within the dike, but some of the quartz has filled Z-shaped tension gashes indicating late emplacement of the quartz. Samples from the quartz vein set striking 140° returned assays of just better than trace amounts. Gold values of 0.20 ounce gold per ton were detected from felsite in the middle of the dike, but values were found to decrease to trace amounts (0.02 ounce gold per ton) in samples collected towards its edges (D. Wilkinson, prospector, personal communication, 1984). Mr. Wilkinson reported that a grab sample from the metabasalts assayed 8 ounces gold per ton, however, this assay could not be repeated with follow-up sampling.

Other wide felsite dikes striking 095° to 110° occur elsewhere on the property, south of the main occurrence. These dikes are similar to that at the main occurrence, but contain biotite, magnetite, py-

rite, chalcopyrite, pyrrhotite, and bornite. Grab samples taken from the dikes by the author assayed trace amounts of gold (Geoscience Laboratories, Ontario Geological Survey, Toronto).

Rognon and Wachman Prospects

The Rognon and Wachman shafts are located immediately northwest of Contact Bay on Wabigoon Lake, approximately 10 km south of Dryden. The shafts are situated within an area of numerous gold occurrences, prospects, and 2 past producing mines, the Bonanza and the Redeemer.

The Rognon shaft is located at the northwestern corner of claim K706195 (formerly K635) and was sunk on a quartz vein in sheared mafic metavolcanic rocks. Recorded production between 1916 and 1918 was 22.2 ounces of gold and 0.5 ounces of silver from 49 tons milled (Ontario Ministry of Natural Resources, Statistical Files). The shaft is 32.3 m (106 feet) deep with 93.6 m (307 feet) of lateral work on 2 levels, including a raise to the surface from the first level. Extensive trenching was done along the entire length of the vein. The property is presently held by W. Sovereign who conducted thorough channel sampling along the vein during 1983.

The Rognon property is underlain by intermediate to mafic metavolcanic rocks intruded by felsite dikes, quartz veins, and a large gabbro body at the southwestern corner of the claim. Gold occurs within the "main vein" striking 108° to 120° for 1.0 km, occupying a 0.5 to 3.0 m wide shear zone, subparallel to the strike of the metavolcanic rocks. The vein varies in width from 4.0 cm to 1.0 m, commonly splitting into discontinuous stringers. The vein consists of red and rusty brown, sugary quartz containing abundant clots and blebs of hematite, chlorite, minor magnetite, and pyrite. The sheared rock beside the vein is a hematitic, chloritized biotite schist. Hematite occurs along hairline fractures, but also appears to be pervasive throughout the rock. The country

rock and vein contain minor but variable (<1 to 2%) amounts of pyrite. Visible gold was observed in the vein by the author. Assays from Sovereign's channel and chip sampling along the length (500 m) of the vein, indicate that gold and silver mineralization occurs intermittently over a strike length of 240 m, in the vicinity of the shaft. Assay results range from trace amounts of gold to 2.57 ounces gold per gold per ton, and 0.01 to 0.55 ounce silver per ton, over an average width of 32 cm (Assessment Files, Kenora Resident Geologist Office).

The Wachman No. 1 and No. 2 shafts are 120 m apart and located on patented claim K646, situated northwest of the Rognon Property. The shafts have been sunk on the same quartz vein as the Rognon shaft, which is a few hundred metres southeast of the Wachman No. 1 shaft. Between 1919 and 1923 the No. 1 shaft was sunk to 19.2 m (63 feet) and the No. 2 shaft sunk to 30.5 m (100 feet) with 12 m (40 feet) of drifting. No production is recorded from this period. In 1929, the Wachman shafts were reopened and production of 8 ounces gold and 34 ounces silver from 34 tons milled was recorded (Ontario Ministry of Natural Resources, Statistical Files). The shafts were again dewatered and sampled in 1935 by Northern Mines Incorporated.

The geology of the Wachman property is similar to the Rognon with the "main vein" occupying a shear zone, striking 120°, within intermediate to mafic metavolcanic rocks. The vein is very narrow and less continuous than on the Rognon Property, making it difficult to trace between the shafts. The country rock within the shear is a moderately carbonatized, chloritic, biotite schist, with narrow veinlets and fracture fillings of calcite. The vein consists of white to red sugary quartz hosting minor amounts of pyrite, chalcopyrite and malachite. Hematite is present in the vein and country rock, but is not as abundant as at the Rognon Property. The best assays from grab samples taken from around the shaft dumps

by the author, were <0.01 ounce gold per ton at the No. 1 shaft and 0.05 ounce gold per ton and 0.13 ounce silver per ton at the No. 2 shaft (Geoscience Laboratories, Ontario Geological Survey, Toronto).

Niemi and H.W. 123 Occurrences

The Niemi and H.W. 123 Occurrences, Southworth Township, are located approximately 3.0 km southeast of Dinorwic. The Niemi Occurrence is situated on the northern half of lot 6, concession III, while the H.W. 123 occurrence is located 400 m to the northwest, on patented claim HW123.

Surface trenching, stripping, sampling, diamond drilling, and electromagnetic and self potential geophysical surveys were conducted on the Niemi Property, by Rio Canadian Explorations Limited, in 1956. Grab samples taken by the company assayed up to 0.45 ounce gold per ton and 2.8 ounces silver per ton, while chip samples assayed 0.10 ounce gold per ton (Thomson *et al.* 1957).

The Niemi Occurrence consists of a 15 m wide shear zone striking 040° for at least 75 m, in a coarse, highly altered mafic body, surrounded by massive, mafic metavolcanic rocks. The shearing strikes 070° to 078° at the northern end of the occurrence. The shear zone is crosscut by an irregular, 3.0 to 4.0 m wide stockwork of quartz-iron carbonate veins, hosting tourmaline, massive tetrahedrite, chalcopyrite, azurite, malachite, and pyrite, with associated gold and silver mineralization. The country rock is intensely sheared, chloritic, bleached to pale brown and variably altered with iron carbonate. Small (2 to 4 mm) dark green clots of chlorite occur throughout the rock, as well as minor but variable (<1-3%) disseminated pyrite and acicular crystals of arsenopyrite. A dark green, chloritic gabbro outcrop with moderate calcium carbonate alteration, occurs immediately north of the occurrence. The gabbro is similar to, but less altered than the sheared

altered rock at the trench, and contains chlorite clots similar to those described above, suggesting that the rock at the trench is highly altered gabbro. North of the occurrence, the sheared country rock is intensely brecciated with angular fragments surrounded by mineralized quartz. The fragments are bleached and carbonatized with dark chlorite rims and apple green cores, possibly due to fuchsitic alteration. They also contain dark green chlorite clots, coarse needles of arsenopyrite, and finely disseminated pyrite. Grab samples of the mineralized quartz were taken from around the main trench, by the author, with assays ranging from trace to 0.05 ounce gold per ton and trace to 0.58 ounce silver per ton (Geoscience Laboratories, Ontario Geological Survey, Toronto).

The H.W. 123 Occurrence, previously unrecorded, consists of a 3.0 to 5.0 m wide, medium-grained, quartz diorite dike, striking 130° and crosscutting a 12 m wide shear zone striking 040°. This shear zone parallels the shear zone at the Niemi Occurrence, 400 m to the southeast. The shearing occurs within a chloritized, intensely carbonatized rock which may be a diorite, but is so intensely altered it is difficult to determine the original mineralogy. These rocks contain minor amounts (<1 to 3%) of disseminated pyrite, chalcopyrite, and arsenopyrite. Grab samples of this altered rock, taken by the author, assayed up to 0.05 ounce gold per ton and 0.42 ounce silver per ton (Geoscience Laboratories, Ontario Geological Survey, Toronto). The quartz diorite dike is fine to medium grained, pink-grey, and variably foliated, containing abundant iron carbonate and small xenoliths of chloritic mafic rock. The dike is intruded by an irregular stockwork of quartz-iron carbonate veins. Arsenopyrite, pyrite, and chalcopyrite are finely disseminated throughout the quartz diorite dike, but are not associated with the quartz veins.

Arsenopyrite is commonly massive, comprising 30 to 50% of the rock. Assays of grab samples

of the dike taken by the author ranged from trace to 0.05 ounce gold per ton (Geoscience Laboratories, Ontario Geological Survey, Toronto).

The Niemi and HW 123 Occurrences are situated within a major set of *en echelon* northeast-trending fault zones, which extend from Upper Manitou Lake, through Dinorwic Lake, to Pickereel Arm on Minnitaki Lake. In the Dinorwic Lake area the fault zone is characterized by intense shearing, intense iron carbonate alteration, and variable silicification. Satterly (1943) has mapped an extensive area of chlorite-carbonate schist centred on Dinorwic Lake. Beard and Rivett (1976) recognized intense carbonatization, quartz-carbonate veining, and gold mineralization in the area, and recommended further exploration.

Other occurrences are located within these major fault zones. At the Big Ruby Occurrence, assays of 1.0 to 82.0 ounces gold per ton were reported from a 9.2 m (30-foot) shaft, on a 1.8 m wide shear zone and quartz vein (Beard and Garratt 1976). The occurrence is located on patented claim HW125, on the northern shore of Dinorwic Lake, approximately 1.0 km west of the Niemi Occurrence. Although the Big Ruby occurrence was not located by the author, intense shearing at 040° and carbonatization of mafic metavolcanic rocks was observed along the northern shore of Dinorwic Lake. The shear zone is in excess of 300 m wide and contains quartz-carbonate veins hosting <1 to 2% disseminated pyrite, chalcopyrite, and arsenopyrite. Grab samples of the quartz veins, taken by the author, assayed 0.01 ounce gold per ton and <0.10 ounce silver per ton (Geoscience Laboratories, Ontario Geological Survey, Toronto).

Approximately 6.5 km northeast of the Niemi Occurrence, in Avery Township, is a 40 m wide zone of shearing and carbonatization striking 040°, in pillowed and massive metabasalts. Three *en echelon*, intensely brecciated and pyritic (<1 to 2%) felsic dikes occur within the shear zone. The

mafic rocks are very pyritic, containing abundant microveins of calcite and iron carbonate. Grab samples from the occurrence, assayed by Kerr Addison Mines Limited, ran 0.5 ounce gold per ton with 1 sample containing visible gold assaying 2.0 ounces gold per ton (Beard and Scott 1975). Grab samples taken by A. Glatz, gave assay values from the dikes and mafic metavolcanic rocks ranging from trace to 0.32 ounce gold per ton (Assessment Files, Kenora Resident Geologist Office). Assays from grab samples taken by the author, were 0.08 ounce gold per ton in the mafic metavolcanic rocks and 0.09 ounce gold per ton in one of the felsic dikes (Geoscience Laboratories, Ontario Geological Survey, Toronto).

The above observations suggest that in the Dinorwic Lake area, gold mineralization is associated with quartz veins and intrusive rocks occurring in a number of locations along major northeast-trending fault zones. These make good targets for further exploration.

Sovereign Peak Lake Prospect

The Sovereign Peak Lake Prospect, Turtlepond Lake area, is located north of Sasakwei Lake and west of Peak Lake, approximately 40 km southeast of Dryden. The Sovereign Property is situated immediately northeast of the former Goldrock mining camp, and immediately east of a spectacular gold showing discovered by E. Starr in 1980.

W. Sovereign staked over and around an old mining claim (K624) in 1982, followed by stripping, lithogeochemical sampling, and humus sampling. Asamera Incorporated optioned the property in 1983 and conducted humus sampling, lithogeochemical sampling, geological mapping, magnetic and VLF-EM geophysical surveys, and diamond drilling. Subsequently to termination of the option agreement W. Sovereign continued prospecting, sampling, and stripping during 1984, and uncovered 3 new gold occurrences.

The Sovereign and the newer "LT", "L" and "New" showings, are located on claims K589052 and K657624, which are underlain by mafic metavolcanic rocks crosscut by wide shear zones and irregular quartz veins.

The Sovereign showing consists of a mineralized, 0.5 to 1.0 m wide, milk white quartz vein, which dips steeply to the east and strikes 350° across a 10 m wide shear zone. Narrow east-striking quartz veinlets extend for several metres from the main vein. The vein terminates abruptly at its southeastern extremity, whereas at the northwestern end it becomes increasingly irregular and narrow. The shear zone strikes east and dips steeply north within medium-grained, chloritic metabasalts. The sheared rock is sericitic with intense iron carbonate alteration, hematite staining, and fine disseminated pyrite. Alteration drops off abruptly to the northwest. The quartz vein contains fragments of chloritic mafic rock and disseminated tourmaline, pyrite, chalcopyrite, and malachite. The chalcopyrite is most abundant at the northwestern end of the vein and is associated with gold. A grab sample from the vein, taken by the author, assayed 12.46 ounce gold per ton and 0.74% copper (Geoscience Laboratories, Ontario Geological Survey, Toronto). Chip samples taken by Asamera Incorporated, indicate that gold mineralization occurs intermittently along the length of the vein. Asamera's assays ranged from trace to 2.13 ounces gold per ton over a 40 cm width, and 3.43 ounces gold per ton over a 35 cm width (Assessment Files, Kenora Resident Geologist Office).

The "LT" showing consists of medium-grained, variably sheared metabasalts, with strong iron carbonate alteration, bleaching, chloritization, and minor silicification. A 0.5 to 1.5 m wide, irregular quartz vein strikes 340° to 350° through the sheared rock, dipping steeply to the west. Narrow quartz veins extend from the main vein or occur subparallel to it. Disseminated pyrite (<3%) occurs in the host

rock close to the quartz veins. The veins do not carry pyrite, but do contain minor tourmaline and small clots of chlorite. A grab sample, taken by the author from the vein, assayed 0.06 ounce gold per ton (Geoscience Laboratories, Ontario Geological Survey, Toronto) and a chip sample across the vein, taken by W. Sovereign, assayed 0.09 ounce gold per ton (W. Sovereign, personal communication, 1984).

The "New" and "L" showings consist of strongly altered metabasalts, crosscut by northeast striking shear zones hosting irregular quartz veins. The veins at both showings contain tourmaline and chlorite, and minor amounts (<1%) of pyrite and chalcopyrite occur in the veins at the "New" showing. Grab samples, taken by the author from veins at both showings, assayed trace amounts of gold (Geoscience Laboratories, Ontario Geological Survey, Toronto).

Shearing and alteration characterize the "LT", "L" and "New" showings, but they lack sulphide mineralization, and gold content appears to be low. Exploration for gold should be directed toward locating other strongly sheared and altered zones that contain quartz veins and significant sulphide mineralization.

EXPLORATION GUIDELINES

Gold exploration in the Dryden area over the last few years has, in general, been directed at the re-evaluation of old mines, prospects, and occurrences. However, a number of these have been neglected, and literature searches can still reveal further significant prospects. Many of the past producers exploited narrow high grade veins in shear zones, but the potential of the surrounding rocks appears to have been largely ignored; where these rocks are altered, a search for mineralized zones should be conducted. Good targets for gold exploration are sheared and altered mafic intrusive rocks and sulphide-bearing quartz veins and felsic dikes in sheared metavolcanic

rocks. Major northeast trending *en echelon* fault zones extending through the Dinorwic Lake area should be explored. Overburden basal till and humus geochemical sampling for gold and associated elements are exploration techniques that have not been fully utilized, but must be carried out with a sound knowledge of local surficial geological conditions.

INDUSTRIAL MINERAL DEVELOPMENT POTENTIAL, NORTHWESTERN ONTARIO

C.C. Storey

Geologist, Ontario Ministry of Natural Resources, Kenora.

HISTORY OF DEVELOPMENT

Industrial minerals have been exploited in Northwestern Ontario for centuries. The native people used soapstone for carving pipes and ceremonial items, rhyolite for arrow heads, and clay for pots. Settlement of the area, the opening of the Lake of the Woods gold camp, and construction of the Canadian Pacific Railway created a need for structural materials and refractory minerals. Interest in nonmetallic commodities in the nineteenth century was noted by Lawson (1886, 1889, 1913) who documented building stone, soapstone, mica, lime, and clay deposits. In addition to dimension and crushed stone, lime for agricultural and gold milling use, pegmatite minerals, soapstone, and clay for brick and tile have been produced at one time or another.

Stone and peat have traditionally been the major commodities produced with production dating from 1882. Dimension stone is currently produced from 3 quarries and crushed stone is produced intermittently from 4 quarries. Peat has been produced intermittently in the Emo area since 1942. Presently Arctic Peat Moss Limited of Barwick produces peat from a bog in Carpenter Township north of Emo, and Du-Nor Products Limited is preparing to produce potting soil from a peat bog near Fort Frances.

In the order of their historical significance, the known nonmetallic commodities not currently in production are as follows. At least 4 brickyards have been in production, 2 at Kenora and 1 each at Dryden and Fort Frances. The most successful of these, the Brinkman Brickyard at Kenora, produced bricks during the 1890s and again during the 1920s to as late as 1929. Lime was produced from Paleozoic limestone boulders at Fort Frances in the 1890s and from Early Precambrian limestone at Red Lake in 1939. Both of these operations were short lived. Soapstone deposits near Dryden, Mine Centre, and several areas in Lake of the Woods were investigated between 1890 and 1929. Six deposits were investigated and 3 produced small quantities of soapstone for refractory use. The Wabigoon Deposit is currently being investigated by Wabigoon Resources Limited. Asbestos is related to soapstone and 1 deposit north of Red Lake was examined in 1976. Pegmatites have been investigated for mica, feldspar, beryl, lithium, and tantalum since 1885. Small amounts of mica and feldspar were produced in 1923 from a pegmatite in Lake of the Woods. Many lithium pegmatites were examined near Dryden and in the Root Lake area northwest of Sioux Lookout in the 1950s. Pegmatites near Dryden were examined for tantalum in 1979 and 1980. Marl from Surprise Lake, north of Ignace, has been extracted for agricultural soil conditioning near Dryden. Fluorite, graphite, quartz-feldspar sand, and nepheline deposits have been examined by prospectors.

COMMODITIES STUDIED

A program to evaluate selected deposits of industrial mineral commodities within the Northwestern Region commenced in April, 1984. This project was funded under the Northern Ontario Rural Development Agreement (NORDA). The intent of the project was to determine which of the known industrial mineral commodities have potential for further development and

what new commodities could be present in the area.

In conjunction, a literature search was carried out for all references to industrial mineral type occurrences to expand the database compiled by Vos *et al.* (1982).

The commodities investigated (Table 5) comprise: talc-soapstone, graphite, marl, pegmatites (beryl, cesium, feldspar, mica, lithium, tantalum), leucogranite, mica schist, kyanite-sillimanite, specular hematite, titanium, diatomaceous lake sediment, clay, "silica" sand, fluorite, and ochre. Examples of each commodity were researched and selected for field examination on the basis of accessibility and the known geological database. In several cases only a small number of deposits of a particular commodity are known.

A total of 33 deposits were examined in the field (Figure 4). The project also included reconnaissance sampling of pegmatites and clay, and additional mapping and sampling of some talc/soapstone deposits identified during the earlier building and monumental stone inventory (Storey 1983, 1984). Some of these deposits were examined only briefly while others were mapped and sampled in more detail. Reconnaissance sampling of pegmatites was done to try to identify potential new lithium, beryllium, and rare element pegmatite fields. Clay was examined in the Kenora and Ear Falls area to extend the work of Guillet (1977). Work was also done on kyanite/sillimanite and mica schist in the Ghost River and Ear Falls area.

CONCLUSIONS

The following conclusions are based upon field work and partial laboratory results as of the time of writing (December, 1984), and may change considerably when additional data becomes available. The commodities that warrant further work are: talc/soapstone, graphite, pegmatites, specular hematite, titanium, marl, and other carbonate materials.

TABLE 5. INDUSTRIAL MINERAL COMMODITIES, NORTHWESTERN ONTARIO

Commodity	Reported Deposits	Deposits Examined	Comments
Clay	4 brickyards, 2 reported occurrences plus 10 occurrences from Guillet (1977)	reconnaissance sampling of clay from the vicinity of known deposits plus other areas not covered by Guillet (1977)	In spite of 1 successful brickyard and several other attempts at brick making, clay products have not been produced to any great extent. Sampling indicates clay deposits are variable and often contain only a small amount of clay minerals and a low Al ₂ O ₃ content. Many of the clays are calcareous, making them unsuitable for brick or tile.
Diatomaceous Sediment	0	3	Little is known about lake sediments. Organic-rich sediment several metres in depth is present in many small lakes and restricted bays of larger lakes. Samples of this material as well as inorganic sediment contain diatoms, but the amounts present are small.
Fluorite	3	1	Fluorite is present in small amounts in the Sturgeon Narrows Alkalic Complex and the Thrasher Occurrence. The former is a nepheline syenite with fluorite-bearing veinlets (Trowell 1983), and the latter is a quartz vein, with erratic amounts of fluorite, cutting metavolcanic rocks.
Graphite	10	4	Graphite occurs in 2 deposit types: flake graphite accompanied by extensive pyrite and pyrrhotite in metasedimentary rocks of the English River Subprovince, and fine powder (amorphous) graphite in black graphitic schists associated with metasedimentary and metavolcanic rocks of the Wabigoon Subprovince. The flake graphite deposits are much more valuable than the more common powder graphite deposits. The potential for additional flake graphite deposits is good.
Kyanite-sillimanite	0	reconnaissance work only	Numerous examples of metamorphic rocks containing kyanite or sillimanite are noted on maps by Breaks <i>et al.</i> (1976, 1984). The sites examined contain only small amounts of alumino-silicate minerals.
Leuco-Granite	3	6 granitoids were sampled	White granitoid rocks from the Butler Quarry, Revell Batholith, and Dore Lake Granite, all described by Storey (1983, 1984), and the Bear Pass Granite and Hawk Lake Ballast Quarry were sampled to determine if they would be suitable as a source of potassium feldspar for ceramic uses. Samples of pink granite from Nelson Granite, Vermilion Bay, were included in this study.

TABLE 5. CONTINUED

Commodity	Reported Deposits	Deposits Examined	Comments
Marl	3	2	Interest in marl has increased in recent years for use as a soil conditioner in acidic agricultural soils. The Surprise Lake Marl Deposit is a locally well known source. Lake sediment sampling by Kenora District OMNR staff during the 1960s located marl in highly organic rich sediments in Helldiver Bay of Shoal Lake, and work by Northland Associates Ltd. (1984) located marl beneath a peat bog near the Village of Finland, Rainy River District. Additional marl deposits should be present in the area.
Ochre	1	1	The Vermilion Lake Pyrite Mine is noted for its extensive development of orange-red coloured soil overlying the body. The material is quite low in FeO content and would probably not be a satisfactory pigment.
Pegmatites	12 major areas (Dryden Pegmatite Field and Ogani-Root Lake field each counted as one)	9 (Mavis Lake, Sandy Creek Be, Kozowy-Leduc-howski Cs, Graphic Lake, Medicine Lake Be, 2 uranium pegmatites near Kenora)	Pegmatites are the most numerous and well studied of the industrial mineral deposits. During extensive exploration for lithium, uranium, and tantalum, many pegmatite deposits have been identified. Work during this study included examining several well known pegmatites plus a geochemical reconnaissance of pegmatites in the Ear Falls and Kenora-Dryden areas.
Mica Schist	0	1	Several areas that seemed to have potential for micaceous schist were examined and found to contain only minor amounts of mica, often in very hard diatexite type rocks. The one example that showed reasonable amounts of muscovite is a schist associated with the quarry near Hudson (see Storey 1983).
"Silica" Sand	1	1	One deposit of sand near Redditt was examined and found to be a quartzofeldspathic sand, not silica sand.
Specular Hematite	3	2	Specular hematite occurs in the Griffith Iron Mine at Ear Falls and as a minor constituent of some other iron deposits. This material is under study for its suitability for use as a pigment (Geoscience Laboratories, Ontario Geological Survey, Toronto).
Talc/ Soapstone	19 (includes 15 described in OFR 5446 and OFR 5522)	2 new deposits plus additional work on some of the others	Many talcose rock bodies were examined during the building and monumental stone inventory. One deposit at Wabigoon is being evaluated by Wabigoon Resources Ltd.
Titanium	1	1	A deposit of titaniferous magnetite near Mine Centre has been evaluated several times in the past and is currently being evaluated by Titan Titanium International Ltd.

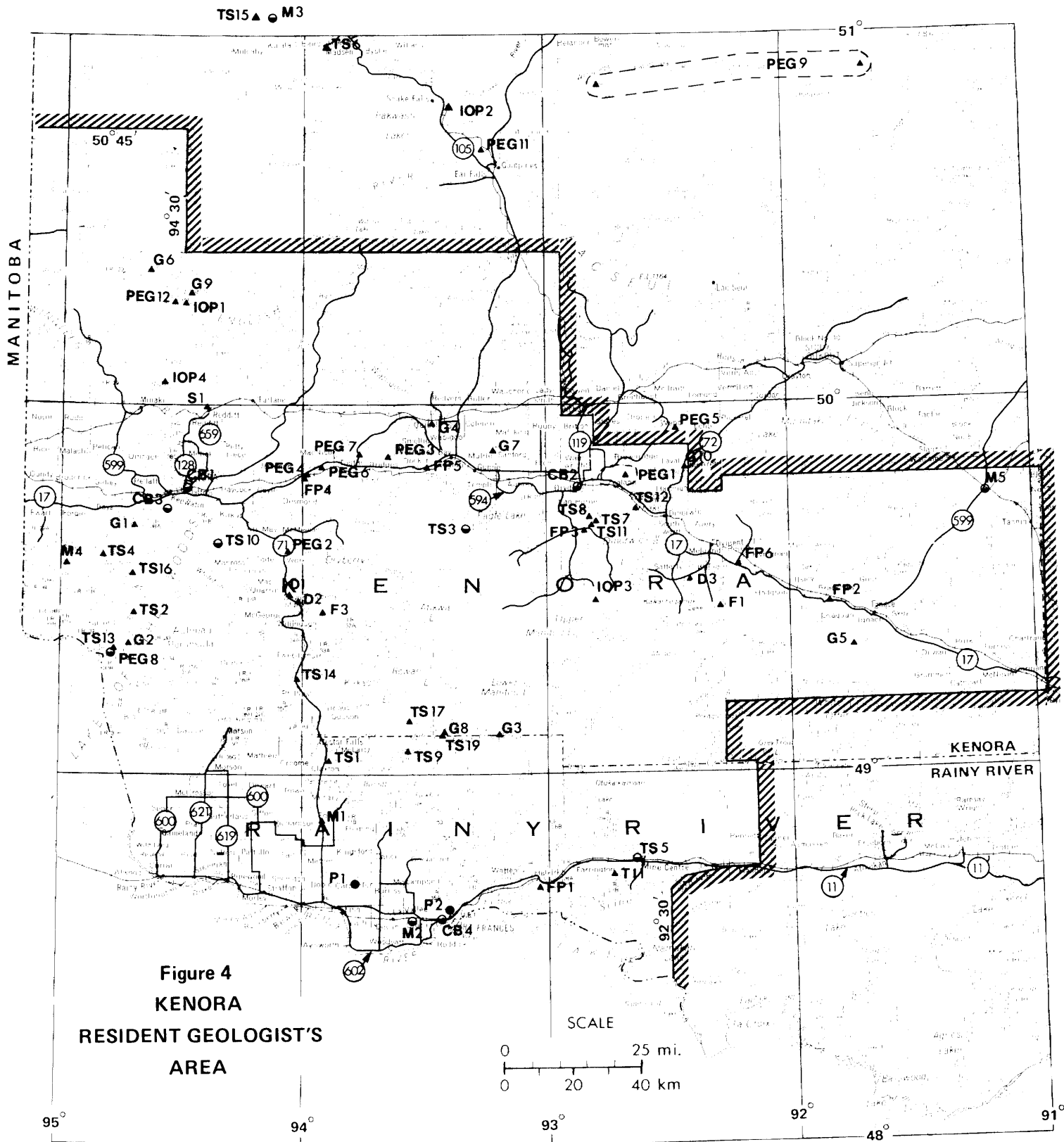


Figure 4
KENORA
RESIDENT GEOLOGIST'S
AREA

EXPLANATION

- PRODUCER
- ◐ PAST PRODUCER
- ▲ PROSPECT/OCCURRENCE
- ▨ Boundary of Resident Geologist's Area

KENORA
RESIDENT GEOLOGIST'S
AREA
Industrial Mineral Deposits

LEGEND

CLAY DEPOSITS

CB1. Brinkman Brickyard	Kenora	c.1898 and 1925-1929
CB2. Dryden Timber & Power Co.	Dryden	c.1912
CB3. Fitzgerald Brickyard	Kenora	1884
CB4. Fort Frances Brickyard		c. 1914

DIATOM DEPOSITS

D1. Bunny Lake
D2. Old Woman Lake
D3. Tabor Lake

FELDSPAR

FP1. Bear Passage Stock
FP2. Butler Quarry
FP3. Dore Lake Granite
FP4. Hawk Lake Quarry
FP5. Nelson Granite
FP6. Revell Batholith

FLUORITE

F1. Oldberg Lake Mo Occurrence	
F2. Sturgeon Narrows Alkalic Complex	(not plotted)
F3. Thrasher Occurrence	

GRAPHITE

G1. Corkscrew Island	Powder
G2. Falcon Island	Powder
G3. Manitou Stretch	Powder
G4. Meehan Occurrence	Flake
G5. Olson Occurrence	
G6. Oneman Lake	Flake
G7. Pope Lake	Flake
G8. Sucas Lake	Powder
G9. Treelined Lake	Flake
G10. Wilkinson	Powder

IRON OXIDE PIGMENT

IOP1. English River	Specular Hematite
IOP2. Griffith Iron Mine	Specular Hematite
IOP3. Kekekwa Lake	Specular Hematite
IOP4. Minaki Pyrite Mine	Red & Yellow 'Ochre'

MARBLE (Calcium Carbonate) LIME/MARL

M1. Finland Bog	Marl
M2. Fort Frances Lime	Lime from Paleozoic limestone boulders c.1911
M3. Patricia Lime Company	Lime from early Precambrian limestone 1939
M4. Shoal Lake	Marl - Very low carbonatite content
M5. Surprise Lake	Marl for soil conditioning 1976
M6. Woman Lake	Marble (not plotted)

PEGMATITE

PEG1. Dryden Pegmatite Field Li, Be, Ta, Fsp; 35 pegmatites	Prosp.
PEG2. Graphic Lake Pegmatites; four or more pegmatites	Occur.

continued

PEGMATITE

PEG3. Harrison Mica occurrence muscovite Cb; 1 pegmatite	Prosp.
PEG4. Hollinger Occurrence Mo, U, Fsp; 1 dike	Prosp.
PEG5. Kozowy-Leduchowski Li, Cs, Fsp; 1 dike	Prosp.
PEG6. McCallum Occurrence Li, Fsp; 3 dikes	Occur.
PEG7. Medicine Lake Beryl Occurrence Be, Fsp, Ta; 1 dike	Prosp.
PEG8. Mica Point Pegmatite Muscovite, Be, Fsp; 1 dike 1885, 1926-1927, 1943	Past Producer
PEG9. Ogani-Root Lake Li, Fsp; 10 pegmatites	Prosp.
PEG10. Pashkokogan Lake Li, Fsp; 1 dike	Occur. (not plotted)
PEG11. Sandy Creek Beryl Occurrence Be, Fsp; 1 dike	Prosp.
PEG12. Separation Lake Beryl Occurrence Be, Fsp; 2 dikes	Occur.

SAND

S1. Redditt Sand Deposit

TALC/SOAPSTONE

TS1. Claxton Township	Occurrence
TS2. Coste Island	Prospect
TS3. Eagle Lake Soapstone Quarry	Past Producer 1925-27
TS4. Labyrinth Bay	Occurrence
TS5. Little Turtle Lake (H.H. Wood Talc Co.)	Past Producer 1922, 1923
TS6. Madsen	Occurrence*
TS7. Mile Lake 1	Prospect
TS8. Mile Lake 2	Occurrence
TS9. Pipestone Lake	Occurrence
TS10. Pipestone Peninsula	Past Producer 1915
TS11. Trap Lake	Prospect
TS12. Wabigoon	Prospect
TS13. Mica Point	Occurrence
TS14. Phillips Township	Occurrence
TS15. Pipestone Bay (Red Lake)	Occurrence
TS.16 Oak Point Serpentinite/ Asbestos	Occurrence
TS17. Pipestone Lake North	Occurrence
TS18. Ponask Lake Asbestos	Prospect (not plotted)
TS19. Sucas Lake Soapstone	Occurrence

TITANIUM

T11. Titan Titanium Titanium, Iron Prosp.

PEAT

P1. Arctic Peat Moss
P2. Du Nor Products

The pegmatite reconnaissance studies results are not yet complete (December, 1984). Anomalous lithium values are present in some of the pegmatite samples collected during the reconnaissance program. Lithium can act as a pathfinder element for other more valuable minerals. The clay sampling results to date have not indicated satisfactory material. Kyanite and sillimanite are present in the English River metasedimentary rocks but only in small amounts. Mica schist with a high proportion of muscovite or phlogopite was not found, but the potential still exists for its presence.

ONTARIO GEOLOGICAL SURVEY ACTIVITIES

During the 1984 field season, the following field parties from the Precambrian Geology and Mineral Deposits Sections operated within the Kenora Mining Division:

J.A. Ayer (Precambrian Geology Section) carried out the first year of a 2-year detailed mapping program of the Bigstone Bay area, Lake of the Woods (Figure 2, (A)).

G.P. Beakhouse (Precambrian Geology Section) carried out reconnaissance investigations of volcanic components and mineral potential of granitoid and medium to high grade metasedimentary terrains within and outside the Division (Figure 2, (B)).

J.C. Davies and P.M. Smith (Mineral Deposits Section) completed a 2-year study of the characteristics of gold deposits in the Lake of the Woods area (Figure 2, (C)).

G.W. Johns (Precambrian Geology Section) commenced a synoptic study of the Gibi Lake-Kakagi Lake-Rowan Lake area (Figure 2, (D)).

R.M. Sutcliffe (Precambrian Geology Section) carried out a detailed mapping program of the Mulcahy Lake Gabbro Intrusion, southwest of Eagle Lake (Figure 2, (E)).

ONTARIO MINERAL EXPLORATION PROGRAM (OMEP)

As of December 1, 1984, 44 designated OMEP programs, on which expenditures totaling an estimated \$2.1 million are anticipated, were operative in the Kenora Mining Division. The following is a list of the companies carrying out the programs, all conducting exploration for gold unless otherwise indicated, and the townships or areas of operation:

Agassiz Resources Limited: Fleming Township (base metals)

Agassiz Resources Limited: Fleming, Senn, and Menary Townships (base metals)

Anyox Metals Limited: Manross and Code Townships

Asamera Incorporated: Boyer Lake Area

Bee Lake Syndicate: Rickaby Lake Area

Bigstone Minerals Limited/Anglo Canadian Mining Corporation: Rowan and Dogpaw Lake Areas and Manross and Code Townships

Bill Knox Syndicate: Atikwa Lake Area

Boise Cascade Corporation: Jaffray Township

Central Crude Limited: Bad Vermilion and Little Turtle Lakes Area

Charger Resources Limited: Cameron and Rowan Lakes Areas

Charger Resources Limited: Cameron and Rowan Lakes Areas

Cleyo Resources Incorporated: Bad Vermilion Lake Area

Cochrane Oil and Gas Limited: Lower Manitou, Harper, and Boyer Lakes Areas

Coloma Resources Limited: Bennett Lake Area

Consolidated Professor Mines Limited: Shoal Lake Area

Cranshaw, Robert: Lower Manitou Lake Area and Hyndman Township

Cream Silver Mines Limited: Rowan Lake Area

D.K. Platinum Corporation: Rowan Lake Area

Dejour Mines Limited: Lawrence Lake Area

Dubenski Gold Mines Limited: Dogpaw Lake Area

Eclipse Mining Corporation: Glass Township

Esso Resources Canada Limited: Kawashegamuk Lake Area

Golden Transit Resources Incorporated: Brooks Lake Area

Hansen, Jens E.: Glass Township

Homestake Explorations Limited: Little Turtle Lake and Porter Inlet Areas

Jalna Resources Limited: Lower Manitou, Schistose, Washeibemaga, and Beartrack Lakes Areas

Kalrock Developments Limited: Tweedsmuir Township

Kalrock Developments Limited: Phillips and Tweedsmuir Townships

Lynx-Canada Explorations Limited: Little Turtle, Hepburn, and Bennett Lakes Areas

Micham Exploration Incorporated: Dogpaw Lake Area

Mistango Consolidated Resources Limited: Laval Township

New McManus Red Lake Gold Mines Limited: Tweedsmuir Township

Nuinsco Resources Limited: Rowan Lake Area

Orotek Resources Corporation: Bad Vermilion Lake Area

President Mines Limited: Kirkup Township

Rosenthal, Lorne: Rowan Lake Area

Rosenthal, Lorne: Cedar, Clay, and Cliff Lakes Area

Sherritt Gordon Mines Limited/Gossan Resources Limited: Dogpaw Lake Area

Silver Lake Resources Incorporated: Lower Manitou Lake Area

Sovereign, W.J.: Turtlepond Lake Area

Sparton Resources Incorporated: Napanee Lake Area

St. Joe Canada Incorporated: Lower Manitou Lake Area

Titan Titanium International Incorporated: Bad Vermilion Lake Area (titanium)

Wasabi Resources Limited: Phillips Township.

RESEARCH BY OTHER AGENCIES

UNIVERSITY THESES

Geological theses related to the Kenora Mining Division believed to be in progress or completed during 1984 are as follows:

Masters Theses

Kresz, D.V.: Completed a study entitled "Evolution of an Archean Greenstone Belt in the Stormy Lake-Kawashagamuk Lake Area (Stratigraphy, Structure, and Geochemistry) - Western Wabigoon Subprovince, Northwest Ontario" (Brock University).

Melling, D.: Continued a study of the geological setting and genesis of the Cameron Lake Gold Deposit of Nuinsco Resources Limited and Lockwood Petroleum Incorporated (Carleton University).

Stix, John: Continued a study on the transition from lower tholeiitic through to upper calcalkaline volcanic rocks at Andrew Bay, Lake of the Woods (University of Toronto).

Doctoral Theses

Edwards, G.R.: Continued a study of Archean volcanic, subvolcanic, and plutonic rock petrogenesis in the Kakagi-Pipestone Lakes area (University of Western Ontario).

Poulsen, K.H.: Completed a study of Archean tectonics and mineralization of the Rainy Lake area (Queens' University).

ONTARIO GEOSCIENCE RESEARCH GRANT PROGRAM

G.R. Edwards (York University) and D.W. Davis (Royal Ontario Museum) continued a study of the petrogenesis and metallogenesis of the Atikwa-Lawrence volcanic-plutonic terrane.

D.H. Watkinson and D. Melling (Carleton University) commenced a study of the geological setting and genesis of the Cameron Lake Gold Deposit.

SELECTED PUBLICATIONS RECEIVED 1984

Bertholf, Jr.
1946: Graded Unconformity, Washeibemaga Lake Area, Ontario; M.Sc. Thesis, University of Chicago, 45p.

Clark, H.G.
1984: Handbook for Prospectors and Developers in the Kenora Area; Tri-Municipal Economic Development Commission, Kenora, Ontario, 178p.

Dunlop, D.J.
1983: Paleomagnetism of Archean Rocks from Northwestern Ontario: Wabigoon Gabbro, Wabigoon Subprovince; Canadian Journal of Earth Sciences, Volume 20, p.1805-1817

Foland, S.S.
1982: Geochemistry, Geochronology, and Origin of an Archean Greenstone-Granite Terrain, Wabigoon Subprovince, Northwestern Ontario; M.Sc. Thesis, University of Montana, Missoula, 166p.

Gupta, V.K., and Barlow, R.B.
1984: A Detailed Gravity Profile Across the English River Subprovince, Northwest Ontario; Canadian Journal of Earth Sciences, Volume 21, p.145-151.

Kresz, David
1984: Evolution of an Archean Greenstone Belt in the Stormy Lake-Kawashagamuk Lake Area (Stratigraphy, Structure and Geochemistry), Western Wabigoon Subprovince, Northwest Ontario; M.Sc. Thesis, Brock University, St. Catharines, Ontario, 262p.

Mulligan, Robert
1984: Geology of Canadian Tungsten Occurrences; Geological Survey of Canada, Economic Geology Report 32, 121p.

REFERENCES

Beard, R.C., and Garratt, G.L.
1976: Gold Deposits of the Kenora-Fort Frances Area, Districts of Kenora and Rainy River; Ontario Division Mines, Mineral Deposits Circular 16, 46p. Accompanied by Chart A, scale 1:253 440 or 1 inch to 4 miles.

Beard, R.C., and Scott, W.
1976: 1975 Report of the Kenora Resident Geologist; p.1-15 in Annual Report of the Regional and Resident Geologists, 1975, edited by C.R. Kustra, Ontario Division of Mines, Miscellaneous Paper 64, 146p.

Beard, R.C., and Rivett, S.
1977: 1976 Report of the Kenora Resident Geologist; p.1-15 in Annual Report of the Regional and Resident Geologists, 1976, edited by C.R. Kustra, Ontario Division of Mines, Miscellaneous Paper 71, 141p.

Breaks, F.W., Bond, W.D., Desnoyers, D.W., Stone, Denver, and Harris, N.
1976: Operation Kenora-Ear Falls, Bruce-Bluffy Lakes Sheet, District of Kenora; Ontario Division of Mines, Preliminary Map P.1199, Geological Series, scale 1:63 360 or 1 inch to 1 mile. Geology 1975.

Breaks, F.W., and Kuehner, S.
1984: Precambrian Geology of the Eagle River-Ghost Lake Area, Kenora District; Ontario Geological Survey, Map P.2623, Geological Series-Preliminary Map, scale 1:31 680 or 1 inch to 1/2 mile. Geology 1980, 1983

Guillet, G.R.
1977: Clay and Shale Deposits of Ontario; Ontario Geological Survey, Mineral Deposits Circular 15, 117p. Accompanied by Map 2358, scale 1:2 000 000.

Lawson, A.C.
1886: Geology of the Lake of the Woods Region; Geological Survey of Canada, Annual Report, New Series, Volume 1, Part CC, for 1885, 151p.

- 1889: Report on the Geology of the Rainy Lake Region; Geological Survey of Canada, Annual Report, New Series, Volume 3, part 1.
- 1913: The Archean Geology of Rainy Lake Re-studied; Canada Department of Mines, Geological Survey, Memoir 40, 115p.
- Ontario Geological Survey
1981: Airborne Electromagnetic and Total Intensity Magnetic Survey, Manitou-Stormy Lakes Area, District of Kenora; by Kenting Earth Sciences Limited for the Ontario Geological Survey, Maps 80 458-80 479, Geophysical/Geochemical Series, scale 1:20 000.
- Satterly, J.
1943: Geology of the Dryden-Wabigoon Area; Ontario Department of Mines, Volume 50, Part 2, 1941, p.1-67. Accompanied by Map 50e, scale 1:63 360 or 1 inch to 1 mile.
- Storey, C.C.
1983: Preliminary Report of the Building and Ornamental Stone Inventory, Kenora and Rainy River Districts; Ontario Geological Survey, Open File Report 5446, 143p., 20 tables, and 37 figures.
- 1984: Preliminary Report of the Building and Ornamental Stone Inventory, Part 2, Kenora and Rainy River Districts; Ontario Geological Survey, Open File Report 5522, 127p., 19 tables, and 23 figures.
- Thomson, Jas. E., Ferguson, S.A., Johnston, W.G.Q., Pye, E.G., Savage, W.S., and Thomson, Robert
1957: Copper, Nickel, Lead, and Zinc Deposits in Ontario; Ontario Department of Mines, Metal Resources Circular 2, 126p.
- Trowell, N.F.
1983: Geology of the Sturgeon Lake Area, Districts of Thunder Bay and Kenora; Ontario Geological Survey, Report 221, 97p. Accompanied by Maps 2456, 2457, and 2458, scale 1:50 000, 1 chart, and 1 sheet of microfiche.
- Vos, M.A., Abolins, T., and Smith, V.
1982: Industrial Minerals of Northern Ontario-Supplement 1, Ontario Geological Survey, Open File Report 5388, 344p., 3 figures, and 1 table.

Red Lake Resident Geologist Area, Northwestern Region

M.J. Lavigne Jr.¹ and B.T. Atkinson²

¹Resident Geologist, ²Resource Geologist, Ontario Ministry of Natural Resources, Red Lake

INTRODUCTION

The Red Lake Resident Geologist Office has undergone a complete staff turnover in 1984. The former Resident Geologist, M. Durocher, vacated his position in March and was replaced by M.J. Lavigne Jr. in June. The position of Resource Geologist, formerly a contract position held by P.S. Burchell who left in February, is now a permanent position held by B.T. Atkinson since August. The secretarial position, formerly a permanent position held by C.D. Van Leeuwen who left in December 1983, is now a contract part-time position held by V. Masi. Prior to April 1st, the 3 offices of Resident Geologists in the Northwestern Region operated at a regional administrative level. The offices now operate at the district level with direct reporting relationships to the District Managers. This merger with the district administration level facilitates operating logistics and permits a closer working relationship with other branches such as fire, timber, fish and wildlife, and engineering services. Thus, the Resident Geologist is now more involved with the concerns of other resource users and allots more time to integrated resource management with other branches of the Ministry of Natural Resources.

RESIDENT GEOLOGIST'S ACTIVITIES

The former Resident and Resource Geologists completed 2 long term projects during their tenure. Geochemical data for the study of hydrothermal wallrock alteration association with gold mineralization found along the Flat Lake - Howey Bay deformation zone (Starratt - Olsen, Madsen, Hasaga, and Howey Mines) have been received and the results were presented by M.E. Durocher at an Ontario Geological Survey (OGS) symposium on Archean gold deposits in Toronto, March 8, 1984.

A written report with the new data is pending while data restricted to the Starratt-Olsen and Mad-

sen Mines area was published in Miscellaneous Paper 110, "Geology of Gold in Ontario". A detailed compilation of the geology and distribution of gold mineralization in the Red Lake Metavolcanic Belt is completed and is now in press.

The new Resident Geologist continued to provide technical advisory service to prospectors, mining companies, and government services, while familiarizing with and evaluating the current state of exploration activity, geology of the Red Lake and Birch Lake areas, and current research activities. Currently, sampling at the Campbell Red Lake Mines has been completed to further establish the use of sulphur isotopes as an exploration tool. The Resident Geologist co-authored the recently released Open File Report 5524, "An Integrated Model for the Origin of Archean Lode Gold Deposits". This model and the data on which it is based was presented at the OGS symposium on March 8, 1984 and again at a symposium on Archean gold deposits at the annual Geological Society of America meeting in Reno, Nevada, November 4-8, 1984. The Resident Geologist presented 2 papers during this symposium.

In 1984, the following gold occurrences, prospects, past producers and mines were visited by the staff of the Red Lake Resident Geologist Office:

1. Madsen (past producer) Baird Township
2. Skookum Bay (prospect) Dome Township
3. Jamie Frontier (past producer) Todd Township
4. Lake Rowan (prospect) Todd Township
5. Red Crest (past producer)
6. Papaonga Lake (occurrences)
7. Campbell Red Lake Mines (producer) Balmer Township
8. Arthur W. White Mine (producer) Balmer Township
9. Cochenour-Willans (past producer) Dome Township

10. Wilmar (past producer) Dome Township
11. Marcus (past producer) Dome Township
12. McMarmac (past producer) Dome Township
13. McFinley (prospect) Bateman Township
14. Canamer (occurrence) Birch Lake
15. McIntyre (prospect) Birch Lake
16. Sudbury Contact (prospect) Birch Lake
17. Horseshoe Island (prospect) Birch Lake
18. Springpole (prospect) Birch Lake
19. Cole (past producer) Ball Township
20. Chukuni (occurrence) Heyson Township
21. Fairlie (occurrence) Fairlie Township
22. Redcon (occurrence) Balmer Township
23. Fisher Islands (occurrence) Fairlie Township
24. Griffith (producer) Bruce Lake.

When property visits are made, grab samples are regularly taken and assayed. Two grab samples taken from the Springpole prospect assayed 3.96 ounces gold per ton, 2.18 ounces silver per ton; and 5.80 ounces gold per ton, 3.30 ounces silver per ton (Geoscience Laboratories, Ontario Geological Survey, Toronto).

MINING ACTIVITY

Campbell Red Lake Mines Limited operated throughout 1984. Production in 1984 is expected to be similar to 1983. Major expenditures consisted of upgrading surface facilities. Underground exploration in 1984 has been directed at maintaining ore reserves.

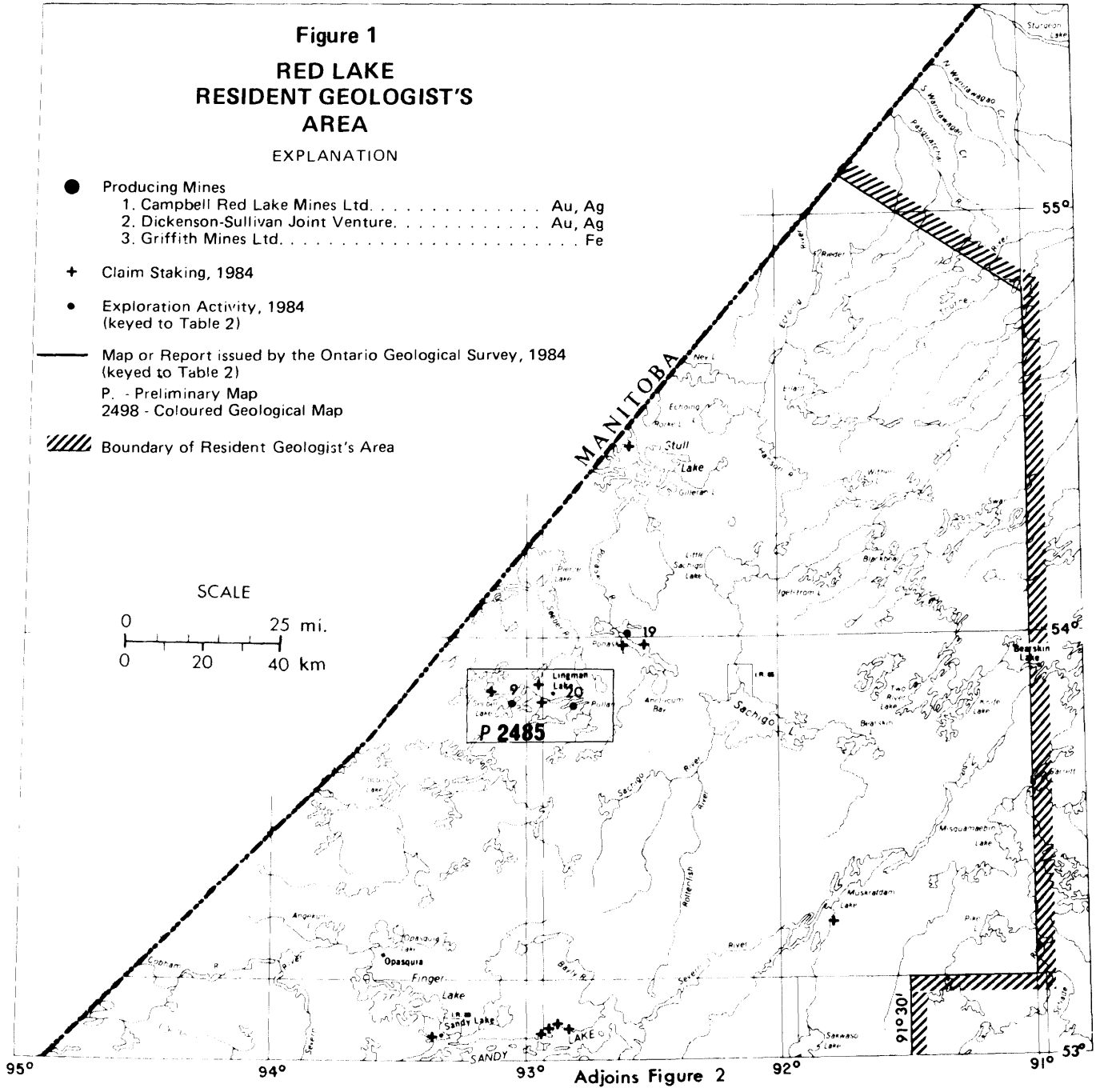
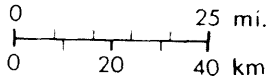
The Arthur W. White Mine of the Dickenson Mines Limited-Sullivan Resources Limited joint venture operated continuously throughout 1984 with production at 600 to 650 tons per day, which

Figure 1 RED LAKE RESIDENT GEOLOGIST'S AREA

EXPLANATION

- Producing Mines
 - 1. Campbell Red Lake Mines Ltd. Au, Ag
 - 2. Dickenson-Sullivan Joint Venture. Au, Ag
 - 3. Griffith Mines Ltd. Fe
- + Claim Staking, 1984
- Exploration Activity, 1984
(keyed to Table 2)
- Map or Report issued by the Ontario Geological Survey, 1984
(keyed to Table 2)
- P. - Preliminary Map
2498 - Coloured Geological Map
- ▨ Boundary of Resident Geologist's Area

SCALE



Adjoins Figure 2

Adjoins Figure 1

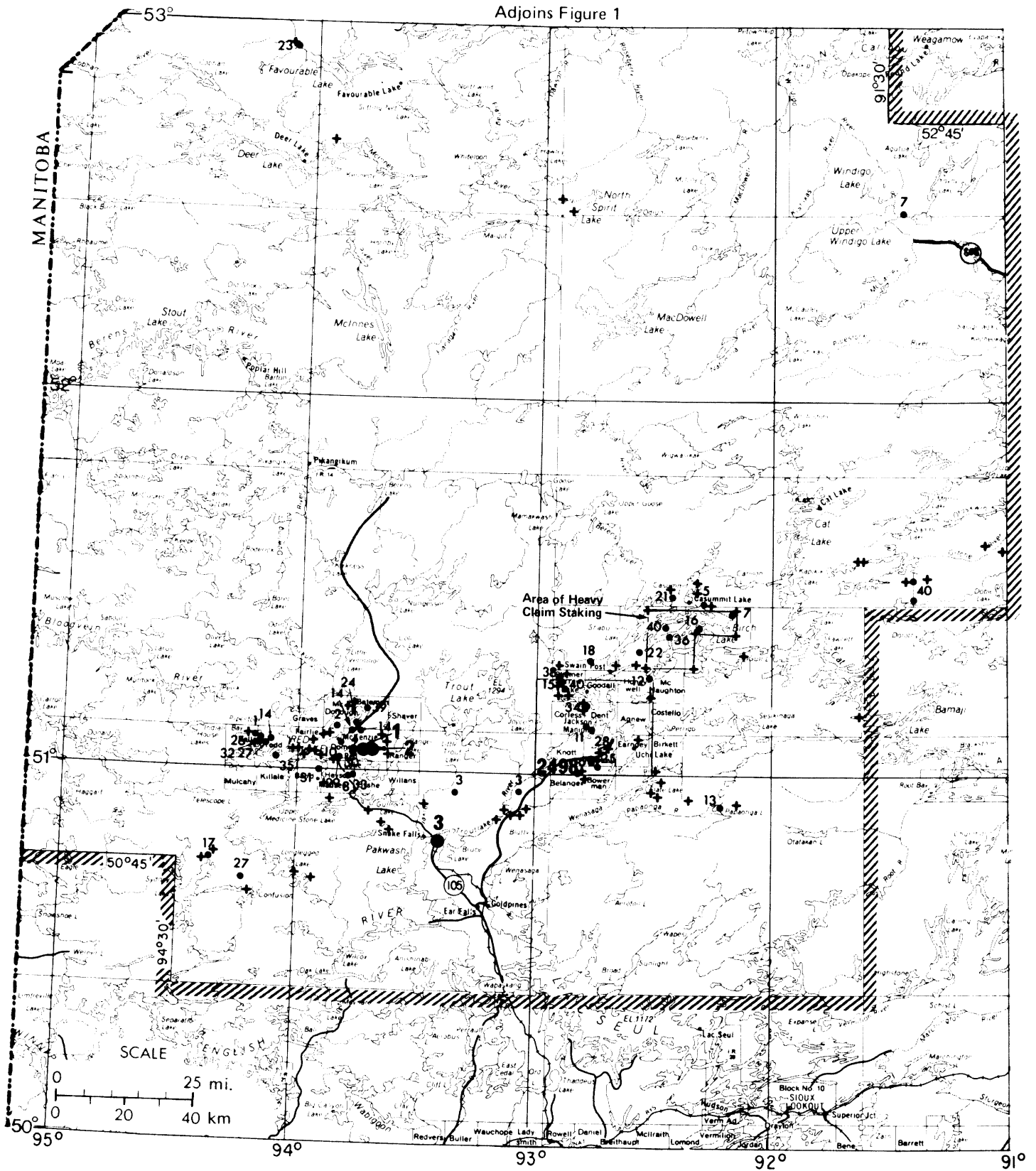


Figure 2

SUMMARY OF CLAIMS RECORDED AND ASSESSMENT WORK CREDIT

TABLE 1

Year	Claims Recorded	Claims Cancelled	Claims Active	Diamond Drilling (Man Days)	Geophysical Surveys (Man Days)	Geological Surveys (Man Days)	Total Man Days
1984	4,015	1,697	7,498	23,670	37,208	10,335	74,472
1983	2,407	1,204	5,180	18,637	22,035	3,468	53,207
1982	942	1,884	3,992	23,967	79,662	6,787	118,775
1981	1,719	1,249	4,889	28,771	66,000	8,182	107,430
1980	2,220	1,115	4,301	38,482	30,240	871	71,975
1979	1,068	1,763	3,221	21,108	38,380	3,154	62,949
1978	1,207	1,521	3,916	25,574	19,496	2,480	50,997
1977	2,324	2,395	4,261	12,994	45,080	620	59,196
1976	2,705	1,382	4,332	18,680	23,578	380	46,544
1975	1,368	2,059	2,957	29,377	12,714	960	44,717
1974	1,339	1,829	3,648	47,362	5,660	3,040	57,719
1973	1,616	3,157	4,009	60,027	20,474	NIL	83,019
1972	2,219	5,284	5,588	34,261	14,858	5,216	56,173
1971	1,541	4,922	8,486	73,019	50,920	2,243	127,556
1970	3,971	7,194	11,759	73,866	329,065	17,606	427,527
1969	10,999	933	14,772	49,212	66,032	1,320	119,039
1968	2,451	1,702	4,784	15,367	48,800	1,228	65,395

* JANUARY 1, 1984 TO NOVEMBER 30, 1984 INCLUSIVE.

is lower than their goal of 700 to 750 per day. Major expenditures consisted of construction of a new tailings dam. Underground development concentrated on accessing ore and increasing proven reserves.

The Griffith Mine, a wholly owned subsidiary of Stelco Incorporated and managed by Picklands, Mather, and Company Limited, operated at a 2/3 capacity and shut down for the month of July. In mid-November, it was announced that Stelco Incorporated is planning to shut down operations in early April 1985.

EXPLORATION ACTIVITY

If one is to use the number of claims recorded, the number of active claims, and the total days of assessment work submitted in 1984 (work not necessarily performed in 1984) as an indirect measure of exploration activity, the Red Lake Mining Division is presently undergoing its highest level of activ-

ity in 15 years. With respect to 1983, claims recorded have increased by 67% and the number of active claims increased by 45% (Table 1). In excess of 40% of this activity was in the Birch Lake area. The balance of claim staking activity is scattered through the remainder of the Birch - Confederation Lakes Metavolcanic Belt, the Red Lake Metavolcanic Belt, the areas east, north and west of Pakwash Lake and limited activity in the northern metavolcanic belts.

Claim staking activity in the Birch Lake area was high throughout the year. This activity was focused on gold prospects. In November, a minor staking rush immediately north of McNaughton Township in the Birch Lake area was the result of a base-metal discovery on the Loydex Resources Incorporated claims. The discovery was the result of a follow-up on gold assays from samples taken from an old trench on Okanse River which separates Birch Lake

from Superstition Lake. Re-examination by K. Bernier, B. Nelson, and L. Nelson led to the discovery of copper mineralization on the waters edge and zinc mineralization underwater. The copper mineralization consisted of a 20 inch wide stringer chalcopyrite zone. The nature of the zinc mineralization cannot be determined as it is underwater. However, grab samples contain sphalerite bands up to 3 cm in thickness. These samples produced high Zn assays with some Cu, Pb, Ag, and Au. The host rock is interpreted to be a dacitic to rhyolitic tuff. The mineralized zone is roughly coincident with 2 VLF anomalies.

Following the results of a feasibility study by Wright Engineering Limited on the Berens River Mine, a former gold-silver producer in the Favourable Lake Metavolcanic Belt, Getty Canadian Metals Limited has decided not to proceed with a mine production program with their joint venture

EXPLORATION ACTIVITY 1984

TABLE 2

Number on Figure	Individual or Company	Activity
1	BIRON BAY RESOURCES	GEOPHYSICAL SURVEYS IN BALL AND TODD TOWNSHIPS
2	BLUESTACK RESOURCES LTD.	DIAMOND DRILLING IN MCDONOUGH TOWNSHIP
3	BP RESOURCES INC. (SELCO DIVISION)	DIAMOND DRILLING-GERRY LAKE MAP SHEET GEOPHYSICAL SURVEYS-GERRY LAKE AND SOUTH OF OTTER LAKE MAP SHEETS (FAR FALLS)
4	CAMPBELL RED LAKE MINES	DIAMOND DRILLING ON THE CRAIBBE FLETCHER PROPERTY, BALMER TOWNSHIP
5	GARMAC RESOURCES LTD	DIAMOND DRILLING ON THE MCINTYRE PROSPECT, BIRCH LAKE, CASUMMIT MAP SHEET
6	COMINCO LTD.	GEOPHYSICAL SURVEYS IN BELANGER AND MITCHELL TOWNSHIPS
7	DOME EXPLORATION (CANADA) LTD.	DIAMOND DRILLING, NANGO LAKES MAP SHEET, EXPLORATION IN THE BIRCH-UCHI-CONFEDERATION-WOMAN LAKES AREAS, DIAMOND DRILLING IN MCDONOUGH TOWNSHIP
8	DROSOSKI, WAYNE	STRIPPING IN HEYSON TOWNSHIP
9	ELDOR RESOURCES LTD.	DIAMOND DRILLING, SEEBER LAKE MAP SHEET
10	ESSO RESOURCES CANADA LTD.	DIAMOND DRILLING IN DOME AND BALMER TOWNSHIPS
11	FRANK, RAYMOND	PROSPECTING AND STRIPPING IN DENT TOWNSHIP
12		
13	GETTY CANADIAN METALS LTD.	DIAMOND DRILLING, GEOLOGICAL AND GEOCHEMICAL SURVEYS; CURIE AND AVIS LAKES MAP SHEETS
14	GOLDQUEST EXPLORATION INCORPORATED	DIAMOND DRILLING ON THE LAKE ROWAN PROPERTY, TODD TOWNSHIP, AND ON THE FINDAR GROUP, BATEMAN TOWNSHIP. GEOLOGICAL, GEOPHYSICAL AND GEOCHEMICAL SURVEYS ON THE ABINO AND MCHARMAC PROPERTIES
15	GRIFFITH, D.R.	STRIPPING AND TRENCHING IN SKINNER TOWNSHIP
16	HEINRICH, BRADLEY L.	STRIPPING AND DIAMOND DRILLING ON BIRCH LAKE, CASUMMIT LAKE MAP SHEET
17	HERMISTON, WAYNE L.	PROSPECTING, LEANO LAKE AND SYDNEY LAKE MAP SHEETS AREA.
18	INDEPENDENT EXPLORATION SERVICES LTD.	GEOPHYSICAL AND GEOCHEMICAL SURVEYS IN THE SHABUMENI LAKE AREA
19	JYX LTD.	GEOPHYSICAL SURVEY ON PONASK LAKE
20	KENNCO EXPLORATION (CANADA) LTD.	GEOLOGICAL, GEOPHYSICAL AND GEOCHEMICAL SURVEYS IN THE LINGMAN LAKE AREA
21	KOSTYNUK, ALEX	TRENCHING IN THE MINK LAKE AREA
22	LABRADOR MINING AND EXPLORATION CO. LTD.	GEOLOGICAL AND GEOCHEMICAL SURVEYS ON BIRCH LAKE
23	MASSIVE ENERGY	EXPLORATION IN THE BORLAND LAKE AREA
24	MCFINLEY RED LAKE MINES LTD.	DIAMOND DRILLING AND UNDERGROUND EXPLORATION IN BATEMAN TOWNSHIP
25	MINEX EXPLORATION SERVICES	EXPLORATION IN BOWERMAN AND MITCHELL TOWNSHIPS
26	NEWEST RED LAKE EXPLORATION CORP.	DIAMOND DRILLING IN TODD TOWNSHIP
27	NORANDA EXPLORATION LTD.	GEOLOGICAL AND GEOPHYSICAL SURVEYS IN TODD TOWNSHIP; AIRBORNE GEOPHYSICAL SURVEYS AND GEOLOGICAL SURVEYS, DIAMOND DRILLING ON THE LEANO LAKE AND SYDNEY LAKE MAP SHEET AREA
28	OROFINO RESOURCES LTD.	TRENCHING AND DIAMOND DRILLING ON JACKSON MANION PROPERTY, DENT TOWNSHIP
29	PETERSON, CHARLES W.	STRIPPING AND TRENCHING DOME TOWNSHIP
30	PIGEON, LAWRENCE A.	GEOPHYSICAL SURVEY IN DOME TOWNSHIP
31	REDAURUM RED LAKE MINES	GEOLOGICAL AND GEOPHYSICAL SURVEYS, DIAMOND DRILLING BAIRD TOWNSHIP
32	RIVARD, O'BRIEN	DIAMOND DRILLING IN TODD TOWNSHIP
33	SPINELLI, JOE	STRIPPING IN HEYSON TOWNSHIP
34	SHERRITT GORDON MINES LTD.	GEOLOGICAL AND GEOCHEMICAL SURVEYS IN DENT, CORLESS AND GOODALL TOWNSHIPS
35	SOLTERMAN, RENE	STRIPPING, TRENCHING IN TODD TOWNSHIP
36	ST. JOE CANADA INC.	GEOLOGICAL SURVEYS AND DIAMOND DRILLING ON BIRCH LAKE
37		
38		
39	WILANOUR RESOURCES LTD.	GEOPHYSICAL SURVEY IN BATEMAN TOWNSHIP
40	WILSHIRE RESOURCES LTD.(DURATION MINES LTD.)	GEOLOGICAL AND GEOPHYSICAL SURVEYS IN SKINNER TOWNSHIP, CASUMMIT MAP SHEET AREA AND MEEN LAKE MAP SHEET AREA

TABLE 3

ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.

Au	Gold	Mag	Magnetometer Survey
AM	Airborne Electromagnetometer Survey	OAG	Overburden Geochemistry
AMAG	Airborne Magnetometer Survey	OVD	Overburden Drilling
Assess	Assessment	Rad	Radiometric Survey
DBH	Diamond Drill Hole	SA	Sampling, Assays
EM	Electromagnetometer Survey	Str	Stripping, Soil Trenching
geochem	Geochemistry	Tc	Trenching
GI	Geological Survey	TR	Rock Trenching
HLEM	Horizontal Loop Electromagnetic Survey	VLF-EM	Very Low Frequency Electromagnetometer Survey
L-geochem	Geochemical Litho-geochemistry	I.P.	Induced Polarization

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
BALL, TODD TP.	52M/1 52L/16	BIRON BAY RESOURCES LTD.	AU	ASSESS	MAG, VLF-EM	1984	2.6867	BALL
BALMER, RANGER TP.	52N/4	ELDORADO NUCLEAR LTD.	AU	ASSESS	MAG, EM	1982	2.5480	BALMER
BALMER, RANGER TP.	52N/4	ELDOR RESOURCES LTD.	AU	ASSESS	D.D.H. (7) 3423'	1983	-----	BALMER
BALMER TP.	52N/4	GOLDOUEST EXPLORATION INC.	AU	ASSESS	MAG, HLEM	1981	2.5411	BALMER
BALMER TP.	52N/4	GOLDOUEST EXPLORATION INC.	AU	ASSESS	GL, RAD	1982	2.5412	BALMER
BALMER TP.	52N/4	GOLDOUEST EXPLORATION INC.	AU	ASSESS	GL, VLF-EM	1984	2.6820	BALMER
BATEMAN TP.	52N/4	GOLDOUEST EXPLORATION INC.	AU	ASSESS	RAD	1982	2.5413	BATEMAN
BATEMAN, BALMER TP.	52N/4	GOLDOUEST EXPLORATION INC.	AU	ASSESS	D.D.H.(4) 1334'	1983	-----	BATEMAN
BATEMAN, BALMER TP.	52N/4	GOLDOUEST EXPLORATION INC.	AU	ASSESS	D.D.H.(1) 300'	1983	-----	BATEMAN
BATEMAN TP.	52N/4	WILANOUR RESOURCES LTD.	AU	ASSESS	MAG, VLF-EM	1984	2.7281	BATEMAN
BELANGER, MITCHELL TP.	52K/15 52N/2	COMINCO LTD.	CU,ZN,AG	ASSESS	MAG	1984	2.6964	BELANGER
BYSHE TP.	52K/13	GOLDOUEST EXPLORATION INC.	AU	ASSESS	D.D.H.(2) 700'	1980	-----	BYSHE
BYSHE TP.	52K/13	GOLDOUEST EXPLORATION INC.	AU	ASSESS	EM	1983	2.5919	BYSHE
BYSHE TP.	52K/13	GOLDOUEST EXPLORATION INC.	AU	ASSESS	GL, RAD	1983	2.5923	BYSHE
CASUMMIT LAKE	52N/8	DOME EXPLORATION (CAN) LTD.	AU	ASSESS	MAG	1983	2.6447	52N/8
CASUMMIT LAKE	52N/8	ST. JOE CANADA INC.	AU	ASSESS	MAG, VLF-EM, MAXMIN	1984	2.6829	52N/8
CASUMMIT LAKE SATTERLY LAKE	52N/8	ST. JOE CANADA INC.	AU	ASSESS	D.D.H.(1) 208'	1984	-----	52N/8
CORLESS, EARNGEY, DENT, MITCHELL, KNOTT TP.	52N/2	OROFINO RESOURCES LTD.	AU	ASSESS	AMAG AEM	1983	2.6077	CORLESS
CURIE LK, AVIS LK.	52K/16	GETTY CANADIAN METALS LTD.	AU	ASSESS	GL	1983	2.6592	52K/16
CURIE LK, AVIS LK.	52K/16	GETTY CANADIAN METALS LTD.	AU	ASSESS	AEM, AMAG	1983	2.6562	52K/16
CURIE LK, JUBILEE LK. ROADHOUSE RIVER AVIS LAKE, SLATE LK.	52K/16 52N/1 52J/13 52K/15	GETTY CANADIAN METALS LTD.	AU	ASSESS	AEM, AMAG	1983	2.7159	52K/16
DENT TP.	52N/2	MARSHALL HAMES, O.C. DEVONSHIRE GOLD RES. INC.	AU	ASSESS	D.D.H.(11) 2862' I.P.	1983	-----	DENT
DOME, FAIRLIE TP.	52N/4	GOLD FIELDS CAN. MINING LTD.	AU	ASSESS	GL	1981-82	2.5824	DOME
DOME TP.	52N/4	GOLD FIELDS CAN. MINING LTD.	AU	ASSESS	I.P.	1982-83	2.5825	DOME
DOME TP.	52N/4	HUSTON C.D. PETERSON, C.W. DESMEULES, M.	AU	ASSESS	MAG, EM	1982	2.5313	DOME
DOME TP.	52N/4	PIGEON, LAURENCE A.	AU	ASSESS	MAG, VLF-EM	1984	2.7305	DOME
EARNGEY TP. UCHI LK.	52N/2	TERRELL, MICHAEL A.	AU	ASSESS	STR.	1984	-----	EARNGEY
EARNGEY TP.	52N/2	TERRELL, MICHAEL A.	AU	ASSESS	D.D.H.(3) 320'	1984	-----	EARNGEY

TABLE 3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
GERRY LAKE	52K/14	B.P. RESOURCES CAN. LTD.	AU	ASSESS	MAG, EM	1984	2.7182	52K/NW
GERRY LAKE	52K/14	B.P. RESOURCES CAN. LTD.	AU	ASSESS	D.D.H.(1) 100'	1984	-----	52K/NW
GRANITE BAY	53F/3	CANADIAN OCCIDENTAL PETROLEUM LTD.	AU	ASSESS	GL, GEOCHEM	1983	2.6241	53F/SW
GRANITE BAY	53F/3	CANADIAN OCCIDENTAL PETROLEUM LTD.	AU	ASSESS	D.D.H.(3) 948'	1983	-----	53F/SW
HAMELL LAKE	52M/1	GOLDOUEST EXPLORATION INC.	AU	ASSESS	GL, RD	1983	2.6352	52M/SE
HAMELL LAKE	52M/1	GOLDOUEST EXPLORATION INC.	AU	ASSESS	STR	1983	-----	52M/SE
HAMELL LAKE	52M/1	NORANDA EXPLORATION CO.	AU	ASSESS	GL.	1983	2.6623	52M/SE
HAMELL LAKE	52M/1	NORANDA EXPLORATION CO.	AU	ASSESS	MAG, EM	1984	2.6692	52M/SE
HEYSON TP.	52K/13	DROSOSKI, WAYNE R.	AU	ASSESS	STR	1984	-----	52K/NW
HEYSON TP.	52K/13	PETERSON, CHARLES	AU	ASSESS	STR	1984	-----	52K/NW
KIPPEN LAKE	53G/5	ELDOR RESOURCES LTD.	AU	ASSESS	D.D.H. (11) 4277'	1984	-----	52G/SW
LINGMAN LAKE	53F/15	NEARCTIC RESOURCES INC.	AU	ASSESS	VLF-EM	1983	2.6519	53F/NE
LINGMAN LAKE	53F/15	NEARCTIC RESOURCES INC.	AU	ASSESS	D.D.H.(13) 2674'	1983	-----	53F/NE
LINGMAN LK, SEEBER LK.	53F/15 53F/14	ELDOR RESOURCES LTD.	AU BASE METALS	ASSESS	D.D.H.(11) 2447'	1984	2.6828	53F/NE
LINGMAN LK, SEEBER LK.	53F/15 53F/14	ELDOR RESOURCES LTD.	AU BASE METALS	ASSESS	MAG, EM	1983	2.5737	53F/NE
MATTSON LK, ARMSTRONG LK.	53C/7	NORANDA EXPLORATION CO.	AU	ASSESS	MAG, EM	1983	2.5672	53C/SE
MCDONOUGH, DOME TP.	52N/4	BLUESTACK RES. LTD.	AU	ASSESS	GL, OVG.	1982	2.5528	52N/SW
MCDONOUGH TP.	52N/4	GOLDOUEST EXPLORATION INC.	AU	ASSESS	D.D.H. (3) 1017'	1983	-----	52N/SW
MCDONOUGH TP.	52N/4	DOME EXPLORATION (CAN) LTD.	AU	ASSESS	D.D.H. (3) 890'	1984	-----	52N/SW
MCVICAR LAKE	52O/11	NORANDA EXPLORATION CO.	AU	ASSESS	GL, VLF-EM	1984	2.7219	52O/NW
MUSKRAT DAM LK., KIPPEN LAKE	53G/5	CANADIAN OCCIDENTAL PETROLEUM LTD.	AU	ASSESS	GL, GEOCHEM	1983	2.6245	53G/SW
NANGO LK, YOYOY LK.	53B/6 53B/11	DOME EXPLORATION (CAN) LTD.	AU	ASSESS	MAG, EM	1983	2.6984	53B/SW
NANGO LK, YOYOY LK.	53B/6 53B/11	DOME EXPLORATION (CAN) LTD.	AU	ASSESS	D.D.H. (10) 7340'	1984	-----	53B/SW
SATTERLY LAKE	52N/8	LABRADOR EXPLORATION (ONT) LTD.	AU	ASSESS	MAG, VLF-EM	1983-84	2.6688	52N/SE
SETTING NET LAKE	53C/13	GETTY CANADIAN METALS LTD.	AU	ASSESS	AEM, AMAG	1983	2.6253	53C/NW
SHABUMENI LAKE	52N/7	LABRADOR EXPLORATION (ONT) LTD.	AU	ASSESS	MAG, EM	1983-84	2.6583	52N/SE
SOUTH OF OTTER LAKE	52K/14	BP RESOURCES CANADA LTD.	AU	ASSESS	D.D.H. (2)	1984	-----	52K/NW
SYDNEY LK, LEANO LK.	52L/9 52L/16	NORANDA EXPLORATION CO.	AU	ASSESS	AEM, AMAG	1984	2.6735	52L/NE
TODD TP.	52M/1	PIPESTONE BAY RESOURCES	AU	ASSESS	MAG, EM	1983	2.6877	52M/SE
YOYOY LAKE	53B/11	DOME EXPLORATION (CAN) LTD.	AU	ASSESS	D.D.H.(2) 1102'	1984	-----	53B/NW

partner, Zahavy Mines Limited. Getty is presently seeking to contract out to a third party. The feasibility study indicated mineable reserves of 601 500 tons at 0.19 ounce gold per ton and 4.41 ounces silver per ton on the No. 3 vein, to a depth of 600 m. This vein has an average width of 2.6 m. Indicated geological reserves are 982 200 tons at 0.26 ounce gold per ton and 4.81 ounces silver per ton. The No. 1 vein (the vein originally mined) and the No. 2 vein were not tested by this underground exploration program.

Wilanour Resources Limited has entered into a joint venture agreement with Esso Minerals Canada to explore its properties with an expenditure of \$2.5 million. Esso can earn a 30% interest and a 60% interest after \$5 million. Esso Minerals Canada can also earn an interest in the neighbouring claims of Consolidated Marcus Gold Mines Limited (65% owned by Wilanour Resources Limited). A \$500 000 expenditure can earn Esso a 30% interest and \$1 million for a 60% interest. The exploration program on the Cochenour-Willans, Wilmar and Ancco Properties consists of re-interpretation of all geological data available, dewatering to the 2050-foot level and diamond drilling. Diamond drilling is testing the following targets: (1) down-dip and on-strike extension of the Wilmar East Zone, (2) down-dip extension of the main Cochenour-Willans shear zone and the Ancco Zone, (3) the area west of the granodiorite zone along an east-southeast break at the Cochenour-Willans and (4) surface drilling on the East Bay serpentinite break between the Consolidated Marcus shaft and the Wilmar East Zone. At the Consolidated Marcus Gold Mines Limited Property, geological mapping and geophysical surveys were followed by diamond drilling.

Goldquest Exploration Incorporated continued an underground exploration program at the Rowan Lake Property. Access is via an adit 30 m below the shaft collar. Raises, subdrifts and stopes were utilized to test continuity of ore

shoots and remove bulk samples. A total of 4072.6 tons of material was removed with an average grade of 0.34 ounce gold per ton.

On the Abino Prospect, Goldquest Exploration Incorporated has done some stripping, geological mapping and geophysical surveys.

Jamie Frontier Resources Incorporated began to dewater the Mount Jamie Mine and will proceed with a 10 000-foot diamond drill program (The Northern Miner, November 1, 1984).

Phoenix Gold Mines Limited has undertaken an underground exploration program on the McFinley Mines Limited Property. Phoenix Gold Mines Limited and an affiliate company, The Coniagas Mines Limited, can earn a 42.9% and 7.1% interest respectively by spending \$3.5 million on exploration and development. (The Northern Miner, September 6, 1984). A headframe with a full complement of surface facilities has been installed and can be accessed by a recently built road. Underground exploration consisted of diamond drilling and drifting to access and evaluate the mineralized zones.

ONTARIO GEOLOGICAL SURVEY ACTIVITIES

A.J. Andrews continued a multi-year project to study the nature of alteration associated with gold deposits. The emphasis at this stage of the study detailed petrographic examination of rocks in the eastern section of the Red Lake Metavolcanic Belt.

J.L. Riley's Peatland Inventory Project, funded by the Ministry of Treasury and Economics under the Board of Industrial Leadership and Development (BILD), expanded to encompass the Red Lake Mining Division. In conjunction with the Ontario Centre for Remote Sensing, sites were selected. Following reconnaissance examination, these sites were sampled by Monenco Ontario Limited, 1981. A report of their findings, to be published as an Open File Report, will be released during the Winter.

ONTARIO MINERAL EXPLORATION PROGRAM (OMEP)

In 1984, 21 OMEP grants totalling an estimated \$2.7 million (November 1984) were applied for and approved in the Red Lake Mining Division. Expenditure by the applicants is estimated to be \$11 million.

RESEARCH BY OTHER AGENCIES

Several projects carried out by university personnel in the Red Lake Mining Division were funded by the Ontario Geoscience Research Fund. These include P.M. Berger and J.M. Summer (Queen's); M. Hugon and W.M. Schwerdtner (Toronto); and S.R. Noble, N.M. Evenson (Toronto), and T.E. Krogh (Royal Ontario Museum).

P.M. Berger continued a structural study of northern Dome and Southern McDonough Townships (Berger and Summers 1984).

H. Hugon continued structural analysis in the Madsen area and has broadened the study to include areas to the east and northeast. This resulted in the identification of additional zones of high strain. (Hugon and Schwerdtner 1984).

S.R. Noble continued a petrological, geochemical, and isotopic characterization of volcanic cycles and granitoids in the Uchi-Confederation Lakes area. This study will also include U-Pb zircon age dating. (Noble *et al.* 1984).

B. Wilson (Queen's) continued a regional structural analysis of the Red Lake Metavolcanic Belt. Logistical support for the study was provided by the Ontario Geological Survey.

M.M. Sanborn (Toronto) continued with a study of gold mineralization by unravelling complex lithologic associations, alteration and deformation at the Cochenour-Willans Mine.

SELECTED REFERENCES AND RECENT PUBLICATIONS

Beatty, C.

1984: Mesoscopic and Microscopic Structural Features Associated with a Brittle-Ductile Shear Zone in the Dome Stock, Red Lake, Ontario, B.Sc. Thesis, Queen's University, 61p.

Berger, P.M., and Summers, J.M.

1984: Structural Geology of Northern Dome and Southern McDonough Townships, Red Lake Area, Ontario; Grant 175, p.211-221 *in* Geoscience Research Grant Program, Summary of Research 1983-1984, edited by V.G. Milne, Ontario Geological Survey, Miscellaneous Paper 121, 252p.

Bowen, R.P.

1984: Geology of the Slate Lake Area, District of Kenora (Patricia Portion); Ontario Geological Survey, Open File

Report 5471, 163p. and 4 maps in back pocket.

Colvine, A.C., Andrews, A.J., Cherry, M.E., Durocher, M.E., Fyon, A.J., Lavigne, M.J., Jr., Macdonald, A.J., Marmont, Sossan, Poulsen, K.H., Springer, J.S., and Troop, D.G.

1984: An Integrated Model for the Origin of Archean Lode Gold Deposits, Ontario Geological Survey, Open File Report 5524, 98p.

Hugon, H., and Schwerdtner, W.M.

1984: Structural Signature and Tectonic History of Deformed Gold-Bearing Rocks in Northwestern Ontario; Grant 149, p.164-176 *in* Geoscience Research Grant Program, Summary of Research 1983-1984, edited by V.G. Milne, Ontario Geological Survey, Miscellaneous Paper 121, 252p.

Johns, G.W., and Richey, S.

1982: Precambrian Geology of the MacQuarrie Township Area,

NTS 52E 8/NE+9/SE, Kenora District, Ontario; Ontario Geological Survey, Preliminary Map, P.2498, scale 1:15 840 or 1 inch to 1/4 mile.

Noble, S.R., Evensen, N.M., and Krogh, T.E.

1984: Petrogenesis of Mineralized Horizons in Uchi Lake Metavolcanics; Grant 168, p.188-195 *in* Geoscience Research Grant Program, Summary of Research 1983-1984, edited by V.G. Milne, Ontario Geological Survey, Miscellaneous Paper 121, 252p.

Wilson, B.C.

1983: Geology of the Lingman Lake Area, Ontario Geological Survey, Open File Report 5482, 83p. Accompanied by Preliminary Map, P.2485, scale 1:31 680 or 1 inch to 1/2 mile.

Sioux Lookout Resident Geologist Area, Northwestern Region

D.A. Janes¹ and R.B. Huggins²

¹Resident Geologist, ²Resource Geologist, Ontario Ministry of Natural Resources, Sioux Lookout

INTRODUCTION

The Sioux Lookout Resident Geologist Office is presently staffed by D.A. Janes, Resident Geologist and M. Sawtelle, Geological Secretary. For the past 3 years, R.B. Huggins has occupied the position of Resource Geologist. In September of 1984, he accepted a position with the Ontario Mineral Exploration Program in Toronto. G. Sjonger was employed for 6 months on a program to produce Geological Data Inventory Folios. P. Subotnic and J.W. Redden are presently employed on the same project.

Exploration activity in the Patricia Mining Division (Figures 1, 2) continues to be almost entirely centred on gold. Several reconnaissance projects in the northern portion of the mining division were undertaken with base metals and gold as targets, but no property level exploration was carried out solely for base metals.

Precious metals exploration was widespread throughout the mining division, and all greenstone belts south of Big Trout Lake had programs at various levels. Exploration in the Fry, Bamaji, Meen, Pickle Lake and North Caribou Lake areas was most intense. Activity continued around Sturgeon and Savant Lakes and a considerable amount of exploration occurred in the Minnitaki Lake region especially around Goldlund Mine.

The Matabi and Lyon Lake Mines on Sturgeon Lake were in production in 1984 and expect to continue in 1985.

In 1984, UMEX Incorporated kept the Thierry Mine at Pickle Lake in care and maintenance status and intend to do so for the next year.

Goldlund Mines Limited completed the expansion of their mill by installing new facilities with capacity in the 300 to 400 t.p.d. range in parallel with their existing 200 t.p.d. mill. They intend to dedicate the 200 t.p.d. mill to custom milling.

Dome Mines Limited conducted an intensive drilling program on their Dona Lake Property, 11 km south of Pickle Lake. This is a new find in this historic camp. Dome Mines Limited completed a decline and a bulk sampling program in late fall at the Musselwhite Property on Opapimiskan Lake. Dome is the operator for the Musselwhite Consortium who will decide, on the basis of the completed program, whether to put the property into production.

RESIDENT GEOLOGIST'S ACTIVITIES

All operating mines in this mining division were visited at least once during 1984. The Resident Geologist spent several weeks examining properties on Sturgeon Lake and Savant Lake, and is preparing a summary report of gold properties in the Sturgeon Lake area. Visits to properties on Bancroft and Eyepamikama Lakes were made in the summer of 1984. Some time was spent with Ontario Geological Survey crews during their mapping programs. A program to convert the present system of Data Series Maps to the Geological Data Folios format was started in early 1984. This program, funded by the Ontario Ministry of Northern Affairs, is opportune since it coincided with the micro-filming of the assessment files of the Patricia Mining Division.

A program of core retrieval and cataloging was conducted from January to May of 1984. This program, funded jointly by the Special Employment Program of the Federal Government and the Province of Ontario, collected 4000 m of exploration drill core in the immediate area of Sioux Lookout. The core is stored in a temporary core facility in Sioux Lookout. It is hoped to continue this program in 1985.

During the Spring of 1984, reorganization of the Northwest Regional Mineral Resources Program resulted in a closer association with the District organization. Reorganization resulted in new re-

sponsibilities for the geologic staff, opportunities for integration of facilities and access to a larger pool of equipment and staff.

Several lectures at local secondary schools were given by staff. Lectures and field trips were conducted for 2 Junior Ranger Camps.

Efforts to stimulate the development of a highly sensitive portable analyser for gold continued in 1984. Production of a prototype by private enterprise is the next step in this program.

Initial steps were taken to test a loose microcomputer-based communications net between the Resident Geologists in the Northwest Region and the Ontario Geological Survey, for the purpose of developing a method to rapidly transmit information.

The next two years will be crucial for the level of mining and exploration activity in the Patricia Mining Division. Should low gold prices continue for an extended period, the amount of exploration and the number of claims held will decrease. It will be necessary to actively promote other mineral commodities as exploration targets to protect the exploration base.

During 1984, two Ontario Geological Survey parties were active in the area. The larger party (20-man) commenced a multidisciplinary study of the North Caribou Volcanic Belt. This program, funded by the Ministry of Northern Affairs, will last for an additional two years and will produce a comprehensive geological, surficial and metallogenic study of this important "greenstone" belt. The other program, directed by G. Stott, concluded the second year of mapping and compilation of the Uchi Belt between Meen and Pickle Lakes. This area is currently under exploration and staking by several companies.

Several graduate students continued studies on metamorphism in the English River Gneissic Belt and support was given to a student for a M.Sc. thesis of the Goldlund Mine, Echo Township. The meta-

morphic studies, in particular, provide new insights into the metamorphic zonation of the English River Gneissic Belt and may, in subsequent years, allow a better definition of its eastern extension.

MINING ACTIVITY

Three major mines operated in the Patricia Mining Division in 1984. Two sites containing operational mills are shut down. Two major development projects were in operation during the year, and a number of advanced exploration programs were carried out.

The Thierry Mine (UMEX Incorporated) at Pickle Lake remained inactive in 1984. UMEX Incorporated has decided to maintain the Thierry Mine in a shut down condition for at least the next year.

Goldlund Mines Limited, Echo Township, remained in production during 1984. During the year, considerable improvements were made to the surface plant with an additional grinding and concentrate circuit installed, which allows a capacity of 400 to 500 t.p.d. The existing headframe was completely renovated and is now capable of lifting ore from several levels. Goldlund processed their first lot of custom ore from Sturgeon Lake, recovering gold from tailings from the Rainbow Island Resources Property. At year end, Goldlund was mining on two shifts per day, while milling at a rate of 3000 tons per month. Mill heads have been below design limits. An intensive underground development project has been proposed to develop underground ore and increase mill heads.

Mattabi Mines Limited and Noranda Mines Limited, Lyon Lake Division, are located on Sturgeon Lake. The Mattabi Mine is owned by Noranda Mines Limited (60%) and Abitibi-Price Incorporated (40%). Ore from both mines is processed at the Mattabi mill to produce zinc, copper, and lead concentrates. Silver is a major by-product. At present, the mill is operating at 2800 tons per day, with

each mine producing roughly equal amounts of ore.

INDUSTRIAL MINERALS

POTTING SOIL AND HORTICULTURAL PRODUCTS

DuNor Products continued production of potting soil and associated peat and marl products during 1984. The company opened an additional plant in Fort Frances to access the American market and to gain additional sources of raw material.

SAND AND GRAVEL

Approximately 910 000 tons of aggregate were removed from Crown-owned pits in the Sioux Lookout District in 1984. Including known private usage, the amount of aggregate extracted is estimated to be 1.1 million tons. This amount is double the usage in 1983 and indicates the importance of this resource to the local economy and the necessity to maintain a sufficient inventory of economically extractable aggregate.

ROCK BALLAST

The Watcomb quarry of Canadian National Railways extracted approximately 95 000 tons of crushed rock for rail ballast and other projects in 1984.

MINERAL EXPLORATION ACTIVITY

Exploration activity in the Patricia Mining Division, from 1981 to 1984, has been at historically high levels. When the final statistics for the year are compiled, 1984 will be the best year since the Sturgeon Lake rush. Claim staking, active claims, and total work done are at the highest levels since 1971 (Tables 1-4). Considering the lack of base metal activity, this result indicates the intense interest shown in the gold potential of the area and underlines the serious effect on exploration activity of a major increase in gold exploration.

Base metal exploration remained at a very low level in 1984, continuing a trend which

started in 1980. Several base metal reconnaissance projects were run in the Uchi Belt with a joint base metal and gold orientation. No major program at the grass roots level was initiated in 1984. Detail and property examinations were done in the Savant Lake area over known prospects.

Programs aimed at lithophile (granitoid) related minerals were at a virtual standstill in spite of favourable geological environments in the southern portion of the English River Gneissic Belt. Opportunities for tungsten, lithium, cesium, gallium, and tantalum, as well as rare earth metals, occur at the northern and southern boundaries of the English River terrain.

Gold exploration continued at a high level, sparked by activity in the Pickle Lake, Opapimiskan Lake, and Meen Lake-Dempster Lake areas. Most programs were targeted on iron formation related deposits.

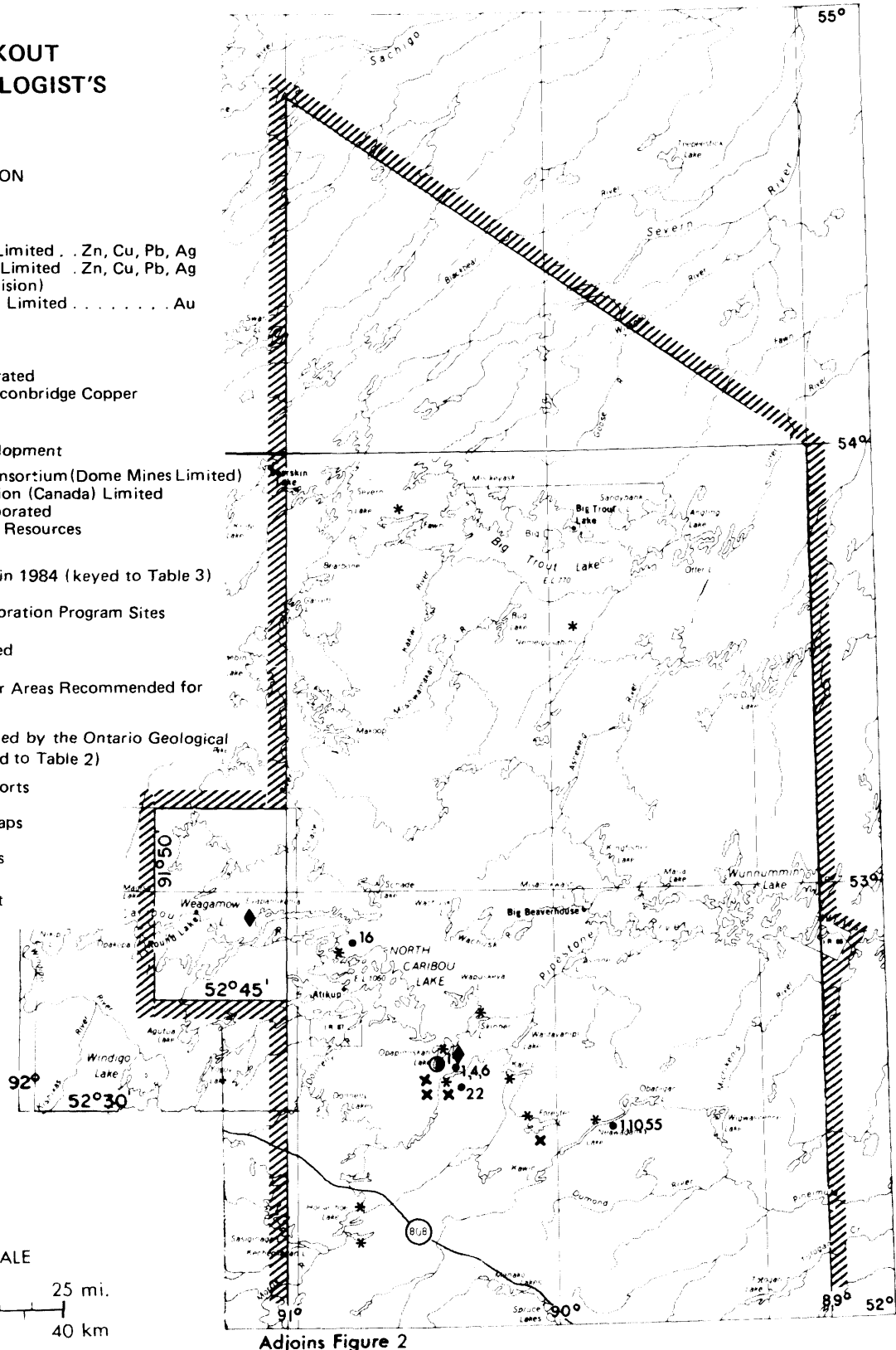
Dome Mines completed a decline on the Musselwhite Consortium property at Opapimiskan Lake. The program included underground mapping and bulk sampling. The Consortium will use these results to plan further development.

Dome Exploration (Canada) Limited capped a multi-year exploration program in the Pickle Lake area with an exciting new gold discovery. The discovery site is located near the northeast tip of Dona Lake. Dome Exploration built an all-weather road to the site which joins Highway 599 11 km south of the town of Pickle Lake. The discovery was made after several years of exploration and is contained in sulphide replacement zones in metamorphosed magnetite - quartz iron formation. The drill core samples suggest that the deposit is similar to the Opapimiskan Lake Deposit, rather than the quartz vein hosted deposits found in the Central Patricia and Pickle Crow Mines. While the latter deposits were associated with magnetite-quartz-carbonate iron formation, gold occurred in veins

Figure 1
SIoux LOOKOUT
RESIDENT GEOLOGIST'S
AREA

EXPLANATION

- Producing Mines
 1. Mattabi Mines Limited . . . Zn, Cu, Pb, Ag
 2. Noranda Mines Limited . . . Zn, Cu, Pb, Ag (Lyon Lake Division)
 3. Goldlund Mines Limited Au
- Mills
 1. UMAX Incorporated
 2. Corporation Falconbridge Copper
- Property Under Development
 1. Musselwhite Consortium (Dome Mines Limited)
 2. Dome Exploration (Canada) Limited
 3. Camreco Incorporated
 4. Rainbow Island Resources
- Exploration Activity in 1984 (keyed to Table 3)
- ✕ Ontario Mineral Exploration Program Sites
- * Assessment Work Filed
- ◆ Property Visits and/or Areas Recommended for Exploration
- == Maps or Reports Issued by the Ontario Geological Survey in 1984 (keyed to Table 2)
 - OFR - Open File Reports
 - P - Preliminary Maps
 - 2443 - Coloured Maps
- ▨ Boundary of Resident Geologist's Area



Adjoins Figure 1

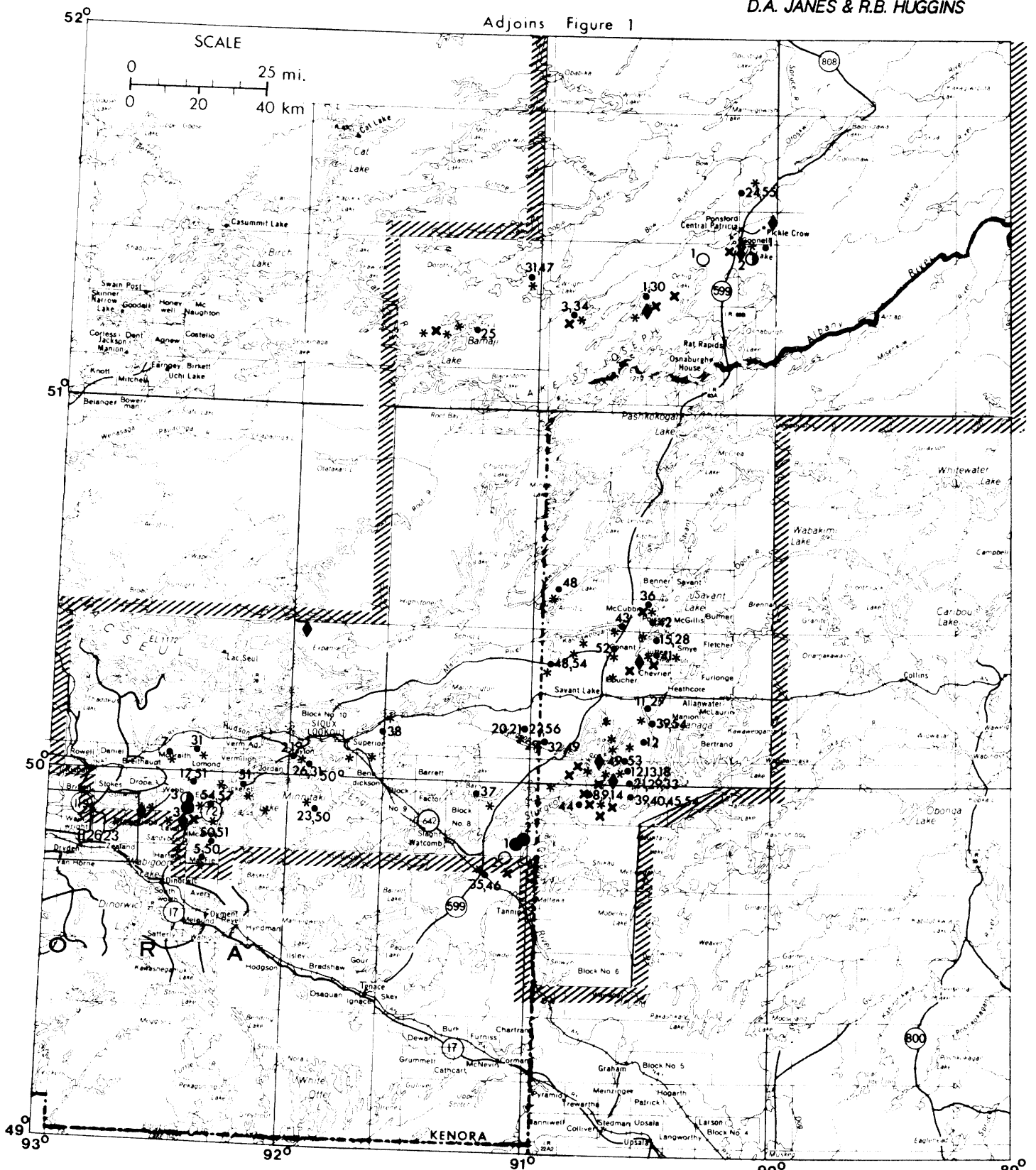


Figure 2

EXPLORATION ACTIVITY DURING THE YEAR.

TABLE 1

Number on Figure	Individual or Company	Activity
1	#493217 Ontario Limited	Zeemel Lake - mag, EM in 1984; Dona Lake - mag, VLF-EM in 1982; Neawagank Lake - VLF, Mag, IP in 1984; Caley Lake- mag, VLF-EM in 1982.
2	#502095 Ontario Limited (Melrose Resources Limited)	Drayton Township - mag, EM in 1984.
3	Amoco Canada Petroleum Limited	Duffel Lake - 7-DD-2400', O.Dr. and Assays in 1984.
4	Armstrong, G., Best, A.P., Labelle, M.J.	Zeemel Lake - mag, EM in 1984.
5	Bernier, K.	McFie Township - EM, GL in 1984.
6	Best, A.P., Labelle, M.J., Armstrong, G.	Zeemel Lake - mag, EM in 1984.
7	BP Resources	Whipper Lake & McIlraith Township - 1-DD-404' in 1984.
8	Canadex Playfair Joint Venture	Six Mile Lake - Stripping in 1983.
9	Canadex Resources, Santa Maria Resources, Swansea Gold Mines Inc.	Six Mile Lake - Property Report in 1983.
10	Canadian Nickel Company Limited	Neawagank Lake - 6-DD-2564.96' in 1984.
11	Candore Explorations Limited	Beckington Lake - Geological Report in 1920.
12	Copconda-York Resources Incorporated	Quest Lake - Assays, mag, EM in 1983; Squaw Lake - mag, EM in 1983; 1-DD-200' in 1984.
13	Corporation Falconbridge Copper	Quest Lake - 4-DD in 1983; Penassi Lake - mag, EM in 1984.
14	Cunningham, L. J.	Six Mile Lake - Mechanical in 1984.
15	Donner, John	Jutten Township - 7-DD-1966' in 1972.
16	Eldorado Nuclear	North Caribou Lake - Geoph, GL, Geoch in 1984. (Northeast Part)
17	Goldlund Mines Limited	Echo Township - O.Dr. in 1981.
18	Hawkins, Stanley C.	Squaw Lake - Mag, EM, Ch. Samp. in 1983/4.
19	Kerr Addison Mines Limited	Drayton Township - mag, EM, Geoch in 1983.
20	King, James L.	Fourbay Lake - mag, EM in 1983.
21	Kuryliw, C.	Fourbay Lake - VLF-EM, mag in 1984. Squaw Lake - GL in 1983/4 and mag, EM in 1984.
22	Labelle, M.J., Best, A.P., Armstrong, G.	Zeemel Lake - mag, EM in 1984.
23	Loydex Resources Inc.	Fourbay Lake - mag, EM, Tr, VLF-EM, GL, Geoch in 1983. Parnes Lake - mag, EM in 1983.
24	Marietta Resources	Tarp Lake - Tr, Str in 1984.
25	McCannell, James D.	Fry Lake - 4-DD-483', GL, mag, EM in 1984.
26	Melrose Resources Limited (#502095 Ontario Limited)	Drayton Township - mag, EM in 1984.
27	Mid-North Engineering Services Ltd.	Beckington Lake - Radiometric survey in 1983.
28	Moede, Roland	Jutten Township - 2-DD-205' in 1984.
29	Moran Resources	Fourbay Lake - EM, mag, GL, Geoch in 1981/2. Squaw Lake - 1-DD-335.6', Str in 1984: AEM, mag, GL, Geoch in 1981.
30	Moss Resources Limited	Caley Lake - IP, EM, mag in 1983.
31	Nahanni Mines Limited	Drayton Township - mag, EM in 1983: 2-DD-798' in 1984. Kawashe Lake - mag, EM in 1984. Lomond Township - mag, EM in 1984. Whipper Lake - mag, EM, 1-DD-349', 1-DD-353' in 1983.
32	Narex Ore Search Consultants Inc.	Fourbay Lake - AEM in 1984. Six Mile Lake - AEM, mag in 1984.
33	Noble Peak Resources Ltd.	Squaw Lake - Geoch in 1983.
34	Noranda Exploration Company Ltd.	Duffel Lake - mag, EM, GL in 1984.
35	Norminex Limited	Valora Lake - GL, Geoch, EM in 1984.

TABLE 1 Continued

Number on Figure	Individual or Company	Activity
36	Norontex Explorations (R. Van Enk)	Poisson Township - PR, Assays in 1984.
37	Petromet Resources Limited	Penassi Lake - PR, GL, EM in 1983.
38	Petrunka, D. F.	Sharron Lake - EM in 1983.
39	Pollock, John A.	Beckington Lake - 4-DD-4225', mag, EM in 1984. Squaw Lake - mag, EM in 1983: mag, EM in 1984.
40	Pominex Limited	Squaw Lake - mag, EM in 1984.
41	Ramsay, R. G.	Jutten Township - 7-DD-2099.0' in 1984.
42	Ramsay, R. G. and Ram Petroleum Ltd.	Poisson Township - VLF-EM, GL, PR in 1982 and GL in 1984.
43	Raylloyd Resources Limited, Ram Petroleum and Ramsay, R. G.	Grebe and McCubbin Townships - 11-DD-3740' and 11-DD-5695' in 1983.
44	Redden, J. W.	Six Mile Lake - PR, mag in 1984.
45	Schiralli, R. A.	Squaw Lake - AEM, VLF-EM, mag in 1984.
46	Seagull Resources	Valora Lake - 14-DD-11,555' in 1984.
47	St. Joe Canada	Kawashe Lake - mag in 1984.
48	Stargazer Resources Limited	Houghton Lake - mag, EM, IP, A, GL, Geoch in 1983. Armit Lake - mag, EM, IP, A, GL, Geoch in 1983.
49	Steep Rock Resources	Fourbay Lake - 2-DD-1180.4', 2-DD-328', 27-DD-2989.8', 1-DD-828', mag, VLF-EM in 1983. Squaw Lake - mag, EM in 1983 and 1984.
50	Sulpetro Minerals Limited	McAree Township - EM in 1984. McFie Township - GL, 1-DD-85.65m in 1984. Parnes Lake - GL, 2-DD-240', EM in 1984.
51	Tarbush Lode Mining Company Limited	Echo Township - EM, Geoch in 1983. McAree Township - EM, Geoch in 1983. Kabik Lake and Pickerel Township - EM, Geoph in 1983.
52	Teck Explorations Limited	Conant Township - 5-DD-1573.0', mag, EM in 1984 and mag, EM in 1983.
53	Tough, Sherman	Squaw Lake - mag, EM in 1984.
54	Umex Inc.	Beckington Lake - GL, Geoch, mag, EM, A in 1983 and EM, GL, Geoch in 1984. Echo Township - Geoch in 1984. Houghton Lake - GL, Geoch in 1982 and Geoch in 1984. Squaw Lake - mag, EM in 1982.
55	Van Horne Gold Exploration Inc.	Neawagank Lake - 6-DD-1971' in 1984. Tarp Lake - mag, EM in 1983.
56	Wasabi Resources Limited and Central Crude Limited	Fourbay Lake - VLF-EM, mag and GL in 1983.
57	Wilkinson, D.	Echo Township - WR, Str, Tr in 1984 and Assays in 1983.

or breccia zones within the folded iron formation.

Dome conducted a major drilling program on the new prospect during the spring and summer of 1984. While ore grade values and widths were obtained in drill intersections, Dome has not commented on the significance of the property.

The activity in the Dona Lake area stimulated several joint ventures. Moss Resources, Van Horne Gold Exploration Incorporated and other companies represented by or associated with H. Hodge have conducted exploration programs at Pickle Lake, Opapimiskan Lake, Bancroft, and Liebert Lakes on

known and newly discovered prospects. Other companies, recognizing the potential for gold in iron formation of the Uchi and North Caribou Lake Belts, have acquired properties in this region. Staking is currently in progress in the North Caribou Lake Belt.

Other areas have shared in the increased activity. The western extension of the Pickle Lake "greenstone" belt around the Obaskaka Pluton has had new exploration for gold, stimulated in part by Ontario Geological Survey mapping of the area. The Fry Lake-Bamaji Lake area to the south has been explored periodically

from the mid 1960s. Gold-quartz veins are associated here with contacts of intrusive bodies and linear shear zones.

The Sturgeon Lake-Savant Lake area is awaiting developments on the properties of Steep Rock Iron Mines Limited in the King Bay sector of Sturgeon Lake. Hudson Bay Exploration and Development Company Limited dropped its option held on the King Bay Properties after disappointing drill results. A number of other properties were explored; Moran Resources Corporation stated their intention to drill the McEdward Lake Property, Falcon-

TABLE 2 SUMMARY OF CLAIMS RECORDED AND ASSESSMENT WORK CREDIT

* Corrected figures of 1983 (additional work not shown is included in the Total Man Days)

** 1984 figures up to and including November (additional work not shown is included in the Total Man Days)

Year	Claims Recorded	Claims Cancelled	Claims Active	Diamond Drilling (Man Days)	Geophysical Surveys (Man Days)	Geological Surveys (Man Days)	Total Man Days
1974	1,011	3,223	5,659	38,049.0	6,255	102	44,406
1975	1,019	2,489	3,903	38,492.7	18,953	1,858	59,303.7
1976	1,185	1,120	3,958	27,111.0	11,555	185	38,851
1977	1,261	1,320	3,760	17,880.1	13,931	946	32,757.1
1978	2,018	765	5,094	33,371.3	57,501	600	91,472.3
1979	1,012	1,061	5,045	30,869	27,605.4	1,949	60,423.4
1980	3,485	1,391	7,068	42,633	13,524	10,800	66,957
1981	2,861	1,582	8,303	42,588	232,184	4,866	287,626
1982	842	1,766	7,737	35,329	73,486	13,980	167,289
1983*	4,398	1,164	10,971	69,568.8	85,536.5	23,738	197,223.1
1984**	4,936	3,695	12,212	40,589.4	113,190	24,941.1	197,301.3

bridge Limited have optioned the St. Anthony Mine from Aubet Resources Incorporated. Several new gold prospects have been reported in new areas and older properties have been re-examined.

The Richelieu Property on Northeast Bay of Sturgeon Lake has been optioned by a new group who conducted a trenching and bulk sampling program just before freeze-up.

The exploration effort in the Minnitaki Lake area has centred on properties near the Goldlund Mine. Camreco Incorporated completed a major drilling program on its property adjoining the Goldlund Mine. Preliminary drill results are encouraging and the drill-inferred tonnage is expected to increase.

Tarbush Lode Mining Limited conducted a mapping and stripping program on their property, adjoining the Camreco Property, exploring extensions of the Goldlund zone. Results have not been reported.

RECOMMENDATIONS FOR EXPLORATION

BASE METALS

Those areas having potential for the "Sturgeon Lake-type" zinc-silver deposits are recommended. The area of felsic volcanic rocks to the south of Savant Lake hosts small lensoidal zinc deposits in highly altered felsic and intermediate volcanic rocks. Small tonnages of lean-to-moderate grade ore have been drilled but are not economic at this time. Several of these deposits appear to be tectonically severed from their feeders. An examination of the structural and folding relationships of these known deposits, along with tracing of alteration patterns might lead to other drill targets. The geological approach is emphasized here since these areas typically give poor geophysical targets.

GOLD

The authors believe that most gold prospects which outcrop south of Latitude 52°N have been discovered and that any reasonable expectation of success will require a geophysical program. Thus, areas of folded, altered iron formation

with which gold may be associated, are recommended for grass roots exploration.

Recently, the Japanese Government has compiled a list of minerals and metals which they expect will be needed for the year 2000. The metals which have the greatest growth potential are those used in the high-tech, largely electronic industries. Among these minerals are beryllium, gallium, lithium and the rare earth metals. All of these metals are found in predominantly lithophile associations, i.e. they are associated with granitoid rocks. The English River Gneiss Belt in Northwestern Ontario has not been sufficiently studied to allow any assessment of its potential. Companies should consider these metals since it appears they have the greatest potential for growth in the foreseeable future. While the tonnage projections for these metals cannot begin to compare with base metals, they command a high price and are used in applications where raw material cost is not crucial.

TABLE 3

ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.

PATRICIA MINING DIVISION

Symbols and Abbreviations

Au-gold	sp-sphalerite	Assess-assessment data	BM-base metals	Mech-mechanical work
Ag-silver	mag-magnetite	IP -induced polarization	PR-prospectus	Ch.Samp.-channel samp-
Cu-copper	hem-hemitite	Mag-magnetic survey	m-meters	ling
Fe-iron	gn-galena	AM-airborne magnetic survey	VLF-very low frequency	cr -cross reference
Pb-lead	cp-chalcopyrite	EM-electromagnetic survey	A-assays	Tr-trenching
Zn-zinc	Tr-trenching	AEM-airborne electromagnetic survey	Geoch-geochemical Survey	WR-work report
s -sulphides	5-DD-486'	VLEM-vertical loop electromagnetic survey	R-radiometric Survey	
py-pyrite	(5 diamond drill	HLEM- horizontal loop electromagnetic survey	O.Dr.-overburden drilling	
po-pyrrhotite	holes, 486 feet	GL-geological survey	Str -stripping	
mo-molybdenite	total depth)	Geoph-geophysical survey	PR-property report	

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number	
Armit Lake	52 J/07 NW	Stargazer Resources Limited	Au	Assess.	mag, EM, IP, A, GL, Geoch	1983	2.4558	17 cr 52J/7 SW (24)	
Beckington Lake	52 J/02 NE	Candore Explorations Limited	Zn,Cu,Pb, Au	Assess.	GL	1920		60	
		Pollock, John A.	Au	Assess.	4-DD-4225'	1984		61	
		Umex Inc.	Au,Ag,Cu, Zn,po	Assess.	GL, Geoch	1983		62	
		Umex Inc.	Au,Ag,Cu, Zn,po	Assess.	mag	1983	2.6200	63	
		Umex Inc.	Au,Ag,Cu, Zn,po	Assess.	EM	1983	2.6201	64	
		Umex Inc.	Au,Ag,Cu, Zn,po	Assess.	Geoch, A	1983	2.6311	65	
		Mid-North Engineering Services Limited	Au	Assess.	R	1983	2.6436	66	
Caley Lake	52 0/07 SE	Pollock, John A.		Assess.	mag, EM	1984	2.7100	Toronto	
		493217 Ontario Ltd.		Assess.	mag, VLF-EM	1982		16 cr 520/8 SW (13)	
Conant Township	52 J/07 SE	Moss Resources Ltd.	Au	Assess.	IP, EM, mag	1983	2.6405	17	
		Teck Corporation	Au	Assess.	5-DD-1573.0'	1984		95	
		Teck Corporation	Au	Assess.	mag, EM	1983		96	
		Umex Inc.	Au	Assess.	EM	1984	2.6745	97	
		Umex Inc.	Au	Assess.	GL, Geoch	1984	2.6318	98	
Dona Lake	52 0/08 SE	Teck Corporation	Au	Assess.	mag, EM	1984	2.7052	99	
		493217 Ontario Ltd.	Au	Assess.	mag, VLF-EM	1982		13	
		Drayton Township	52 J/04 SW	Nahanni Mines Ltd.	Au	Assess.	2-DD-798'	1984	19
		Kerr Addison Ltd.	Au	Assess.	mag, EM, Geoch	1983	2.5733	Toronto	
Duffell Lake	52 0/02 NW	Nahanni Mines Ltd.	Au	Assess.	mag, EM	1983	2.6093		
		502095 Ontario Ltd. (Melrose Resources Limited)	Au	Assess.	mag, EM	1984	2.7211		
		Amoco Canada Petroleum Ltd.	Au,Cu,Zn, Pb	Assess.	7-DD-2400'	1984		12	
		Amoco Canada Petroleum Ltd.	Au,Cu,Zn, Pb	Assess.	O.Dr., A	1984	2.6642	13	
Echo Township	52 F/16 NW	Amoco Canada Petroleum Ltd.	Au,Cu,Zn, Pb	Assess.	A	1984	2.6643	14	
		Noranda Exploration Company Ltd.		Assess.	mag, EM	1984	2.7015	Toronto	
		Noranda Exploration Company Ltd.	Au	Assess.	GL	1984	2.7019	Toronto	
		Noranda Exploration Company Ltd.	Au	Assess.	GL	1984	2.7020	Toronto	
		Amoco Canada Petroleum Co. Ltd.	Au	Assess.	A	1984	2.6644	Toronto	
Wilkinson, D.	Au	Assess.	WR, Str, Tr	1984		29-A1*			

*Assessment Files that are available in microfiche

TABLE 3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Echo Township	52 F/16 NW	Tarbush Lode Mining Company Ltd.	Au	Assess.	EM, Geoch	1983	2.5830	30
		Wilkinson, D.	Au,Ag,Cu, Zn,Pb	Assess.	A	1983	2.6388	31
		Goldlund Mines Ltd.	Au	Assess.	O.Dr.	1981	1.6739	32
Evans Lake	52 J/07 SE	Umex Inc.	31 major & minor elements	Assess.	Geoch	1984	2.7134	Toronto cr 52 J/7SW
Fourbay Lake	52 J/02 SW	Loydex Resources Inc.	Au	Assess.	mag, EM	1983	2.6003	65
		Loydex Resources Inc.	Au	Assess.	Tr	1983		66
		Narex Ore Search Consultants Inc.	Au	Assess.	AEM	1984	2.6114	67
		Steep Rock Resources Ltd.	Au	Assess.	2-DD-1180.4'	1983		68
		Steep Rock Resources Ltd.	Au	Assess.	2-DD-328'	1983		69
		Steep Rock Resources Ltd.	Au	Assess.	27-DD-2989.8'	1983		70
		Steep Rock Resources Ltd.	Au	Assess.	mag, VLF-EM	1983	2.6160	71
		Wasabi Resources Ltd. and Central Crude Ltd.	Au	Assess.	VLF-EM, mag, GL	1983	2.6351	72
		Kuryliw, C.	Au	Assess.	VLF-EM, mag	1984	2.6377	73
		Loydex Resources Inc.	Au	Assess.	VLF-EM, mag	1983	2.6232	74
		Loydex Resources Inc.	Au	Assess.	GL, Geoch, Tr	1983	2.6075	75
		Steep Rock Resources Ltd.	Au	Assess.	VLF-EM, mag	1983	2.5754	76
		Loydex Resources Ltd.	Au	Assess.	VLF-EM	1984	2.6529	77
		King, James L.	Au	Assess.	mag, EM	1983	2.6115	Toronto
Fry Lake	52 0/03 NW	McCannell, James D.	Au	Assess.	4-DD-483'	1984		24
		McCannell, James D.	Au	Assess.	GL, mag, EM	1984	2.6919	25
		McCannell, James D.	Au	Assess.	4-DD	1984		26
Grebe Lake and McCubbin Township	52 J/07 NE	Raylloyd Resources Ltd.	Au	Assess.	11-DD-3740'	1983		50
		Raylloyd Resources Ltd, Ram Petroleum Ltd, Ramsay, R. G.	Au	Assess.	11-DD-5695'	1983		51
Houghton Lake	52 J/07 SW	Stargazer Resources	Au	Assess.	mag, EM, IP, A, GL, Geoch	1983	2.4558	24 cr 52J/7NW (17)
		Umex Inc.	Cu,Zn,Pb	Assess.	GL, Geoch	1982	2.5628	25
		Umex Inc.	31 major & minor elements	Assess.	Geoch	1984	2.7134	Toronto
Jutten Township	52 J/08 NW	Ramsay, Raymond G.	Au	Assess.	7-DD-2099.0'	1984		31
		Moede, Roland	Au	Assess.	2-DD-205'	1984		32
		Donner, John	Au	Assess.	7-DD-1966'	1972		33
Kabik Lake and Pickerel Township	52 F/16 NE	Tarbush Lode Mining Co. Ltd.	Au	Assess.	EM, Geoph	1983		39
		Tarbush Lode Mining Co. Ltd.	Au	Assess.	EM	1983		0036-B1*

*Assessment files that are available in microfiche

TABLE 3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Kawashe Lake	52 0/06 SE	St. Joe Canada Inc.	Au	Assess.	mag	1984	2.7053	18
Lomond Township	52 K/01 SW	Nahanni Mines Ltd.	Au	Assess.	mag, EM	1984	2.6093	37 cr 52J/4SW (21)
McAree Township	52 F/16 NW	Tarbush Lode Mining Co. Ltd.	Au	Assess.	EM, Geoch	1983	2.5830	30
		Sulpetro Minerals Ltd.	Au,Cu,Zn, Pb	Assess.	EM	1984	1.6393	33
McFie Township	52 F/16 SW	Bernier, K.	Au	Assess.	EM, GL	1983		0033-A1*
		Bernier, K.	Au	Assess.	EM	1984		34
		Sulpetro Minerals Ltd.	Au	Assess.	GL	1984		35
		Sulpetro Minerals Ltd.	Au	Assess.	1-DD-85.65m	1984		36
McIlraith Township	52 K/01 SW	BP Resources	Au	Assess.	1-DD-404'	1984		36
Neawagank Lake	53 A/05 NW	Van Horne Gold Exploration Inc.	Au	Assess.	6-DD-1971'	1984		20
		493217 Ontario Ltd. (Jack Hodge)	Au	Assess.	VLF, mag, IP	1984	2.6678	21
		Canadian Nickel Company Ltd.	Au	Assess.	6-DD-2564.96'	1984		19
North Caribou Lake (Northeast Part)	53 B/15 SE	Eldorado Nuclear Ltd.	Au	Assess.	Geoph, GL, Geoch	1984		16
Parnes Lake	52 G/13 NW	Sulpetro Minerals Ltd.	Au,Cu,Zn, Pb	Assess.	GL	1984		30
		Sulpetro Minerals Ltd.	Au,Cu,Zn, Pb	Assess.	2-DD-340'	1984		31
		Loydex Resources Inc.	Au	Assess.	mag, EM	1983	2.5717	32
		Sulpetro Minerals Ltd.	Au	Assess.	EM	1984	2.6392	33
Penassi Lake	52 G/14 NE	Corporation Falcon-bridge Copper	Cu,Zn,Pb	Assess.	mag, EM	1984	2.5603	69
		Petromet Resources Ltd.	Au,Cu,Zn Pb	Assess.	PR, GL, EM	1983	2.6324	70
Poisson Township	52 J/08 NW	Ramsay, Raymond G., and Ram Petroleum Ltd.	Au	Assess.	VLF-EM, GL, PR	1982	2.5788	Toronto
		Ramsay, Raymond G., and Ram Petroleum Ltd.	Au	Assess.	GL	1984	2.6300	35
		Norontex Exploration (R. Van Enk)	Au	Assess.	PR, A	1984	2.7173	Toronto
Quest Lake	52 G/15 NE	Corporation Falcon-bridge Copper	Cu,Zn,Pb	Assess.	4-DD	1983		27
		Copconda-York Resources Inc.	Cu,Zn,Pb, Au	Assess.	mag, EM	1983	2.6496	28
		Copconda-York Resources Inc.	Au,As	Assess.	A	1983	2.6578	Toronto
Sharron Lake	52 J/04 NE	Petrunka, D. F.	Au	Assess.	EM	1983	2.6214	21
Sixmile Lake	52 G/15 NW	Canadex Playfair Joint Venture	Au	Assess.	Str	1983		119
		Cunningham, L. J.	Au	Assess.	Mech	1984		118
		Redden, J. W.	Au	Assess.	PR, mag	1984	2.6907	120
		Canadex Resources, Playfair Resources, Santa Maria Resources, Swansea Gold Mines Inc.	Au	Assess.	PR	1984	2.6574	121
		Narex Ore Search Consultants Ltd.	Au	Assess.	AEM, mag	1983	2.6114	122 cr 52J/2 SW (67)
Squaw Lake	52 J/02 SE	Pollock, John A.	Au	Assess.	mag, EM	1983	2.5677	59
		Copconda-York Resources Inc.	Au	Assess.	1-DD-200'	1984		60

*Assessment Files that are available in microfiche

TABLE 3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Squaw Lake	52 J/02 SE	Steep Rock Resources Inc.	Au	Assess.	mag, EM	1984	2.7274	61
		Umex Inc.	Au, Zn, Cu, Pb	Assess.	mag, EM	1982	2.5637	62
		Moran Resources	Au	Assess.	1-DD-335.6'	1984		63
		Moran Resources	Au	Assess.	Str	1984		64
		Steep Rock Resources Inc. (S. Johnson)	Au	Assess.	mag, EM	1983	2.6020	65
		Kuryliw, C.	Au	Assess.	GL	1983/4	2.6378	66
		Hawkins, Stanley C.	Au	Assess.	mag, EM, Ch.Samp.	1983/4	2.6459	67
		Kuryliw, C.	Au	Assess.	mag, EM	1984	2.6473	68
		Copconda-York Resources Limited	Au	Assess.	mag, EM	1983	2.6493	69
		Tough, Sherman	Au	Assess.	mag, EM	1984	2.6641	70
		Pominex Limited	Au	Assess.	mag, EM	1984	2.664	71
		Noble Peak Resources Ltd.	Au	Assess.	Geoch	1983	2.7127	72
		Moran Resources	Au	Assess.	AEM, mag, GL, Geoch	1981/2	63.4182	73 cr 52 J/2SW (78)
		Steep Rock Resources Inc.	Au	Assess.	mag, EM	1983	2.7274	74
		Pollock, J. A.		Assess.	mag, EM	1984	2.7100	Toronto
Schiralli, R. A.	Au, s	Assess.	AEM, VLF-EM, mag	1984	2.7231	Toronto		
Tarp Lake	52 0/09 SE	Marietta Resources	Au	Assess.	Tr, Str	1984		40
		Van Horne Gold Exploration Inc.	Au	Assess.	mag, EM	1983	2.6243	41
Valora Lake	52 G/14 SE	Seagull Resources	Zn, Cu, Pb, Au	Assess.	14-DD-11,555'	1984	2.6226	100
		Norminex Limited	Au	Assess.	GL, Geoch, EM	1984	2.6402	101
Whipper Lake	52 K/1 SW	Nahanni Mines Ltd.	Au	Assess.	mag, EM	1983	2.6093	Toronto
		Nahanni Mines Ltd.	Au	Assess.	1-DD-349'	1983		34
		Nahanni Mines Ltd.	Au	Assess.	1-DD-353'	1983		35
		BP Resources	Au	Assess.	1-DD-404'	1984		36
Zeemel Lake	53 B/9 SW	493217 Ontario Ltd.	Au	Assess.	mag, EM	1984	2.6625	26
		Best, A.P. Armstrong, G. Labelle, M. J.	Au	Assess.	mag, EM	1984	2.6901	27
		493217 Ontario Ltd.	Au	Assess.	mag, EM	1984	1.6791	Toronto

TABLE 4. ONTARIO MINERAL EXPLORATION PROGRAMS, PATRICIA MINING DIVISION

Company Name	Area	Estimated Eligible Expenses
Legion R.	Zeemel L.	\$ 22,500
Noble Peak R.	Squaw L.	97,000
Cindy-Mae R.	Tarp L.	266,424
Anderson, Joseph S.	Squaw L. & Quest L.	20,000
Cline Development	Valora L.	44,500
Jalna R.	Six Mile L. & Quest L.	294,782
581356 Ontario L.	Forrester L.	40,000
Hudson Bay Ex. & Development C.L.	Fourbay L. & Squaw L.	165,000
Eden Roc Minerals	Caley L.	85,375
Northern Dynasty	Duffell L.	25,000
Tarbush Lode M.C.	McAree, Echo & Pickerel Twp.	147,375
Lynx Canada Ex. L.	Savant L.	28,665
Kennco Ex. L.	Ochig L.	100,000
Kuryliw, C.J.	Fourbay L.	80,000
Wasabi R.	Fourbay L.	16,750
Sherritt Gordon M.L.	Fry L.	85,750
Moss R.	Dona L.	480,000
Moran R.	Squaw L.	32,000
Cumberland R.	Evans L.	36,600
Armstrong, George	Zeemel L.	241,000
Bresea R.	Squaw L.	147,063
Savant Ex. L.	Poisson Twp.	57,000
559534 Ontario L.	Zeemel L.	18,975

RECENT PUBLICATIONS AND REFERENCES

Blackburn, C.E.
1973-1978: Kenora-Fort Frances Geological Compilation Series; Ontario Geological Survey, Map 2443, scale 1:253 440. Revision of Map 2115.
1984: The Explore Report, Report of all physical work and surveys performed in Ontario in 1983 based on reports received as of June 30, 1984 to July 12, 1984, Mineral Statistics Section, Ministry of Natural Resources.
Breaks, F.W., and Kuehner, S.
1984: Precambrian Geology of the Eagle River-Ghost Lake Area, Kenora District; Ontario Geological Survey, Map P.2623, Geological Series-Preliminary Map, scale 1:31 680 or 1 inch

to 1/2 mile. Geology 1980, 1983.
Campbell, I.H., Leshner, C.M., Coad, P., Franklin, J.M., Goodwin, A.M., Gorton, M.P., Hart, T.R., Scott, S.S., Sowa, J.M., and Thurston, P.C.
1984: Ontario Geoscience Research Grant Program, Grant No. 80-Rare Earth Elements in Felsic Volcanic Rocks Associated with Cu-Zn Massive Sulphide Mineralization, Ontario Geological Survey, Open File Report 5485, 35p.
Colvine, A.C., Andrews, J.J., Cherry, M.E., Durocher, M.E., Fyon, A.J., Lavigne, M.J. Jr., MacDonald, A.J., Marmont, Soussan, Poulsen, K.H., Springer, J.S., and Troop, D.G.
1984: An Integrated Model for the Origin of Archean Lode Gold Deposits, Ontario Geological

Survey, Open File Report 5524, 98p.

Les Consultants Sogir Inc.

1984: Market Study for Stone in Northwestern Ontario, Ontario Geological Survey, Open File Report 5493, 186p.

Ontario Geological Survey

1983: Uranium and Thorium Deposits of Northern Ontario, Mineral Deposits Circular 25.

Page, R.O.

1984: Geology of the Lateral Lake Area, District of Kenora, Ontario Geological Survey, Open File Report 5518, 175p.

Proctor Redfern Group

1984: Peat and Peatland Evaluation of the Ignace Area, Volume 1 to VI, Ontario Geological Survey, Open File Report 5487, 209p.

Sage, R.P.

1983: Geology of the Big Beaver House Carbonatite Complex, Ontario Geological Survey, Open File Report 5397, 117p.

1983: Geology of the Schryburt Lake Carbonatite Complex, Ontario Geological Survey, Open File Report 5413, 84p.

1983: Literature Review of Alkaline Rocks -Carbonatites, Ontario Geological Survey, Open File Report 5436, 277p.

1983: Geology of the Sturgeon Narrows and Squaw Lake Alkaline Rock Complexes, Ontario Geological Survey, Open File Report 5417, 168p.

Stevanato, R.J., and Vos, M.A.

1984: The Application of Lake Sediment Geochemistry to Exploration for Lithium Pegmatites in Northern Canada, Ontario Geological Survey, Open File Report 5500, 66p.

Storey, C.C.

1984: Preliminary Report of the Building and Ornamental Stone Inventory, Part 2, Kenora and Rainy River Districts, Ontario Geological Survey, Open File Report 5522, 127p.

Thunder Bay Resident Geologist Area, North Central Region

G.C. Patterson¹, J.K. Mason², and B.R. Schnieders²

¹Resident Geologist, ²Resource Geologist, Ontario Ministry of Natural Resources, Thunder Bay

INTRODUCTION

Current permanent staff in the Thunder Bay Office include: K.G. Fenwick, Regional Mineral Resources Co-ordinator; G.C. Patterson, Resident Geologist; J.F. Scott, Resource Geologist; and A.R. Downton, Secretary. The remainder of the staff held contract positions. F.J. Kristjansson, Quaternary Geologist, with assistance from C.M. Hine, Resource Geologist, were responsible for geological input to land use concerns (such as forest management agreements and municipal planning) and aggregate mapping. The Beardmore - Geraldton Economic Geologist Program was supervised by J.K. Mason, Resource Geologist, with assistance from G.D. White, Resource Geologist. B.R. Schnieders, Resource Geologist, with assistance from A.A. Speed, Resource Geologist, ran the Economic Geologist Program in the Schreiber-Terrace Bay area. M.C. Kennedy, Resource Geologist, with assistance from P. Gertzbein, Resource Geologist, started a Building Stone Inventory for the North Central Region. A.D. MacTavish and R.J.A. Dutka, Resource Geologists, started a Cobalt-Base Metal-Platinum Group Elements Study in the Atikokan area. P. Perry, Resource Geologist, prepared Geological Data Inventory Folios and carried out an audit of the assessment files. T. Twomey, Resource Geologist, led field trips to the Hemlo area and prepared Geological Data Inventory Folios. S. Koski and L. Strasser provided clerical assistance. J. Seguin, Senior Assistant, aided J.F. Scott in mapping MacGregor Township. M.C. Kennedy and A.D. MacTavish, Resource Geologists, supervised a Mining Sector Work Program staffed by T. Twomey, R.J.A. Dutka, J. Schnessl, P.M. Gertzbein, E. Sidey, T. Eden, and M. Fedoroniuk. R. Larsen was contracted to give lectures to the Junior Forest Rangers. E. Johnson, and L. Aune, Experience '84 students, assisted with office work, and C. Butella, Resource Geologist, was hired part-time for drafting.

ACKNOWLEDGMENTS

The section in this report on Quaternary Geology was written by F.J. Kristjansson. The description of the Schreiber-Terrace Bay Economic Geologist Program was written by B.R. Schnieders with assistance from A.A. Speed. J.K. Mason, with help from G.D. White, wrote the section on the Beardmore-Geraldton Economic Geologist Program. The report on the Cobalt-Base Metal-Platinum Group Element Study in the Atikokan area was written by A.D. MacTavish and R. Dutka. M.C. Kennedy and P. Gertzbein contributed the section on building stone in the North Central Region. Technical support was provided by S. Koski, P. Perry, T. Twomey, and A.R. Downton.

RESIDENT GEOLOGIST STAFF ACTIVITIES

Much of the Resident Geologist staff's time was spent in consultation with prospectors and with geologists from exploration and mining companies (an average of 12 consultations a day). Other activities included field trips, tours, and numerous property visits.

The Hemlo area remained the most active in the North Central Region. The Resident Geologist gave a total of 14 talks on the Hemlo deposit to various groups and organizations, including The Canadian Institute of Mining and Metallurgy, Saskatoon, and The Geological Association of Canada, Vancouver. Sixteen field trips, for a combined total of approximately 300 people, were given to the area. Technical advice was given to the Hemlo Co-ordinating Committee and other related groups concerned with Hemlo development. In addition, approximately 4 weeks were spent in the area carrying out field research. A Field Trip Guide to the Hemlo area was published (Patterson 1984).

A number of other tours and information sessions were conducted for mining companies and government personnel. J.K. Mason

gave 4 tours in the Beardmore-Geraldton area. A Field Trip Guide of this area is in preparation. B.R. Schnieders led 4 tours in the Schreiber-Terrace Bay area, and J.F. Scott took 2 groups to the Schreiber Channel fossil site. The office staff gave a series of talks, in 6 locations throughout the district, on exploration techniques and local mineral potential. Four poster displays were given at the Ontario Geological Survey's Geoscience Research Seminar, Toronto, on the Beardmore-Geraldton area, the Schreiber-Terrace Bay area, the Cobalt-Base Metal-Platinum Group Element Study in Atikokan, and Building Stone in the North Central Region. Eight poster displays were exhibited and 4 talks were given at the Joint Ontario Geological Survey-Lakehead University Seminar in Thunder Bay.

A study of the amethyst industry in the region was initiated. A total of 36 properties were examined by the Resident Geologist and an Open File Report on amethyst occurrences in the Thunder Bay area is being prepared.

K.G. Fenwick carried out field examinations of hazard land locations throughout the region, as well as compiling historical data on mining in the area.

J.F. Scott, with assistance from J. Seguin, started a mapping project in the western portion of MacGregor Township.

The office staff (particularly F.J. Kristjansson) continued to be involved in land use planning, mining exploration in candidate parks, forest management agreements, environmental issues, and road and proposed transmission line placements. A number of townships were given assistance in assessing aggregate potential. Several public meetings concerning aggregate assessment were attended.

Two Mining Sector Work Programs were organized and supervised through this office. Four people continued a hazard land survey of the North Central Region. Three people prepared geology displays

for Neys, Kakabeka Falls, and Schreiber Channel Provincial Parks.

MINING ACTIVITIES

METALLIC MINERALS

The 2 major metal producers in the North Central Region are the Noranda Incorporated (Geco Division) copper-zinc-silver mine at Manitouwadge (7) and the Inco Limited nickel-copper mine at Shebandowan (5) (Figure 2). The Geco Mine milled 1 375 000 tons of ore in 1983 producing 20 190 tons of copper, 40 810 tons zinc, 540 tons of lead, and 1 344 000 ounces of silver (Canadian Mines Handbook 1984-85). The Shebandowan Mine has been in continuous production for all of 1984.

The Teck Corporation GO-MILL (formerly the Pancontinental Mining (Canada) Limited custom mill) in Beardmore was converted to a cyanide gold mill during 1984. A total of 24 000 tons grading 0.11 ounce gold per ton of dump material from the Leitch Mine was processed (R. Dunning, Project Superintendent, Teck Corporation (Leitch Division), Beardmore, personal communication, 1984).

The Northern Concentrators Limited's custom mill in Thunder Bay processed 327 tons of ore from the No. 2 zone on the Crooked Green Creek Property (8) in Pifher Township, as well as 40 tons of custom orders from Ontario and Quebec (B. Doucet, Mill Manager, Northern Concentrators Limited, Thunder Bay, personal communication, 1984).

Mining Corporation of Canada Limited has been running a recovery operation at the Consolidated Louanna Gold Mines Limited property at O'Sullivan Lake. A total of 70 000 tons of ore was milled at 0.22 ounce gold per ton (C. Pasikey, Geologist, Cumo Resources Limited, Vancouver, personal communication, 1984).

Three mines are under development in the Hemlo area by Noranda Incorporated, Teck Corporation, and Lac Minerals Limited. Corporation Falconbridge Copper has commenced sinking a shaft on its Winston Lake zinc-copper-silver property northwest of Schreiber.

Q.C. Explorations Limited set up a porta-mill in Thunder Bay to process dredged dump material from the former Silver Islet Mine. Plans are being made to process a bulk sample from the Thorco Property near Onaman Lake (T. Gledhill, President, Q.C. Explorations Limited, Toronto, personal communication, 1984).

INDUSTRIAL MINERALS

Most of the amethyst production came from operations in McTavish Township, northeast of Thunder Bay. These include the deposits of Gunnard Noyes (4), the Ontario Gem Company (9), J. Barrett Mine (1), the Dorion Amethyst Mine (3), and the Thunder Bay Amethyst Panorama (10). Limited production came from the Little Bear Quarry (6) northeast of Nipigon.

During 1984 Tri-Ven Minerals Corporation has continued plans for the marketing of marl from its Shillabeer Lake Property, 80 km northeast of Thunder Bay. ROK Engineering Limited is operating a granite quarry 3 km north of Highway 17, just to the east of Highway 614. The material is being used as aggregate.

CLAIM STAKING AND EXPLORATION ACTIVITY

The total number of claims staked in the North Central Region was 7978 (to November 30, 1984) which represents a decrease over the number of claims staked in 1983. However, the total number of active claims as of November 30, 1981, rose to 34 560 (Table 3). This represents a record for the North Central Region.

A more accurate representation of the exploration activity is

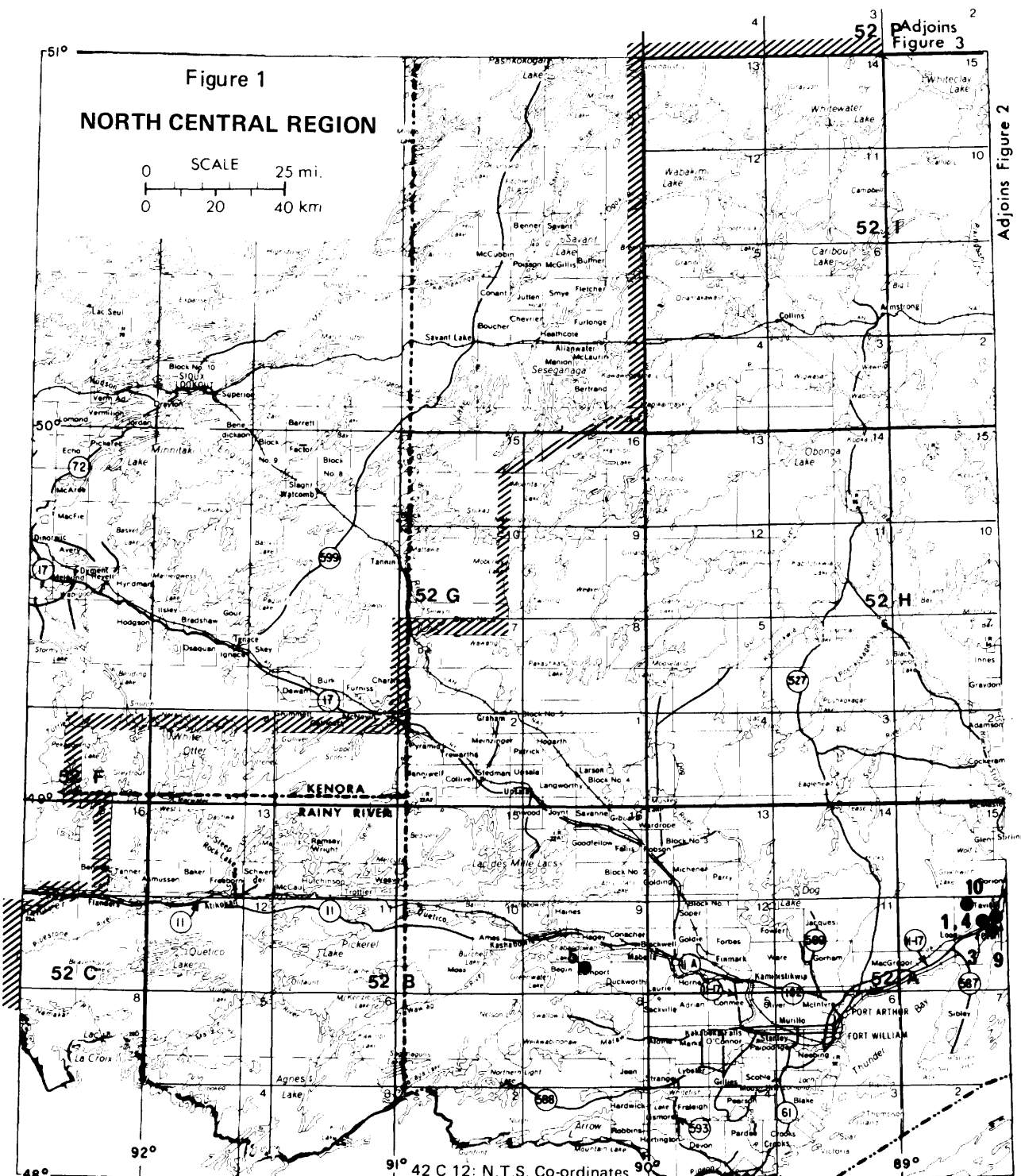
the number of man days of assessment work filed (Tables 1 and 3). Work filed in 1983 and 1984 approximately equals the cumulative amount of work filed in the previous 20 years.

HEMLO AREA

INTRODUCTION

Currently 3 companies, Noranda Incorporated, Teck Corporation, and Lac Minerals Limited, are developing mines on a single large deposit with a reported tonnage of 76 367 679 tons at 0.24 ounce gold per ton (The Globe and Mail, December 20, 1983; The Globe and Mail, December 14, 1983; The Northern Miner, October 13, 1983). The Noranda Incorporated shaft has been sunk to 540 m and the mill will start processing ore early in 1985 (The Northern Miner, November 15, 1984). The Teck Corporation shaft is at 457 m and production is planned for 1985 (The Northern Miner, October 11, 1984). Lac Minerals Limited is sinking 2 shafts and a decline. A small open pit is also planned east of Moose Lake. The Lac Minerals Limited's mill is currently being constructed and production is planned for 1986.

Exploration activity within the Hemlo area, from Marathon to White River, has remained very high. Most companies have filed sufficient assessment work to hold the ground for a number of years. Geological Data Inventory Folios (GDIFs) are being prepared for the area. The general geology of the main deposit has been summarized in a Field Trip Guidebook to the Hemlo area, Ontario Geological Survey, Miscellaneous Paper 118, 1984. For convenience the exploration programs have been divided into 5 categories, based on similarities in styles of mineralization and geology. These 5 divisions are: North Rim Properties, Pic River Properties, Barite Occurrences, Heron Bay Gold Mines Property, and the Golden Sceptre North Zone.



- Producing Mines
- 1. Jim Barrett Mine Amethyst
- 2. Consolidated Louanna Gold Mines Limited, Au
- 3. Dorion Amethyst Mine Amethyst
- 4. Gunnard Noyes-Diamond Willow Mine Amethyst
- 5. Inco Metals Limited Cu, Ni, PGM, Co
- Shebandowan Mine
- 6. Little Bear Quarry Amethyst
- 7. Noranda Mines Limited Cu, Zn, Ag
- Geco Division,
- 8. Northern Concentrators, Au, Cu
- (Crooked Green Creek Mine)
- 9. Ontario Gem Company Amethyst
- 10. Thunder Bay Amethyst Panorama Amethyst

- Mines and/or Properties Under Development
- 1. Roxmark Mines Limited-Sherritt-Gordon Mines Au
- Limited Magnet Mine
- 2. Teck Corporation Au
- Leitch Division
- 3. Corporation Falconbridge Copper Zn, Cu, Ag, Au
- Winston Lake
- 4. Noranda Mines Limited Au, Mo
- Hemlo Division,
- 5. Lac Minerals Limited Au
- Williams Property
- 6. Teck Exploration Au
- Corana Property

▨ Boundary of Resident Geologist's Area

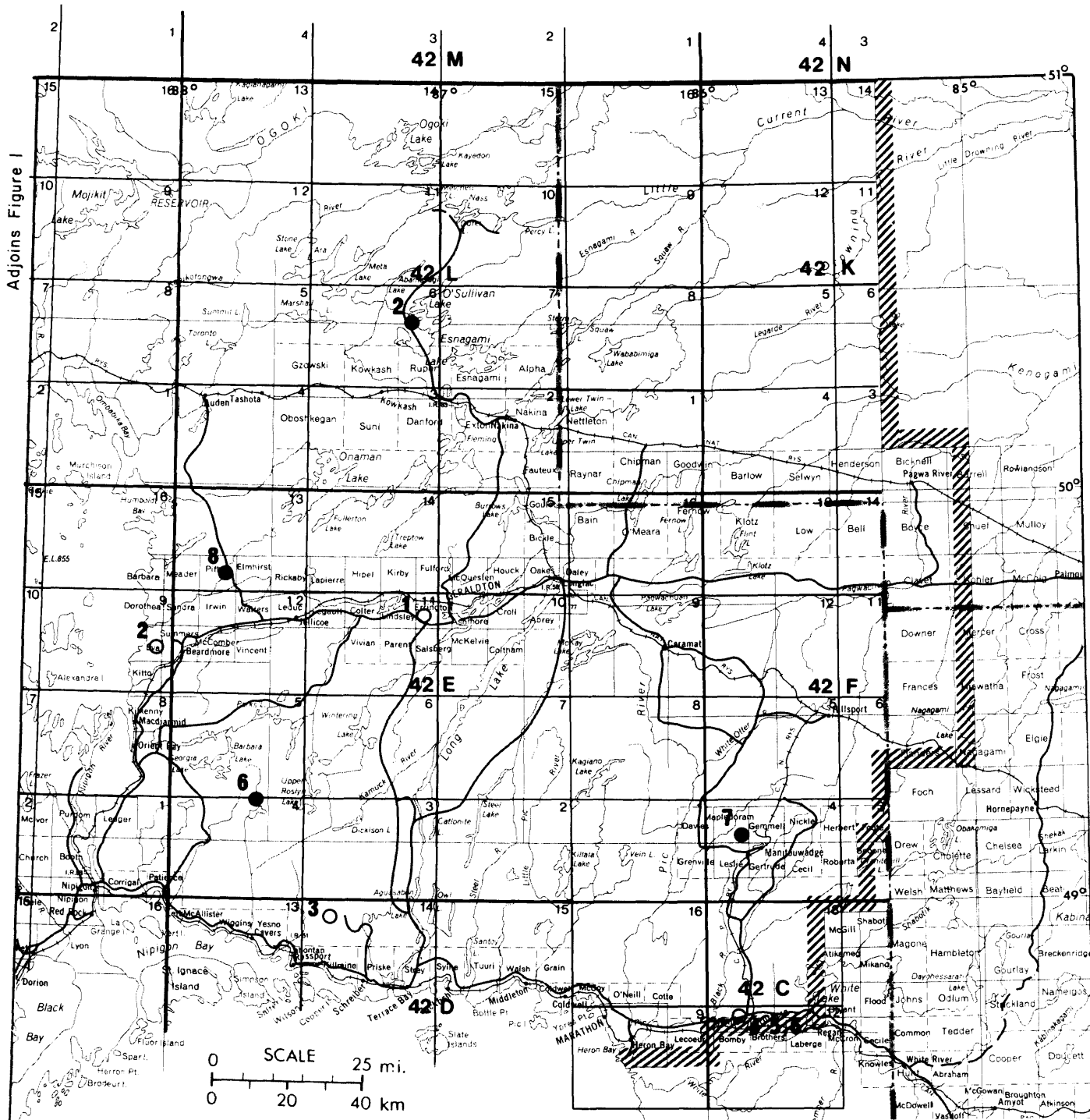


Figure 2

EXPLANATION

Producing Mines ●

- | | |
|--|-----------------|
| 1. Jim Barrett Mine | Amethyst |
| 2. Consolidated Louanna Gold Mines Limited | Au |
| 3. Dorion Amethyst Mine | Amethyst |
| 4. Gunnard Noyes-Diamond Willow Mine | Amethyst |
| 5. Inco Metals Limited Shebandowan Mine | Cu, Ni, PGM, Co |
| 6. Little Bear Quarry | Amethyst |
| 7. Noranda Mines Limited Geco Division | Cu, Zn, Ag |
| 8. Northern Concentrators (Crooked Green Creek Mine) | Au, Cu |
| 9. Ontario Gem Company | Amethyst |
| 10. Thunder Bay Amethyst Panorama | Amethyst |

Mines and/or Properties Under Development ○

- | | |
|--|----------------|
| 1. Roxmark Mines Limited-Sherritt-Gordon Mines Limited Magnet Mine | Au |
| 2. Teck Corporation Leitch Division | Au |
| 3. Corporation Falconbridge Copper Winston Lake | Zn, Cu, Ag, Au |
| 4. Noranda Mines Limited Hemlo Division | Au, Mo |
| 5. Lac Minerals Limited Williams Property | Au |
| 6. Teck Exploration Corana Property | Au |

Boundary of North Central Region

TABLE 1 ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.

<p>AEM - Airborne Electromagnetic Survey A Mag - Airborne Magnetic Survey Assay - Assay Results Assess - Assessment Non-Assess - Non-Assessment Work Data DD - Diamond Drilling (where shown, the number following "DD" indicate the number of holes drilled and the total length drilled, respectively) EM - Ground Electromagnetic Survey Geochem - Geochemical Survey GL - Geological Survey IP - Induced Polarization Survey Mag - Ground Magnetic Survey Man Work - Manual Work</p>	<p>Mech Work - Mechanical Work OVD - Overburden Drilling Rad - Radiometric Survey Res - Resistivity Survey STR - Stripping Tr - Trenching VLF - Very Low Frequency (EM-16) Survey Met - Metallurgical Testing BS - Beneficiation Studies Ag - Silver Amy - Amethyst ap - Apatite Au - Gold ba - Barite</p>	<p>Bm - Base Metals Bst - Building Stone Cu - Copper Mo - Molybdenum Nb - Niobium Ni - Nickel Pb - Lead Pt - Plantium py - Pyrite REE - Rare Earths U - Uranium Zn - Zinc Marl - Marl</p>
---	---	---

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Goldie Twp. (G658), Dawson Road Lots (G649)	52A12/SW	1. Abitibi-Price Inc.	Au	Assess	VLF, Mag	1983	2.6398	-
Strey Twp. (G633)	42D14/SE	2. Acheron Resources Ltd.	Au	Assess	GL, Geochem	1983	2.6450	-
Priske Twp. (G631), Strey Twp. (G633)	42D14/SE	3. Acker, Walter	Au	Assess	GL	1983	2.6364	-
Leduc Twp. (G169), Colter Twp. (G477), Legault Twp. (G170), Vivian Twp. (G471)	42E12/NE, 42E11/NW	4. Alclare Resources Ltd.	Au	Assess	A Mag, VLF, AEM	1983	2.6525	-
Molson Lake Area (G603)	42C12/NW	5. Americ Mines Ltd.	Au	Assess	VLF, Mag	1983	2.6211	-
Syine Twp. (G634)	42D14/SE	6a. Asarco Explor. Co. of Canada Ltd.	Au	Assess	GL	1983	2.4478	-
Priske Twp. (G631)	42D14/SE	6b. Asarco Explor. Co. of Canada Ltd.	Au	Assess	GL	1983	2.5974	-
Lower Aguasabon Lake Area (G599)	42D14/NE	7a. Aurelian Developers Ltd.	Au	Assess	AEM, VLF, A Mag	1983	2.6190	-
Rous Lake Area (G611)	42D9/NE	7b. Aurelian Developers Ltd.	Au	Assess	EM, A Mag	1983	2.5670	-
Rous Lake Area (G611)	42D9/NE	7c. Aurelian Developers Ltd.	Au	Assess	Geochem, GL, Assay	1983	2.6930	-
Rous Lake Area/Lecours Twp. (G611)	42D9/NE	8. Baden Explor. Inc.	Au	Assess	VLF, Mag	1983	2.6037	-
Lower Aguasabon Lake Area (G599)	42D14/NE	9. Barracuda Resources Ltd. (Gracey, K. A.)	Au	Assess	AEM, VLF, A Mag	1983	2.6385	-
McTavish Twp. (G675)	52A10/NE	10. Barrett, J.	Amy	Assess	Mech Work, STR	1984	-	-
Molson Lake Area (G603)	42C12/NW	11. Bel Ont Resources Ltd. (Westfield Resources)	Au	Assess	STR	1984	-	-
Paipoonge Twp. (G680)	52A6/SW	12. Belluz, B.	Ag	Assess	STR, Man Work, Mech Work	1984	-	-
Conacher Twp. (G646)	52B9/NE	13. Benderite, Adam	-	Assess	STR	1984	-	-
Norway Lake Area (G545), Richardson Lake (G553)	52G3/SW/SE	14. Billiton Canada Ltd.	Au, Bm	Assess	GL	1983	2.6326	-
Black River Area (G580), Wabikoba Lake Area (G620)	42C13/NW, 42C13/SW	15a. Boos, B., (Hibbart, N.), (Rodeo Resources Ltd.)	Au	Assess	GL, Geochem	1983	2.5912	-
Molson Lake Area (G603)	42C12/NW	15b. Boos, B., (Manwa Explor.)	Au	Assess	GL, Geochem	1983	2.5908	-
Molson Lake Area (G603)	42C12/NW	15c. Boos, B.	Au	Assess	IP	1983	2.6079	-
Molson Lake Area (G603)	42C12/NW	15d. Boos, B., (Seemar Mines Ltd.)	Au	Assess	Assay	1983	2.6670	-
Molson Lake Area (G603)	42C12/NW	15e. Boos, B., (Seemar Mines Ltd.)	Au	Assess	IP, Res	1983	2.6590	-

TABLE 1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Molson Lake Area (G603)	42C12/NW	15f. Boos, B.	Au	Assess	EM, Mag	1984	2.5609	-
Miminiska Lake Area (G332)	52P10/SE	16. BP Explor. Canada Ltd.	Au	Assess	VLF, Mag	1983	2.6530	-
Molson Lake Area (G603)	42C12/NW	17. Bridge Resources Ltd. (Orequest Consultants)	Au	Assess	IP, Res	1983	2.6810	-
Ashmore Twp. (G472)	42E10/NW	18. Bridgewest Development Corporation	Au	Assess	DD 3-304.8 m	1984	-	-
Molson Lake Area (G603)	42C12/NW	19a. Brigade Resources Inc. (Noranda Explor. Co. Ltd.)	Au	Assess	DD 1-368.0 m	1984	-	-
Molson Lake Area (G603)	42C12/NW	19b. Brigade Resources Inc. (Noranda Explor. Co. Ltd.)	Au	Assess	Mag	1983	2.6669	-
Molson Lake Area (G603)	42C12/NW	19c. Brigade Resources Inc. (Noranda Explor. Co. Ltd.)	Au	Assess	GL, IP, Assay, Geochem	1983	2.6618	-
Molson Lake Area (G603)	42C12/NW	19d. Brigade Resources Inc.	Au	Assess	DD 1-860 m	1984	-	-
Seeley Lake Area (G613)	42D16/SW	20. Brown McDade Resources Ltd.	Au	Assess	Mag, VLF	1984	2.6410	-
Lower Aguasabon Lake Area (G599)	42D14/NE	21. Bullet Energy Ltd. (Gracey, K. A.)	Au	Assess	AEM, VLF, A Mag	1983	2.6386	-
Garden Lake Area (G721)	52H12/SW	22a. Bumbu, Costy	Au	Assess	Mech Work, Tr	1984	-	-
Garden Lake Area (721)	52H12/SW	22b. Bumbu, Costy	Au	Assess	Mech Work	1984	-	-
Hay Lake Area (G728)	52G2/SE	22c. Bumbu, Costy	Au	Assess	Mech Work	1984	-	-
Metcalfe Lake Area (G84)	42L4/NE	23. Callisto Minerals Inc.	Au	Assess	Res	1984	2.7095	-
Ashmore Twp. (G472) Croll Twp. (G491)	42E10/NW	24. Cambridge Development Corporation	Au	Assess	GL	1983	2.6152	-
Pic Twp. (G630) Rous Lake Area (G611)	42D9/NE	25. Cameron, Kirk	Au	Assess	AEM, VLF, GL, A Mag	1983	2.6278	-
Freeborn Twp. (G570)	52B13/SE	26. Camflo Mines Ltd. (Fern Elizabeth Gold Explor.)	Au	Assess	Geochem	1982	2.5392	-
Wabikoba Lake Area (G620)	42C13/SW	27. Campbell, Bruce	Au	Assess	EM, Mag	1983	-	-
Santoy Lake Area (G612)	42D15/NW	28. Canadian Endeavor Mines Ltd.	Au	Assess	AEM, VLF, A Mag	1983	2.6188	-

TABLE 1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Castlebar Lake Area (G220)	42E16/SE	29a. Canadian Nickel Co. Ltd.	Au	Assess	DD 1-122.53 m	1983	-	-
Castelwood Lake Area (G22), Martin Lake Area (G79)	42E13/NE/NW	29b. Canadian Nickel Co. Ltd.	Au	Assess	VLF, Mag	1984	2.7010	-
Pyramid Lake Area (G550)	52G3/SE	29c. Canadian Nickel Co. Ltd.	Bm	Assess	EM, Mag	1983	2.5983	-
Ramsay-Wright Twp. (G573)	52E14/SW	29d. Canadian Nickel Co. Ltd.	Au	Assess	DD 4-284.36 m	1983	-	-
Walters Twp. (G171)	42E12/NE	30a. Canady, Edward (Wenzoski Property)	Au	Assess	STR	1983	-	-
Walters Twp. (G171)	42E12/NE	30b. Canady, Edward (Wenzoski Property)	Au	Assess	STR	1983	-	-
Klotz Lake Area (G295)	42F13/SW	31a. Canamax Resources Inc.	Au	Assess	DD 1-123.0 m	1984	-	-
Max Lake Area (G741)	52H3/NW	31b. Canamax Resources Inc.	Au	Assess	VLF, Mag	1983	2.6986	-
Vincent Twp. (G163)	42E12/NE	31c. Canamax Resources Inc.	Au	Assess	EM, Mag	1983	2.5886	-
Wabikoba Lake Area (G620)	42C13/SW	31d. Canamax Resources Inc.	Au	Assess	AEM, A Mag	1983	2.5833	-
Wabikoba Lake Area (G620)	42C13/SW	31e. Canamax Resources Inc.	Au	Assess	DD 4-637 m, Mech Work	1984	-	-
Rous Lake Area (G611)	42D9/NE	32. Cannon Mines Ltd.	Au	Assess	VLF, Mag	1983	2.5799	-
Tyrol Lake Area (G141)	42E13/SW	33. Carling Copper Mines	Au	Assess	Man Work, Mech Work	1983	-	-
Tyrol Lake Area/Pifher Twp. (G141), Elmhirst Twp. (G162)	42E13/SW	34. Carling Gold Resources Inc.	Au	Assess	DD 4-314.85 m, Assay	1984	2.7368	-
Seeley Lake Area (G613)	42D16/SW	35. Carlson Mines Ltd. (Laurasia Resources Ltd.)	Au	Assess	GL, Mag	1983	2.6296	-
McTavish Twp. (G675)	52A10/NE	36a. Castagne, A.	Amy	Assess	STR	1984	-	-
McTavish Twp. (G675)	52A10/NE	36b. Castagne, A.	Amy	Assess	STR	1984	-	-
Molson Lake Area (G603)	42C12/NW	37a. Caulfield Resources Ltd.	Au	Assess	Geochem	1982	2.5898	-
Molson Lake Area (G603)	42C12/NW	37b. Caulfield Resources Ltd.	Au	Assess	GL	1983	2.5873	-
Molson Lake Area (G603)	42C12/NW	37c. Caulfield Resources Ltd.	Au	Assess	IP, DD 7-1252.05 m	1983	2.5667	-
Priske Twp. (G631), Lower Aguasabon Lake Area (G599)	42D14/NE	38. Chapel Bay Explor. Inc.	Au, Bm	Assess	IP, Res	1984	2.6850	-
Lower Aguasabon Lake Area (G599)	42D14/NE	39. Charger Resources, (Gracey, K. A.)	Au	Assess	AEM, VLF, A Mag	1983	2.6382	-

TABLE 1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Wabikoba Lake Area (G620), Black River Area (580)	42C13/SW/NW	40a. Chavin of Canada Ltd., (Houston, C.), (Bumbu, M.)	Au	Assess	AEM, VLF, A Mag	1983	2.5891	-
Walsh Twp. (G636)	42D15/SE	40b. Chavin of Canada Ltd.	Au	Assess	AEM, VLF, A Mag	1983	2.5855	-
Olga Lake Area (G604), Black River Area (G580)	42C13/NE/NW	41. Clear Mines Ltd., (Amendologine, M.), (Young, S.)	Au	Assess	GL	1983	2.6095	-
Colter Twp. (G477), Lindsley Twp. (G483)	42E11/NE/NW	42a. Cominco Ltd.	Au	Assess	OVD	1983	2.5640	-
Richardson Lake Area (G553)	52G3/SE	42b. Cominco Ltd.	Au, Bm	Assess	GL, VLF, Mag, DD 1-459.33 m	1983	2.6344	-
Richardson Lake Area (G553)	52G3/SE	42c. Cominco Ltd.	Au	Assess	DD 1-459.34 m	1983	-	-
Molson Lake Area (G603)	42C12/NW	43a. Consolidated Montclerg Mines	Au	Assess	EM, Mag	1983	2.5818	-
Molson Lake Area (G603)	42C12/NW	43b. Consolidated Montclerg Mines	Au	Assess	GL, EM, Mag	1983	2.5817	-
Tuuri Twp. (G635)	42D15/SW	44. Coronet Resources Ltd., (Gracey, K. A.)	Au	Assess	AEM, VLF, A Mag	1983	2.6504	-
Lower Aguasabon Lake Area (G599), Pays Plat Lake (G606), Rope Lake Area (G609), Upper Aguasabon Lake Area (G617)	42D14/NE/NW, 43E SW/SE	45a. Corporation Falconbridge Copper	Bm, Zn, Cu	Assess	VLF, Mag	1984	2.6770	-
Pays Plat Lake Area (G606)	42D14/NW	45b. Corporation Falconbridge Copper (Winston Lake Project)	Bm, Zn, Cu	Assess	Assay, GL	1983	2.6474	-
Pays Plat Lake Area (G606)	42D14/NW	45c. Corporation Falconbridge Copper	Bm, Au	Assess	DD 2-1537.5 m	1983	-	-
Pays Plat Lake Area (G606), Rope Lake Area (G609)	42D14/NW, 42E3/SW	45d. Corporation Falconbridge Copper	Au, Bm	Assess	Geochem, GL	1979	2.5926	-
Pays Plat Lake Area (G606), Rope Lake Area (G609), Upper Aguasabon Lake Area (G617), Lower Aguasabon Lake Area (G599)	42D14/NW, 42E3/SW/SE, 42D14/NE	45e. Corporation Falconbridge Copper	Au, Bm	Assess	AEM, VLF	1982	2.6047	-
Rope Lake Area (G609), Pays Plat Lake Area (G606), Upper Aguasabon Lake Area (G617)	42E3/SW, 42D14/NW, 42E3/SE	45f. Corporation Falconbridge Copper	Au, Bm	Assess	DD 17-2952.99 m	1984	-	-

TABLE 1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Rope Lake Area (G609), Pays Plat Lake Area (G606)	42E3/SW, 42D14/NW	45g. Corporation Falconbridge Copper	Au, Bm	Assess	DD 2-671.8 m	1983	-	-
Summit Lake Area (G136)	42L5/NE	45h. Corporation Falconbridge Copper, (Marshall Lake Area)	Cu, Zn, Ag	Assess	DD 1-286.90 m	1983	-	-
Summit Lake Area (G136)	42L5/NE	45g. Corporation Falconbridge Copper, (Marshall Lake Area)	Cu, Zn, Ag	Assess	GL	1983	2.5604	-
Tyrol Lake Area/Pifher Twp. (G141)	42E13/SW	46. Cowan, S.	Au	Assess	GL	1983	2.5836	-
Walters Twp. (G171)	42E12/NE	47. Cox, Nolan, (Princess Lona Property)	Au	Assess	GL	1982	2.5848	-
McComber Twp. (G166)	42E12/SW	48a. Craskie Mines Ltd., (Hudson Bay Mining & Smelting)	Au	Assess	EM, Mag	1983	2.5539	-
Vincent Twp. (G163)	42E12/NW	48b. Craskie Mines Ltd., (Douglas, Gregory B.)	Au	Assess	EM, Mag	1983	2.5538	-
Vincent Twp. (G163)	42E12/NE	48c. Craskie Mines Ltd.	Au	Assess	Met	1983	2.6050	-
Vincent Twp. (G163)	42E12/NE	48d. Craskie Mines Ltd.	Au	Assess	Mech Work	1983	-	-
Vincent Twp. (G163)	42E12/NE	48e. Craskie Mines Ltd.	Au	Assess	Mag	1984	2.6933	-
Vincent Twp. (G163)	42E12/NE	48f. Craskie Mines Ltd.	Au	Assess	DD 2-195.37 m	1984	-	-
Pic Twp. (G630)	42D9/NE	49. Crescent Mines Ltd.	Au	Assess	GL, Geochem, Assay	1983	-	-
Powell Lake Area (G549)	52B7/NW	50a. Cumberland Resources Ltd.	Au	Assess	AEM, A Mag, VLF	1983	2.6645	-
Syine Twp. (G634), Santoy Lake Area (G612)	42D15/NW	50b. Cumberland Resources Ltd.	Au	Assess	GL, Geochem	1983	2.6022	-
Tuuri Twp. (G635)	42D15/SW	50c. Cumberland Resources Ltd.	Au	Assess	AEM, A Mag, VLF	1983	2.5847	-
Walsh Twp. (G636)	42D15/SE/SW	50d. Cumberland Resources Ltd.	Au	Assess	AEM, A Mag, VLF	1983	2.5846	-
Walsh Twp. (G636)	42D15/SE	50e. Cumberland Resources Ltd.	Au	Assess	AEM, A Mag, VLF	1983	2.5845	-
Molson Lake Area (G603)	42C12/NW	51a. Dakota-Energy Corp.	Au	Assess	DD 7-997.91 m	1983	-	-
Molson Lake Area (G603)	42C12/NW	51b. Dakota-Energy Corp.	Au	Assess	IP	1983	2.6005	-

TABLE 1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Molson Lake Area (G603)	42C12/NW	51d. Dakota-Energy Corp.	Au	Assess	Assay, Geochem	1982	-	-
Molson Lake Area (G603)	42C12/NW	51e. Dakota-Energy Corp.	Au	Assess	Geochem	1982	2.5899	-
Pic Twp. (G630)	42D9/NW	52. Dalton, A.	Au	Assess	VLF, Mag	1983	2.6166	-
Rous Lake Area (G611)	42D9/NE	53. Devonion Resources Ltd., (Noranda Explor. Co. Ltd.)	Au	Assess	GL, Assay	1983	2.6942	-
Rous Lake Area (G611)	42D9/NE	54. Dodds, John V.	Au	Assess	Mag	1983	2.5752	-
Lindsley Twp. (G483)	42E11/NE	55. Dome Explor.	Au	Assess	DD 2-381.5 m	1982	-	-
Crescent Lake Area (G27)	52I8/NW	56. Donner, John	REE	Assess	Assay, Geochem	1982	2.5315	-
Tuuri Twp. (G635)	42D15/SW	57. Duquette, Louis E.	Au	Assess	Man Work, STR	1983	-	-
Vincent Twp. (G163)	42E12/NE/NW	58a. Eldor Resources Ltd.	Au	Assess	EM, Mag	1983	2.5636	-
Vincent Twp. (G163)	42E12/NE	58b. Eldor Resources Ltd.	Au	Assess	Assay, DD 11-692.4 m	1983	-	-
Vincent Twp. (G163)	42E12/NE/NW	58c. Eldor Resources Ltd., (Maki Property)	Au	Assess	Assay	1983	2.6896	-
McTavish Twp. (G675)	52A10/NE	59. Eldorado Nuclear Ltd.	U	Assess	GL, Geochem, Rad	1983	2.5457	-
Pic Twp. (G630)	42D9/NW	60a. Esso Resources Canada Ltd.	Au	Assess	AEM, A Mag	1983	2.5816	-
Pic Twp. (G630)	42D9/NW	60b. Esso Resources Canada Ltd.	Au	Assess	AEM, A Mag	1983	2.5814	-
Pic Twp. (G630)	42D9/NW	60c. Esso Resources Canada Ltd.	Au	Assess	AEM, A Mag	1983	2.5815	-
Kaby Lake Area (G59)	42E13/SE	61a. Farakel Co.	Au	Assess	VLF, EM	1983	2.5757	-
Rickaby Twp. (G161), Elmhurst Twp. (G162), Walters Twp. (G171)	42E13/SE, 42E12/NE	61b. Farakel Co.	Au	Assess	VLF, EM	1983	2.5415	-
Rickaby Twp. (G161), Walters Twp. (G171), Elmhurst Twp. (G162)	42E13/SE, 42E12/NE, 42E13/SE	61c. Farakel Co.	Au	Assess	IP, VLF	1983	2.5875	-
Miminiska Lake Area (G332)	52P10/SE	62. Felmont Oil Corp., (New Jersey Zinc Explor. Co. Canada Ltd.)	Au	Assess	DD 1-117.95 m	1984	-	-
Syine Twp. (G634)	42D15/SW	63a. Ferguson, A.	Au	Assess	Man Work, Mech Work, STR	1983	-	-
Syine Twp. (G634)	42D15/SW	63b. Ferguson, A.	Au	Assess	Man Work, Mech Work	1983	-	-

THUNDER BAY — NORTH CENTRAL REGION

TABLE 1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Baker Twp./Miranda Lake Area (G543), Freeborn Twp. (G570), McCaul Twp./Sabawi Lake Area (G554)	52B13/SW/SE, 52B14/SW	64a. Fern Elizabeth Gold Explor. Ltd., (Moffatt, Bob)	Au	Non Assess	Geochem, Assay, VLF, Mag, GL	1982	63.4139	-
Finlayson Lake Area (G528)	52B13/NE	64b. Fern Elizabeth Gold Explor. Ltd.	Au	Assess	STr, Mech Work	1984	-	-
Finlayson Lake Area (G528)	52B13/NE	64c. Fern Elizabeth Gold Explor. Ltd.	Au	Assess	Mech Work, STr	1983	-	-
Freeborn Twp. (G570)	52B13/SE	64d. Fern Elizabeth Gold Explor. Ltd., (Moffatt, Bob)	Au	Assess	STr	1984	-	-
Freeborn Twp. (G570)	52B13/SE	64e. Fern Elizabeth Gold Explor. Ltd., (Camflo Mines)	Au	Assess	Geochem, Assay	1982	2.4785	-
Freeborn Twp. (G570)	52B13/SE	64f. Fern Elizabeth Gold Explor. Ltd., (Camflo Mines)	Au	Assess	DD 14-532 m	1984	-	-
Freeborn Twp. (G570), Miranda Lake Area (G543)	52B13/SE	64g. Fern Elizabeth Gold Explor. Ltd.	Au	Assess	Tr, STr, Mech Work	1983	-	-
Hutchinson Twp. (G571)	52B14/SW	64h. Fern Elizabeth Gold Explor. Ltd.	Au	Assess	Man Work, Mech Work, STr	1984	-	-
Hutchinson Twp. (G571)	52B14/SW	64i. Fern Elizabeth Gold Explor. Ltd.	Au	Assess	STr	1984	-	-
Sabawi Lake Area/McCaul Twp. (G554)	52B14/SW	64j. Fern Elizabeth Gold Explor. Ltd., (Moffatt, Bob)	Au	Assess	STr	1983	-	-
Sabawi Lake Area/McCaul Twp. (G554)	52B14/SW	64k. Fern Elizabeth Gold Explor. Ltd., (Moffatt, Bob)	Au	Assess	Mech Work, Man Work	1984	-	-
Sabawi Lake Area/McCaul Twp. (G554)	52B14/SW	64l. Fern Elizabeth Gold Explor. Ltd.	Au	Assess	STr, Mech Work, Man Work	1982	-	-
Seeley Lake Area (G613)	42D16/SW	65. Filo, Kevin, (Roy, Rejean)	Au	Assess	GL	1983	2.6299	-
Rope Lake Area (G609), Upper Aquasabon Lake Area (G617)	42E3/SW/SE	66. Flintrock Mines	Au	Assess	AEM, A Mag	1983	2.5693	-
Strey Twp. (G633)	42D14/SE	67. Franklin Resources Ltd., (Gracey, K. A.)	Au	Assess	AEM, VLF, A Mag	1983	2.6387	-

TABLE 1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Pic Twp. (G630)	42D9/NE	68. Fourstar Petroleum Resources Ltd.	Au	Assess	GL	1983	2.6570	-
Klotz Lake Area (G295), Kassaqimini Lake Area (G286), Pagwachuan Lake Area (G368), Castlebar Lake Area (G220)	42F13/SW, 42F12/NW, 42E9/NE, 42E16/SE	69. Getty Canadian Mines Ltd.	Au	Assess	AEM, A Mag	1984	2.6597	-
Pic Twp. (G630)	42D9/NW	70a. Glitter Gold Mines Ltd.	Au	Assess	AEM, A Mag, VLF	1983	2.6179	-
Pic Twp. (G630)	42D9/NW	70b. Glitter Gold Mines Ltd.	Au	Assess	Assay, Geochem	1983	2.6940	-
Pic Twp. (G630)	42D9/NE	71. Godin, Edward	Au	Assess	EM, Mag	1983	2.6089	-
Rous Lake Area (G611)	42D9/NE	72a. Gold Fields Canadian Mining Ltd., (Autocrat Resources Ltd.), (Templar Mining Corp.)	Au	Assess	Assay, GL, Geochem	1983	2.6854	-
Rous Lake Area (G611)	42D9/NE	72b. Gold Fields Canadian Mining Ltd., (International Rhodes Resources Inc.)	Au	Assess	Assay, Geochem, GL	1983	2.6851	-
Rous Lake Area (G611)	42D9/NE	73. Gold Fields Resources Ltd., (Triple Crown Resources Ltd.)	Au	Assess	GL	1983	2.6852	-
Molson Lake Area (G603), Wabikoba Lake Area (G620)	42C12/NW, 42C13/SW	74. Golden Century Resources Corp., (Lampe Resources Co. Ltd.)	Au	Assess	GL	1983	2.6197	-
Pic Twp. (G630)	42D9/NW/NE	75a. Golden Range Resources Inc.	Au	Assess	VLF, Mag	1983	2.6139	-
Pic Twp. (G630)	42D9/NW	75b. Golden Range Resources Inc.	Au	Assess	IP, Mag	1983	2.6327	-
Tuuri Twp. (G635)	42D15/SW	75c. Golden Range Resources Inc.	Au	Assess	AEM, VLF, A Mag	1983	2.6193	-
Upper Aguasabon Lake Area (G617)	42E3/SE	75d. Golden Range Resources Inc.	Au	Assess	AEM, VLF, A Mag	1983	2.6194	-
Lower Aguasabon Lake Area (G599)	42D14/NE	76. Goldpac Investments Ltd.	Au, Bm	Assess	VLF, Mag	1983	2.6220	-
Seeley Lake Area (G613)	42D16/SW	77a. Gowganda Resources Inc., (Homestake Mineral Co.)	Au	Assess	Mag	1983	2.6800	-
Seeley Lake Area (G613)	42D16/SW	77b. Gowganda Resources Inc.	Au	Assess	IP	1983	2.5981	-

TABLE 1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Lower Aguasabon Lake Area (G599), Strey Twp. (G633)	42D14/NE	78a. Gracey, K. A., (Montrose Energy Ltd.)	Au	Assess	AEM, VLF, A Mag	1983	2.6122	-
Lower Aguasabon Lake Area (G599)	42D14/NE	78b. Gracey, K. A., (Pezim, M.)	Au	Assess	AEM, VLF, A Mag	1983	2.6143	-
Lower Aguasabon Lake Area (G599)	42D14/NE	78c. Gracey, K. A. (In trust), (Lazurus Resources Ltd.)	Au	Assess	Geochem, GL, Assay	1983	2.7080	-
Molson Lake Area (G603)	42C12/NW	78d. Gracey, K. A. (In trust), (Caravelle Resources Ltd.)	Au	Assess	IP, Res	1983	2.6811	-
Molson Lake Area (G603)	42C12/NW	78e. Gracey, K. A.	Au	Assess	VLF, Mag	1983	2.5821	-
Pic Twp. (G630)	42D9/NE	78f. Gracey, K. A., (Padre Resources Ltd.), (Orequest Consultants)	Au	Assess	IP, Res	1983	2.6816	-
Santoy Lake Area (G612)	42D15/NW	78g. Gracey, K. A., (Orequest Consultants)	Au	Assess	AEM, VLF, A Mag	1983	2.6503	-
Santoy Lake Area (G612)	42D15/NW	78h. Gracey, K. A. (Orequest Consultants)	Au	Assess	AEM, VLF, A Mag	1983	2.6509	-
Strey Twp. (G633)	42D14/SE	78i. Gracey, K. A. (Acheron Resources Ltd.)	Au	Assess	AEM, VLF, A Mag	1983	2.6126	-
Strey Twp. (G633)	42D14/SE	78j. Gracey, K. A.	Au	Assess	AEM, VLF, A Mag	1983	2.6146	-
Strey Twp. (G633)	42D14/SE/NE	78k. Gracey, K. A.	Au	Assess	AEM, VLF, A Mag	1983	2.6183	-
Strey Twp. (G633)	42D14/SE	78l. Gracey, K. A.	Au	Assess	AEM, VLF, A Mag	1983	2.6219	-
Strey Twp. (G633), Lower Aguasabon Lake Area (G599)	42D14/NE	78m. Gracey, K. A. (S.O. Resources Ltd.)	Au	Assess	AEM, VLF, A Mag	1983	2.6158	-
Syine Twp. (G634), Lower Aguasabon Lake Area (G599)	42D14/NE	78n. Gracey, K. A. (Greyhawk Resources Ltd.)	Au, Bm	Assess	AEM, VLF, A Mag	1983	2.6147	-
Syine Twp. (G634), Lower Aguasabon Lake Area (G599)	42D14/SW/NE/SE	78o. Gracey, K. A.	Au	Assess	AEM, VLF, A Mag	1983	2.6144	-
Elmhirst Twp. (G162)	42E13/SE	79a. Grant, John	Au	Assess	EM, VLF, Mag	1983	2.5876	-
Elmhirst Twp. (G162)	42E13/SE	79b. Grant, John	Au	Assess	STr	1984	-	-
Oliver Twp. (G679)	52A5/NE	80. Grayson, L., (Moore, Paul)	Pb, Zn, Ag	Assess	STr, Man Work, Mech Work	1983	-	-
Lower Aguasabon Lake Area (G599)	42D14/NE	81. Green River Resources Ltd.	Au	Assess	VLF, Mag	1983	2.6208	-
Conacher Twp. (G646)	52B9/SE	82a. GLE Resources Ltd., (Halverson, R.)	Au, Bm	Assess	GL	1983	2.6195	-

TABLE 1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Hagey Twp. (G661)	52B9/NE	82b. GLE Resources Ltd.	Au, Bm	Assess	VLF, Mag	1983	2.5780	-
Hagey Twp. (G661)	52B9/NE	82c. GLE Resources Ltd.	Au, Bm	Assess	IP, Mag, EM	1983	2.5563	-
Hagey Twp. (G661)	52B9/NE	82d. GLE Resources Ltd.	Au, Bm	Assess	VLF, Mag	1983	2.6031	-
Hagey Twp. (G661)	52B9/NE	82e. GLE Resources Ltd.	Au	Assess	IP	1982	2.5030	-
Haines Twp. (G662)	52B9/NW	82f. GLE Resources Ltd.	Au, Bm	Assess	VLF, Mag	1984	2.6032	-
Strey Twp. (G633)	42D14/SE	83. Greyhawk Resources Ltd., (Gracey, K. A.)	Au	Assess	AEM, A Mag, VLF	1983	2.6383	-
Powell Lake Area (G549)	52B7/NW	84a. Griffis, Bill, (United Northstar Mines Ltd.)	Au, Bm	Assess	AEM, VLF, A Mag	1983	2.6507	-
Powell Lake Area (G549)	52B7/NW	84b. Griffis, Bill, (Wolf River Resources)	Au, Bm	Assess	AEM, VLF, A Mag	1983	2.6508	-
Powell Lake Area (G549)	52B7/NW	84c. Griffis, Bill, (Arctic Atlantic Explor. Ltd.)	Au, Bm	Assess	AEM, VLF, A Mag	1983	2.6513	-
Molson Lake Area (G603), Wabikoba Lake Area (G620)	42C12/NW 42C13/SW	85. 655 Group Holdings, (Canadian Endeavor Mines Inc.), (Apple, Nixon B.)	Au	Assess	AEM, VLF, A Mag	1983	2.6157	-
Syine Twp. (G634)	42D15/SW	86a. Hahn, Paul	Au	Assess	Geochem	1983	2.5800	-
Syine Twp. (G634)	42D15/SW	86b. Hahn, Paul	Au	Assess	VLF, Mag, Rad	1983	2.6833	-
Wabikoba Lake Area (G620)	42C13/SW	87. Harlin Resources Ltd., (Montgomery Consultants Ltd.), (Recoski, F.), (Bellemore, Y.)	Au	Assess	IP, Assay, GL, Geochem, VLF, Mag, Res	1983	2.6030	-
Walsh Twp. (G636)	42D15/SE	88. Halonen, V.	Au	Assess	Mech Work	1983	-	-
Syine Twp. (G634)	42D15/SW	89a. Hamel, J. R.	Au	Assess	Mech Work	1983	-	-
Syine Twp. (G634)	42D15/SW	89b. Hamel, J. R.	Au	Assess	Man Work	1983	-	-
Syine Twp. (G634)	42D15/SW	89c. Hamel, J. R.	Au	Assess	Mech Work	1982	-	-
Lorna Lake Area (G598), Rous Lake Area (G611)	42D16/SE, 42D9/NE	90a. Hansen, Jens E., (Golden Rule Resources Ltd.), (Lacana Mining Corp.)	Au	Assess	VLF	1983	2.6897	-
Rous Lake Area (G611), Lorna Lake Area (G598)	42D9/NE, 42D16/SE	90b. Hansen, Jens E.	Au	Assess	AEM, VLF, A Mag	1983	2.6019	-

TABLE 1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Pic Twp. (G630)	42D9/NE	91a. Hardy International Inc.	Au	Assess	GL, Mag	1983	2.6159	-
Pic Twp. (G630)	42D9/NE	91b. Hardy International Inc.	Au	Assess	Geochem	1983	2.6437	-
Walters Twp. (G171)	42E12/NE	92. Harte Resources Ltd., (Hames, Marshall C.), (Burr, S. V.)	Au	Assess	DD 3-302.97 m	1984	-	-
Rous Lake Area/ Lecours Twp. (G611)	42D9/NE	93a. Hawkins, S. G.	Au	Assess	GL, Geochem	1983	2.6203	-
Rous Lake Area (G611)	42D9/NE	93b. Hawkins, S. G.	Au	Assess	AEM, VLF, EM, A Mag	1983	2.5829	-
Wabikoba Lake Area (G620)	42C13/SW	94a. Hemlo Explor. Ltd.	Au	Assess	IP, Res	1984	2.6813	-
Wabikoba Lake Area (G620)	42C13/SW	94b. Hemlo Explor. Ltd.	Au	Assess	GL	1983	2.6367	-
Black River Area (G580), Wabikoba Lake Area (G620)	42C13/NW/ SW	95a. Hibbart, Nick, (Rodeo Resources Ltd.)	Au	Assess	VLF, Mag	1983	2.5723	-
Wabikoba Lake Area (G620)	42C13/SW	95b. Hibbart, Nick	Au	Assess	DD 4-296.87 m	1983	-	-
Santoy Lake Area (G612), Syine Twp. (G634)	42D15/NW/ SW	96. Hicks, Orville, (Hankin Hicks Bell Group)	Au	Assess	AEM, VLF, A Mag	1983	2.6191	-
Tyrol Lake Area (G141)	42E13/SW	97. Hillsborough Explor. Ltd.	Au	Assess	VLF, Mag	1983	2.6216	-
Meador Twp. (G168)	42E13/SW	98a. Holmwood Resources Ltd., (Holm, Hilda), (Pirum Lake Property)	Au, Cu	Assess	DD 3-132.58 m	1984	-	-
Sandra Twp. (G556), Tyrol Lake Area (G141), Meador Twp. (G168)	42E12/NW, 42E13/SW	98b. Holmwood Resources Ltd.	Au, Ag, Cu	Assess	STR	1984	-	-
McComber Twp. (G166), Irwin Twp. (G164)	42E12/SW/ NW	99. Hopkins, Albert	Au	Assess	Mech Work, DD 1-87.88 m	1982	-	-
Summers Twp. (G165)	42E12/SW	100. Houghton, F.	Au	Assess	STR	1984	-	-
White Lake Area (S) (G623), White Lake Area (N) (G622)	42C12/NE, 42C13/SE	101a. HRC Hemlo Resources Corp.	Au	Assess	A Mag, AEM, VLF	1983	2.6633	-
Molson Lake Area (G603)	42C12/NW	101b. HRC Hemlo Resources Corp.	Au	Assess	A Mag, AEM, VLF	1983	2.6099	-
Molson Lake Area (G603), White Lake Area (S) (G623), White Lake Area (N) (G622) (SSM)	42C12/NW, 42C13/SW, 42C12/NE	101c. HRC Hemlo Resources Corp.	Au	Assess	A Mag, AEM, VLF	1983	2.6356	-

TABLE 1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Mikinak Lake Area (G87)	52H7/SW	102. Hudson Bay Explor. & Development Co. Ltd.	Bm	Non Assess	OVD	1981	63.3947	-
Fronde Lake Area (G252)	52P9/SW	103. Humby, D. A., (Gallion Resources Ltd.)	Au	Assess	EM, Mag	1982	2.5277	-
Wabikoba Lake Area (G620)	42C13/SW	104. Impala Resources Ltd., (Pezim, Murray), (Clemis, A.)	Au	Assess	AEM, VLF, A Mag	1983	2.6120	-
Seeley Lake Area (G613)	42D16/SW	105a. Ingamar Explor. Ltd., (East-West Resource Corp.)	Au	Assess	GL, Mag, Geochem	1983	2.6024	-
Seeley Lake Area (G613)	42D16/SW	105b. Ingamar Explor. Ltd.	Au	Assess	IP	1983	2.6238	-
Seeley Lake Area (G613)	42D16/SW	105c. Ingamar Explor. Ltd.	Au	Assess	DD 3-432 m	1984	-	-
Seeley Lake Area (G613)	42D16/SW	105d. Ingamar Explor. Ltd.	Au	Assess	GL, Mag	1983	2.6061	-
Seeley Lake Area (G613)	42D16/SW	105e. Ingamar Explor. Ltd.	Au	Assess	IP	1983	2.6237	-
Pic Twp. (G630)	42D9/NW	105f. Ingamar Explor. Ltd.	Au	Assess	IP, Mag	1983	2.5996	-
Rous Lake Area/ Lecours Twp. (G611)	42D9/NE	106a. Intercontinental Energy Corp.	Au	Assess	IP, Assay, GL, Geochem	1984	2.6993	-
Rous Lake Area (G611)	42D9/NE	106b. Intercontinental Energy Corp., (Tulcalsoosa Oil & Gas Ltd.), (El Paso Energy Corp.), (Devonion Resources Ltd.)	Au	Assess	OVD	1983	2.6807	-
Rous Lake Area (G611)	42D9/NE	107. International Laco Resources Inc., (Gold Fields Canadian Mining Ltd.)	Au	Assess	Assay, Geochem, GL	1983	2.6853	-
Laurie Twp. (G669), Duckworth Twp. (G638)	52B9/SE	108. Jalna Resources Ltd.	Au	Assess	Mech Work, Man Work	1983	-	-
Pays Plat Lake Area (G606)	42D14/NW	109. Kalrock Developments Ltd.	Au	Assess	EM, A Mag	1983	2.5804	-
Lorna Lake Area (G598), Rous Lake Area (G611)	42D16/SE, 42D9/NE	110. Kan Resources Ltd.	Au	Assess	AEM, VLF, A Mag	1983	2.6366	-
MacGregor Twp. (G672)	52A11/SE	111a. Karkkainen, Alpo	Amy, Ag	Assess	STR	1983	-	-

TABLE 1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
MacGregor Twp. (G672)	52A11/SE	111b. Karkkainen, Alpo	Ag, Amy	Assess	STr	1983	-	-
Pic Twp. (G630)	42D9/NW	112a. Kasner, Robert J.	Au	Assess	AEM, VLF, A Mag	1983	2.6339	-
Wabikoba Lake Area (G620)	42C13/SW	112b. Kasner, Robert J., (Hemlo Reef Resources)	Au	Assess	EM, Mag	1983	2.5544	-
Santoy Lake Area (G612)	42D15/NW	113a. Keighley, E., (Gracey, K. A.), (Orequest Consultants)	Au	Assess	AEM, A Mag, VLF	1983	2.6506	-
Santoy Lake Area (G612)	42D15/NW	113b. Keighley, E., (Orequest Consultants)	Au	Assess	AEM, VLF, A Mag	1983	2.6512	-
Gzowski Twp. (G182), Willet Lake Area (G156)	42L5/SE	114. Kerr Addison Mines Ltd.	Au	Assess	GL	1983	2.6332	-
Syine Twp. (G634), Tuuri Twp. (G635)	42D15/SW	115a. Kingdom Resources Ltd.	Au	Assess	AEM, VLF, EM, A Mag	1983	2.5962	-
Tuuri Twp. (G635)	42D15/SW	115b. Kingdom Resources Ltd., (Phantom Explor. Services Ltd.)	Au	Assess	VLF, Mag	1984	2.6667	-
Santoy Lake Area (G612)	42D15/NW	116. Kistabish, R.	Au	Assess	AEM, VLF, A Mag	1983	2.6145	-
Wabikoba Lake Area (G620)	42C13/SW	117a. Kondrat, John	Au	Assess	Geochem	1983	2.5913	-
Wabikoba Lake Area (G620)	42C13/SW	117b. Kondrat, John, (Rodeo Resources Ltd.)	Au	Assess	EM, Mag	1983	2.5728	-
Wabikoba Lake Area (G620)	42C13/SW	117c. Kondrat, John	Au	Assess	GL, Geochem	1983	2.5915	-
Factor Lake Area (G527)	52C9/NE	118a. Kroocmo, David, (Murray, W. S.)	Au	Assess	STr	1983	-	-
Factor Lake Area (G527)	52C9/NE	118b. Kroocmo, David, (Murray, W. S.)	Au	Non Assess	GL	1982	63.4024	-
Tib Lake Area (M2911)	52H4/NW	119a. Kuhner, Knut	Cu, Ni, Pt	Assess	GL, Geochem, Mag	1982	2.5610	-
Tib Lake Area (M2911)	52H4/NW	119b. Kuhner, Knut	Cu, Ni, Pt	Assess	Mech Work	1983	-	-
Molson Lake Area (G603)	42C12/NW	120a. Lac Minerals Ltd.	Au	Assess	GL	1983	2.6637	-
Molson Lake Area (G603)	42C12/NW	120b. Lac Minerals Ltd.	Au	Assess	DD 8-1371.3 m	1983	-	-
Molson Lake Area (G603)	42C12/NW	120c. Lac Minerals Ltd.	Au	Assess	VLF, Mag	1983	2.6394	-
Molson Lake Area (G603)	42C12/NW	120d. Lac Minerals Ltd.	Au	Assess	Geochem, Assay	1983	2.6635	-

TABLE 1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Conacher Twp. (G646)	52B9/SE	121a. Lacana Mining Corp.	Au	Assess	VLF	1983	2.6475	-
Conacher Twp. (G646)	52B9/SE	121b. Lacana Mining Corp.	Au	Assess	IP	1983	2.6345	-
Henderson Lake Area (G504), Goodfellow Twp. (G659), Boot Bay Area (G2709)	52B16/SW/SE, 52B15/SE	121c. Lacana Mining Corp.	Au	Non Assess	GL, EM, Mag	1982	63.4174	-
Henderson Lake Area (G504), Goodfellow Twp. (G659), Boot Bay Area (G2709)	52B16/SW/SE	121d. Lacana Mining Corp.	Au	Assess	GL, EM, Mag	1982	2.5110	-
Humbolt Bay Area (G53), Martin Lake Area (G79)	52H16/NE, 42E13/NW	121e. Lacana Mining Corp.	Au	Assess	EM	1983	2.6587	-
Upper Aguasabon Lake Area (G617), Rope Lake Area (G609)	42E3/SE/SW	121f. Lacana Mining Corp.	Au	Assess	AEM, A Mag	1983	2.5710	-
Tuuri Twp. (G635)	42D15/SW	122. Lacroix, D.	Au	Assess	EM, VLF, Mag	1983	2.5689	-
Metcalfe Lake Area (G84)	42L4/NE	123a. Lafontaine, A., (Robertson, James S.)	Au	Assess	Man Work	1982	-	-
Metcalfe Lake Area (G84)	42L4/NE	123b. Lafontaine, A. (Robertson, James S.)	Au	Assess	Assay	1983	2.6036	-
Caribou River Area (G20), Linklater Lake Area (G69)	52I11/SE, 52I10/SW	124. Lambert, A. J., (Selco Inc. Explor.), (Caribou Lake Project)	Au, Bm	Assess	EM, Mag	1984	2.7046	-
Tyrol Lake Area (G141)	42E13/SW	125. Laurendeau, Daniel, (Augmitto Explor. Ltd.)	Au	Assess	Geochem, VLF, Mag	1983	2.6066	-
Weaver Twp. (G576)	52B14/SE	126. Lazan Explor. Development Ltd.	Au	Assess	DD 6-308.15 m	1984	-	-
Wabikoba Lake Area (G620)	42C13/SW	127. Lenora Explor. Ltd., (Argentex Resources), (Homestake Resources)	Au	Assess	DD 3-481.59 m	1983	-	-
Priske Twp. (G631)	42D14/SE	128a. Lormac Explor. Ltd.	Au	Assess	EM, VLF, Mag	1983	2.6000	-
Priske Twp. (G631)	42D14/SE	128b. Lormac Explor. Ltd.	Au	Assess	DD 4-455.12 m	1983	-	-

TABLE 1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Eaglehead Lake Area (G714)	52H3/SE	129a. Lundmark, H., (McAteer, W.)	Bst	Assess	Mech Work	1984	-	-
Seeley Lake Area (G613)	42D16/SW	129b. Lundmark, H.	Au	Assess	Mech Work	1984	-	-
Seeley Lake Area (G613)	42D16/SW	129c. Lundmark, H.	Au	Assess	Man Work	1984	-	-
Seeley Lake Area (G613)	42D16/SW	129d. Lundmark, H.	Au	Assess	BS	1983	-	-
Pic Twp. (G630)	42D9	130a. Lytton Minerals Ltd., (The Ontario Paper Co. Ltd.)	Au	Non Assess	GL	1983	63.4041	-
Pic Twp. (G630)	42D9/NW	130b. Lytton Minerals Ltd., (The Ontario Paper Co. Ltd.)	Au	Assess	DD 24-4379.64 m	1984	-	-
Pic Twp. (G630)	42D9/NW	130c. Lytton Minerals Ltd.	Au	Assess	Man Work, Mech Work	1983	-	-
Pic Twp. (G630)	42D9/NW	130d. Lytton Minerals Ltd.	Au	Assess	GL, Mag, VLF	1983	-	-
Pic Twp. (G630)	42D9/NW	130e. Lytton Minerals Ltd.	Au	Assess	VLF, Mag	1983	2.6168	-
Pic Twp. (G630)	42D9/NW	130f. Lytton Minerals Ltd.	Au	Assess	GL, VLF, Mag	1983	2.6165	-
Molson Lake Area (G603)	42C12/NW	131a. Lynx Canada Explor. Ltd.	Au	Assess	VLF, Mag	1983	2.5694	-
Molson Lake Area (G603)	42C12/NW	131b. Lynx Canada Explor. Ltd.	Au	Assess	GL, VLF, Mag	1983	2.5917	-
Molson Lake Area (G603)	42C12/NW	132. MacDonnell, Angus	Au	Assess	Mech Work	1984	-	-
Burchell Lake Area (G706)	52B10/SE	133. MacLeod, J. W., (Tenajon Silver Corp.), (Suneva Resources Ltd.)	Cu, Ni	Assess	Geochem, VLF	1983	2.6346	-
Vincent Twp. (G163)	42E12/NE	134a. Maki, Neil	Au	Non Assess	Assay, Tr	1983	63.4038	-
Vincent Twp. (G163)	42E12/NE	134b. Maki, Neil	Au	Assess	STr	1983	-	-
Vincent Twp. (G163)	42E12/NE	134c. Maki, Neil	Au	Assess	Mech Work, Man Work	1983	-	-
Ashmore Twp. (G472)	42E10/NW	135a. Malouf, M.	Au	Assess	STr	1984	-	-

TABLE 1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
McBean Lake Area (G321), Abrey Twp. (M1691), Croll Twp. (G491), Coltham Twp. (G481)	42E10/NE	135b. Malour, M. (Fereau Resources Inc.)	Au	Assess	VLF, Mag	1984	2.6572	-
Wabikoba Lake Area (G620), White Lake Area (N) (G622), Molson Lake Area (G603)	42C13/SW/SE, 42C12/NW	136. Manwa Explor. Services Ltd.	Au	Assess	AEM, VLF, A Mag	1983	2.7064	-
Tuuri Twp. (G635)	42D15/SW	137. Marathon Minerals Inc.	Au	Assess	VLF, Mag	1983	2.5779	-
Lower Aquasabon Lake Area (G599)	42D14/NE	138. Marge Enterprises Ltd.	Au	Assess	VLF, Mag	1983	2.6206	-
Klotz Lake Area (G295)	42F13/SW	139. Martin, Paul, (Lill, J. R.)	Au	Non Assess	VLF, Mag	1981	63.4039	-
Eaglehead Lake Area (G714)	52H3/SE	140a. McAteer, W., (Lundmark, H.)	Bst	Assess	Man Work, Mech Work	1984	-	-
Eaglehead Lake Area (G714)	52H3/SE	140b. McAteer, W., (Lundmark, H.)	Bst	Assess	Mech Work, Man Work	1982	-	-
Syine Twp. (G634)	42D15/SW	141. McCullough, D., (Schiralli, R.)	Au	Assess	AEM, EM, VLF, A Mag	1983	2.5708	-
Haines Twp. (G662), Kashabowie Lake Area (M2405), Hagey Twp. (G661), Crayfish Lake Area (M2347)	52B9/NW/NE, 52B10/NE	142a. McGowan, R. J., (Noranda Explor. Co. Ltd.)	Au	Assess	AEM, VLF, A Mag	1983	2.6265	-
Legault Twp. (G170)	42E11/NW	142b. McGowan, R. J.	Au	Assess	VLF, Mag	1984	2.6671	-
Tyrol Lake Area/Pifher Twp. (G141)	42E13/SW	142c. McGowan, R. J.	Au, Ag	Assess	GL	1983	2.6090	-
Wabikoba Lake Area (G620)	42C13/SW	142d. McGowan, R. J., (Solong Lake Property), (Manwa Explor. Services Ltd.)	Au	Assess	VLF, Mag	1984	2.6777	-
Wabikoba Lake Area (G620), White Lake Area (N) (G622)	42C13/SW/SE	142e. McGowan, R. J., (Denom Resources Inc.)	Au	Assess	GL, VLF, Mag	1983	2.5914	-
Wabikoba Lake Area (G620)	42C13/SW	142f. McGowan, R. J.	Au	Assess	AEM, VLF, A Mag	1983	2.6011	-
Wabikoba Lake Area (G620), Molson Lake Area (G603), White Lake Area (S) (G623)	42C13/SW, 42C12/NW/NE	142g. McGowan, R. J.	Au	Assess	GL	1983	2.5989	-
Wabikoba Lake Area (G620)	42C13/SW	142h. McGowan, R. J.	Au	Assess	GL	1983	2.6028	-
Wabikoba Lake Area (G620), White Lake Area (N) (G623)	42C13/SW/SE	142i. McGowan, R. J., (Midnapore Resources Inc.)	Au	Assess	IP, Res	1984	2.6593	-

THUNDER BAY — NORTH CENTRAL REGION

TABLE 1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
White Lake Area (N) (G622)	42C13/SE	142j. McGowan, R. J., (Neptune Resources)	Au	Assess	Geochem	1983	2.5906	-
White Lake Area (N) (G622)	42C13/SE	142k. McGowan, R. J.	Au	Assess	AEM, VLF, A Mag	1983	2.6118	-
White Lake Area (N) (G622)	42C13/SE	142l. McGowan, R. J., (Midnapore Resources Inc.)	Au	Assess	DD 7-775.7 m	1984	-	-
White Lake Area (N) (G622), Wabikoba Lake Area (G620)	42C13/SE/SW	142m. McGowan, R. J., (Trident Resources Inc.)	Au	Assess	Geochem, Assay, GL, VLF	1983	2.6323	-
White Lake Area (N) (G622)	42C13/SE	142n. McGowan, R. J., (Midnapore Resources Inc.)	Au	Assess	Geochem, Mag, VLF	1983	2.6271	-
Lower Aguasabon Lake Area (G599)	42D14/NE	143. McKenzie, R., (Troy Minerals & Technology Ltd.)	Au	Assess	AEM, VLF, A Mag	1983	2.6184	-
Tuuri Twp. (G635)	42D15/SW	144. McKinnon, Don	Au	Assess	DD 11-1231.69 m	1984	-	-
Summers Twp. (G165), Eva Twp. (M1784)	52H9/SE	145a. McMahon, J. A., (Cox, W. L.), (Rentz, M.)	U	Assess	GL, Mag	1983	-	-
Summers Twp. (G165)	52H9/SE	145b. McMahon, J. A., (Undersill Lake Property)	Au	Assess	GL, Rad	1984	2.7014	-
Kabamichigama Lake Area (G58)	42E4/NE	146. McWilliams, D.	py, Cu	Assess	GL, Mag, Geochem	1983	2.6242	-
Irwin Twp. (G164)	42E12/NW	147a. Metalore Resources Ltd.	Au	Assess	GL, EM, Mag	1983	2.5857	-
Irwin Twp. (G164)	42E12/NW	147b. Metalore Resources Ltd., (Brookbank Property)	Au	Assess	GL, EM, Mag	1983	2.5803	-
Irwin Twp. (G164)	42E12/NW	147c. Metalore Resources Ltd.	Au	Assess	STr	1983	-	-
Irwin Twp. (G164)	42E12/NW	147d. Metalore Resources Ltd.	Au	Non Assess	DD 4-403.86 m	1983	63.4167	-
Syine Twp. (G634), Santoy Lake Area (G612)	42D15/SW, 42D14/SE, 42D15/NW	148a. Micham Explor. Inc.	Au	Assess	AEM, VLF, A Mag	1983	2.6189	-
Syine Twp. (G634), Santoy Lake Area (G612)	42D15/SW, 42D14/SE, 42D15/NW	148b. Micham Explor. Inc.	Au	Assess	GL	1983	2.6014	-
Pic Twp. (G630)	42D9/NW	149. Michano, J. G.	Au	Assess	AEM, A Mag	1983	2.5813	-

TABLE 1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Rous Lake Area/ Lecours Twp. (G611), Molson Lake Area (G603)	42D9/NE, 42C12/NW	150. Mid Canada Explor. Services Ltd.	Au	Assess	AEM, VLF, A Mag	1983	-	-
Castlebar Lake Area (G220), Pagwachwan Lake Area (G368)	42E16/SE, 42E9/NE	151a. Mid North Engineering Service Ltd., (Villeneuve Resources Ltd.)	Au	Assess	EM, VLF, Mag	1983	2.5787	-
Klotz Lake Area (G295)	42F13/SW	151b. Mid North Engineering Service Ltd., (Transway Explor. Inc.)	Au	Assess	Mag, VLF	1983	2.6640	-
Pagwachwan Lake Area (G368)	42E9/NE	151c. Mid North Engineering Service Ltd.	Au	Assess	DD 6-448.6 m	1983	-	-
White Lake Area (N) (G622)	42C13/SE	152. Midnapore Resources Ltd., (McGowan, R.J.)	Au	Assess	GL	1983	2.5905	-
Lower Aguasabon Lake Area (G599)	42D14/NE	153. Mikkonen, R. V.	Au	Assess	Man Work	1983	-	-
O'Connor Twp. (G678)	52A5/SE	154. Mill Rock Resources Inc., (Thorsteinson, D.)	ba	Assess	STR	1984	-	-
Pic Twp. (G630)	42D9/NW	155. Mills, K. D.	Au	Assess	VLF, Mag	1983	2.5938	-
Norway Lake Area (G545), Richardson Lake Area (G553)	52G3/SW/ SE	156. Mining North Explor. Ltd.	Au, Bm	Assess	Assay	1982	2.5384	-
Hutchinson Twp. (G571)	52B14/SW	157. Moffat, R., (Hill Property)	Au	Assess	GL, EM, Mag	1981	2.4210	-
White Lake Area (G) (G623)	42C12/NE	158. Monica Resources Ltd.	Au	Assess	AEM, VLF, A Mag	1983	2.6174	-
Weaver Twp. (G576)	52B14/SE	159. Morehouse, W. D.	Bm	Assess	STR	1983	-	-
Lorna Lake Area (G598), Seeley Lake Area (G613)	42D16/SE/ SW	160. Murphy, D. R., (Lavoie, R.), (Pelangio Larder Mines)	Au	Assess	GL, Mag	1983	2.6060	-
Rous Lake Area (G611)	42D9/NE	161a. Murray, B. R.	Au	Assess	AEM, VLF, A Mag	1983	2.6096	-
Wabikoba Lake Area (G620)	42C13/SW	161b. Murray, B. R. (In trust)	Au	Assess	AEM, VLF, A Mag	1983	-	-
Wabikoba Lake Area (G620)	42C13/SW	161c. Murray, B. R., (Bernier, P.)	Au	Assess	AEM, VLF, A Mag	1983	2.6248	-
Factor Lake Area (G527)	52C9/NE	162. Murray, W. S.	Au	Assess	STR	1983	-	-

THUNDER BAY — NORTH CENTRAL REGION

TABLE 1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Rous Lake Area/ Lecours Twp. (G611)	42D9/NE	163. Nabigon, J., (Huncho Gold Mines Inc.)	Au	Assess	VLF, Mag	1983	2.6148	-
Hagey Twp. (G661)	52B9/NE	164A. Narex Ore Search Consultants Inc.	Au, Bm	Assess	GL	1983	2.6156	-
Hagey Twp. (G661)	52B9/NE	164b. Narex Ore Search Consultants Inc., (Onitap Resources Inc.)	Au, Bm	Assess	EM	1983	2.6786	-
Pic Twp. (G630)	42D9/NE	164c. Narex Ore Search Consultants Inc.	Au	Assess	AEM, A Mag	1983	2.6015	-
Pic Twp. (G630)	42D9/NW	165. National Trust Co. Ltd., (Tech Corp.), (Silver Standard)	Au	Assess	Mag	1983	2.5835	-
Lapierre Lake Area/ Hipel Twp. (G65)	42E14/SW	166a. Nelson, B. I.	Au	Assess	Mech Work, Man Work	1983	-	-
Lapierre Lake Area/ Hipel Twp. (G65)	42E14/SW	166b. Nelson, B. I.	Au	Assess	STr	1983	-	-
Vincent Twp. (G163)	42E12/NE/ SE	166c. Nelson, B.	Au	Assess	STr	1983	-	-
Seeley Lake Area (G613)	42D16/SW	167. Nelson, J., (Canadian- United Minerals Inc.)	Au	Assess	Assay, Tr	1983	2.6222	-
Priske Twp. (G631), Killraine Twp. (G625)	42D14/SW/ SE	168. New Ambrose Resources Inc., (United Continental Energy Corp.), (Livingstone Energy Corp.)	Au	Assess	AEM, VLF, A Mag	1983	2.6874	-
Klotz Lake Area (G295)	42F13/SW	169a. New Arcadia Explor.	Au	Assess	DD 4-304.8 m	1983	-	-
Klotz Lake Area (G295)	42F13/SW	169b. New Aracia Explor.	Au	Assess	GL	1983	2.6554	-
Snowdrift Lake Area (G402), Miminiska Lake Area (G332)	52P10/SW/ SE	170. New Jersey Zinc Co. (Canada) Ltd.	Au	Assess	DD 8-1118.92 m	1984	-	-
Loken Lake Area (G597), Olie Lake Area (G605)	42F4/NE, 42F5/SE	171. Noranda Inc. (Geco Division)	Au	Asses:	DD 10-1657.50 m	1984	-	-

TABLE 1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Dorion Twp. (M1698)	52A15/SE	172a. Noranda Explor. Co. Ltd.	Pb, Zn, Cu, Ag	Assess	Geochem, GL, Mag	1983	2.5901	-
Lower Aguasabon Lake Area (G599), Upper Aguasabon Lake Area (G617) Cairngorm Lake Area (G585), Santoy Lake Area (G612), Rope Lake Area (G609), Pays Plat Lake Area (G606), Gravel Lake Area (G45), Middle Fox Lake Area (G85)	42D14/NE/NW, 42D15/NW, 42D13/NE, 42E2/SW, 42E3/SE/SW, 42E4/SE	172b. Noranda Explor. Co. Ltd.	Au, Bm	Assess	A Mag	1983	2.5952	-
Martinet Lake Area (G601), Vein Creek Area (G618)	42D16/NW, 42E1/SW	172c. Noranda Explor. Co. Ltd., (Lafond, D.)	Au	Assess	AEM, VLF, A Mag	1983	2.6746	-
McTavish Twp. (G675)	52A10/NE	172d. Noranda Explor. Co. Ltd.	Pb, Zn, Cu, Ag	Assess	GL, Geochem	1983	2.5900	-
Pays Plat Lake Area (G606), Rope Lake Area (G609)	42D14/NW, 42E3/SW	172e. Noranda Explor. Co. Ltd.	Au	Assess	STR	1983	-	-
Pays Plat Lake Area (G606), Lower Aguasabon Lake Area (G599), Middle Fox Lake Area (G85), Santoy Lake Area (G612), Gravel Lake Area (G45), Rope Lake Area (G609), Upper Aguasabon Lake Area (G617)	42D14/NW/NE, 42D13/NE, 42D15/NW, 42E4/SE, 42E3/SW/SE	172f. Noranda Explor. Co. Ltd.	Au	Assess	EM, Mag	1983	2.5763	-
Pays Plat Lake Area (G606), Killraine Twp. (G625)	42D14/NW	172g. Noranda Explor. Co. Ltd.	Au, Bm	Assess	EM	1983	2.6803	-
Pays Plat Lake Area (G606), Lower Aguasabon Lake (G599)	42D14/NW/NE	172h. Noranda Explor. Co. Ltd.	Au	Assess	AEM, A Mag	1983	2.6065	-
Pays Plat Lake Area (G606), Rope Lake Area (G609)	42D14/NW, 42E3/SW	172i. Noranda Explor. Co. Ltd.	Au	Assess	Assay	1983	2.5434	-
Priske Twp. (G631), Killraine Twp. (G625), Pays Plat Lake Area (G606)	42D14/SW/NW	172j. Noranda Explor. Co. Ltd.	Au, Bm	Assess	GL, Geochem	1983	2.6778	-
Priske Twp. (G631), Killraine Twp. (G625)	42D14/NW/SW	172k. Noranda Explor. Co. Ltd.	Au, Bm	Assess	Mag	1983	2.6801	-
Priske Twp. (G631)	42D14/NW/SW	172l. Noranda Explor. Co. Ltd.	Au, Bm	Assess	EM	1983	2.6795	-

TABLE 1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Rous Lake Area/ Lecours Twp. (G611), Mussy Lake Area (M29), Pic Twp. (G630), Molson Lake Area (G603)	42D9/NE/ SE/NE, 42C12/NW	172m. Noranda Explor. Co. Ltd., (Pryme Property)	Au	Assess	AEM, VLF, A Mag	1983	2.6632	-
Wabikoba Lake Area (G620)	42C13/SW	172n. Noranda Explor. Co. Ltd., (Pryme Energy Option)	Au	Assess	Mag	1983	2.5932	-
Wabikoba Lake Area (G620)	42C13/SW	172o. Noranda Explor. Co. Ltd.	Au	Assess	AEM	1983	2.7068	-
Wabikoba Lake Area (G620)	42C13/SW	172p. Noranda Explor. Co. Ltd.	Au	Assess	IP, Res	1983	2.5933	-
Wabikoba Lake Area (G620)	42C13/SW	172q. Noranda Explor. Co. Ltd.	Au	Assess	DD 2-361.40 m	1983	-	-
Wabikoba Lake Area (G620)	42C13/SW	172r. Noranda Explor. Co. Ltd.	Au	Assess	Geochem	1983	2.5947	-
Foch Lake Area (G591)	42F3/NW	173a. Noranda Mines Ltd.	Au	Assess	Geochem, GL	1983	2.6264	-
Loken Lake Area (G597)	42F4/NE	173b. Noranda Mines Ltd.	Au	Assess	DD 4-1597.15 m	1983	-	-
Loken Lake Area (G597), Olie Lake Area (G605)	42F4/NE, 42F5/SE	173c. Noranda Mines Ltd.	Au	Assess	Geochem	1984	2.6753	-
Loken Lake Area (G597)	42F4/NE	173d. Noranda Mines Ltd. (Geco Division)	Au	Assess	Mag	1982	2.5594	-
Manitouwadge Lake Area (G600)	42F4/NW	173e. Noranda Mines Ltd.	Au	Assess	DD 2-383.74 m	1983	-	-
Manitouwadge Lake Area (G600)	42F4/NW	173f. Noranda Mines Ltd.	Au	Assess	GL, Geochem	1982	2.5671	-
Manitouwadge Lake Area (G600)	42F4/NW	173g. Noranda Mines Ltd. (Geco Division)	Au	Assess	Mag, EM	1984	2.6413	-
Wabikoba Lake Area (G620)	42C13/SW	174. Norman Resources Ltd.	Au	Assess	AEM, VLF, A Mag	1983	2.6012	-
Irwin Twp. (G164), McComber Twp. (G166)	42E12/NW	175. Normine Resources Ltd., (Struck, W.), (Nordin, G.), (Hopkins, A.)	Au	Assess	Assay, GL, Mag, Geochem	1983	2.5819	-
Tyrol Lake Area (G141)	42E13/SW	176a. Northern Concentrators Ltd., (Cowan, S.)	Au, Ag, Cu	Assess	Man Work, Mech Work	1984	-	-
Tyrol Lake Area (G141)	42E13/SW	176b. Northern Concentrators Ltd., (Crooked Green)	Au, Ag, Cu	Assess	STR, Mech Work	1983	-	-

TABLE 1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Tyrol Lake Area (G141)	42E13/SW	176c. Northern Concentrators Ltd.	Au, Ag, Cu	Assess	Mech Work	1983	-	-
Tyrol Lake Area (G141)	42E13/SW	176d. Northern Concentrators Ltd., (Cowan, S.)	Au, Ag, Cu	Assess	DD 18-502.0 m	1983	-	-
Tyrol Lake Area (G141)	42E13/SW	176e. Northern Concentrators Ltd., (Cowan, S.)	Au, Ag, Cu	Assess	DD 45-1265.83 m	1983	2.6330	-
Tyrol Lake Area (G141)	42E13/SW	176f. Northern Concentrators Ltd., (Cowan, S.)	Au, Ag, Cu	Assess	Assay	1983	2.6435	-
Tyrol Lake Area (G141)	42E13/SW	176g. Northern Concentrators Ltd., (Cowan, M. F.)	Au, Ag, Cu	Assess	EM, VLF, Mag	1983	2.5722	-
Tyrol Lake Area (G141)	42E13/SW	176h. Northern Concentrators Ltd., (Cowan, M. F.)	Au, Ag, Cu	Assess	GL	1983	2.5756	-
Pic Twp. (G630)	42D9/NE	177. Northern Eagle Mines Ltd.	Au	Assess	AEM, VLF, A Mag	1983	2.5842	-
Killala Lake Area (G596)	42E2/SE	178. Nuinsco Resources Ltd.	REE, Nb, ap	Assess	DD 10-1401.16 m	1983	-	-
Pic Twp. (G630)	42D9/NW	179. Nuttall, C., (Lytton Minerals Ltd.)	Au	Assess	VLF, GL, Mag	1983	2.6167	-
Caramat Lake Area (G219)	42E9/SE	180. Onesime, A.	Au	Assess	Mech Work	1983	-	-
Molson Lake Area (G603), Rous Lake Area (G611)	42C12/NW, 42D9/NE	181a. 502095 Ontario Ltd., (Melrose Resources Ltd.)	Au	Assess	A Mag, AEM, VLF	1983	2.6654	-
Molson Lake Area (G603), Rous Lake Area (G611)	42C12/NW, 42D9/NE	181b. 502095 Ontario Ltd., (Melrose Resources Ltd. Property)	Au	Assess	Geochem, GL	1983	2.6371	-
Strey Twp. (G633)	42D14/SE	181c. 502095 Ontario Ltd.	Au	Assess	AEM, VLF, A Mag	1983	2.6192	-
Strey Twp. (G633)	42D14/SE	181d. 502095 Ontario Ltd.	Au	Assess	GL	1983	2.5765	-
Rous Lake Area (G611)	42D9/NE	182a. 508610 Ontario Ltd.	Au	Assess	AEM, VLF, A Mag	1983	2.5852	-

TABLE 1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Rous Lake Area (G611)	42D9/NE	182b. 508610 Ontario Ltd., (International Cherokee Development Corp.)	Au	Assess	IP, Res	1983	2.6812	-
Mussy Lake Area (M29), Pic Twp. (G630)	42D9/SE/NW	183a. 511735 Ontario Ltd., (Maple Leaf Petroleum)	Au	Assess	VLF, Mag	1983	2.5895	-
Pic Twp. (G630), Mussy Lake Area (M29)	42D9/SW/SE	183b. 511735 Ontario Ltd., (Walhalla Maple Leaf Petroleum)	Au	Assess	Geochem, IP, GL, VLF, DD 14-1999.24 m	1983	2.6835	-
Pic Twp. (G630)	42D9/NW	184. 539004 Ontario Ltd.	Au	Assess	AEM, VLF, A Mag	1983	2.6182	-
Molson Lake Area (G603)	42C12/NW	185a. Opsal, F. E., (Kohn, S.)	Au	Assess	DD 17-1917.49 m	1983	-	-
Molson Lake Area (G603)	42C12/NW	185b. Opsal, F. E., (Kohn, Saul), (Interlake Development Corp.)	Au	Assess	DD 1-2457 m	1984	-	-
Rous Lake Area (G611)	42D9/NE	185c. Opsal, F. E., (Kohn, S.), (Gold Fields Canadian Mining Ltd.), (Youngman Oil & Gas Ltd.)	Au	Assess	Assays, GL	1983	2.6855	-
Errington Twp. (G479)	42E10/NW	186. Oster, Joseph A.	Au	Assess	DD 1-30.88 m	1983	-	-
Summers Twp. (G165)	42E12/SW	187a. Pancontinental Mining (Canada) Ltd.	Au	Assess	STr, Man Work	1984	-	-
Summers Twp. (G165)	42E12/SW	187b. Pancontinental Mining (Canada) Ltd.	Au	Assess	STr, Man Work	1984	-	-
Summers Twp. (G165)	42E12/SW	187c. Pancontinental Mining (Canada) Ltd.	Au	Assess	STr	1984	-	-
Martinet Lake Area (G601), Foxtrap Lake Area (G592)	42D16/NW, 42D15/NE	188a. Parlake Resources Ltd.	Au	Assess	GL, Assay	1983	2.6486	-
Martinet Lake Area (G601), Foxtrap Lake Area (G592)	42D16/NW, 42D15/NE	188b. Parlake Resources Ltd.	Au	Assess	GL	1983	2.6485	-
Kabamichigama Lake Area (G58)	42E4/NE	189. Paterson, R.	Cu	Assess	Man Work	1983	-	-
Wabikoba Lake Area (G620)	42C13/SW	190. Pawnee Oil Corp., (Bremner, D.)	Au	Assess	VLF, Mag	1983	2.5748	-

TABLE 1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Duckworth Twp. (G638)	52B9/SE	191. Penziwol, M., (Wojnarski, J.)	Au	Assess	Assay	1983	2.6476	-
Rous Lake Area/ Lecours Twp. (G611)	42D9/NE	192. Perkin, J., (Honcho Gold Mines Inc.)	Au	Assess	Mag, VLF	1983	2.6149	-
Dorion Twp. (M1698), Wolf Lake Area (G160)	52A15/SE/NE	193. Petrunka, D.	Pb, Zn, ba	Assess	DD 8-216.48 m	1982	-	-
Pic Twp. (G630)	42D9/NE	194a. Pezim, M., (Clemiss, A.), (Northern Eagle Mines Ltd.)	Au	Assess	IP, Res	1983	2.6809	-
Pic Twp. (G630)	42D9/NE	194b. Pezim, M., (Clemiss, A.), (Rideau Resources Corp.), (Orequest Consultants)	Au	Assess	IP, Res	1983	2.6815	-
Pic Twp. (G630)	42D9/NW	194c. Pezim, M., (Clemiss, A.), (Dynamics Energy Corp.), (Wildrose Petroleum Ltd.)	Au	Assess	GL, Assay, Geochem	1983	2.6941	-
Lorna Lake Area (G598), Wabikoba Lake Area (G620)	42D16/SE, 42C13/SW	194d. Pezim, M., (Clemiss, A.)	Au	Assess	AEM, VLF, A Mag	1983	2.6007	-
Pic Twp. (G630)	42D9/NW	194e. Pezim, M.	Au	Assess	AEM, VLF, A Mag	1983	2.6212	-
Pic Twp. (G630)	42D9/NW	194f. Pezim, M., (Clemiss, A.)	Au	Assess	AEM, VLF, A Mag	1983	2.6123	-
Pic Twp. (G630)	42D9/NW	194g. Pezim, M., (Clemiss, A.)	Au	Assess	AEM, VLF, A Mag	1983	2.5851	-
Pic Twp. (G630)	42D9/NW	194h. Pezim, M., (Clemiss, A.), (Kadrey Resources Corp.)	Au	Assess	AEM, VLF, A Mag	1983	2.6124	-
Pic Twp. (G630)	42D9/NW	194i. Pezim, M.	Au	Assess	AEM, VLF, A Mag	1983	2.6125	-
Pic Twp. (G630)	42D9/NW	194j. Pezim, M.	Au	Assess	AEM, VLF, A Mag	1983	2.6185	-
Pic Twp. (G630)	42D9/NW	194k. Pezim, M., (Clemiss, A.)	Au	Assess	VLF, Mag	1983	2.5890	-
Pic Twp. (G630)	42D9/NW	194l. Pezim, M., (Clemiss, A.), (MacKenzie Energy Corp.), (Orequest Consultants)	Au	Assess	IP, Res	1983	2.6818	-

TABLE 1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Pic Twp. (G630)	42D9/NW	194m. Pezim, M., (Clemiss, A.), (Cal Dynamics Energy Corp.)	Au	Assess	IP, Res	1983	2.6814	-
Wabikoba Lake Area (G620)	42C13/SW	194n. Pezim, M., (Clemiss, A.)	Au	Assess	AEM, VLF, A Mag	1983	2.6009	-
Wabikoba Lake Area (G620)	42C13/SW	194o. Pezim, M., (Clemiss, A.)	Au	Assess	AEM, VLF, A Mag	1983	2.6101	-
Wabikoba Lake Area (G620)	42C13/SW	194p. Pezim, M.	Au	Assess	AEM, VLF, A Mag	1983	2.6013	-
Wabikoba Lake Area (G620)	42C13/SW	194q. Pezim, M., (Clemiss, A.)	Au	Assess	AEM, VLF, A Mag	1983	2.6008	-
Wabikoba Lake Area (G620)	42C13/SW	194r. Pezim, M., (Clemiss, A.), (Qued Resources Corp.), (Manwa Explor. Services Ltd.)	Au	Assess	IP, Res	1983	2.6817	-
Vincent Twp. (G163)	42E12/NE	195a. Pichette, G.	Au	Assess	GL	1983	2.6002	-
Vincent Twp. (G163)	42E12/NE	195b. Pichette, G.	Au	Assess	DD 5-302.63 m	1983	-	-
Lower Aguasabon Lake Area (G599)	42D14/NE	196. Pipawa Explor. Ltd., (Owl Lake Ltd. (Molybdenite Property))	Mo, Au	Assess	Geochem, GL	1983	2.6541	-
Walters Twp. (G171)	42E12/NE	197a. Pollock, John	Au	Assess	VLF	1983	2.6049	-
Walters Twp. (G171)	42E12/NE	197b. Pollock, John	Au	Assess	DD 1-122.22 m	1984	-	-
Irwin Twp. (G164)	42E12/NW	198. Prago Resources & Energy Inc.	Au	Assess	Mag, VLF	1984	2.6733	-
Veekay Lake (G440)	42M12/SE	199. Pricemore Resources Inc.	Au	Non Assess	Assay, GL, DD 26-1985.46 m	1982	63.4144	-
Strey Twp. (G633)	42D14/NE	200. Prophet Resources Ltd.	Au	Assess	VLF, Mag	1983	2.6207	-
Molson Lake Area (G603)	42C12/NW	201a. Pryme Energy Resources Ltd., (Noranda Explor. Co. Ltd.)	Au	Assess	AEM, VLF	1983	2.7041	-

TABLE 1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Rous Lake Area (G611), Mussy Lake Area (M29), Molson Lake Area (G603)	42D9/NE/SE, 42C12/NW	201b. Pryme Energy Resources Ltd., (Noranda Explor. Co. Ltd.)	Au	Assess	AEM	1983	2.6928	-
Pifher Twp. (G14), Elmhirst Twp. (G162), Irwin Twp. (G164), Walters Twp. (G171)	42E13/SW, 42E12/NW	202. Quebec Sturgeon River Mines Ltd., (Jupiter Minerals Inc.)	Au	Non Assess	Geochem, GL, EM, Mag	1981	63.4108	-
Rich Lake Area (G388)	52P9/SE	203. Randa, T. V.	Au	Assess	Assay	1981	2.4739	-
Wabikoba Lake Area (G620)	42C13/SW	204a. Recoskie, F., (Robert, Y. R.)	Au	Assess	AEM, VLF, A Mag	1983	2.6041	-
Wabikoba Lake Area (G620)	42C13/SW	204b. Recoskie, F., (Robert, Y. R.)	Au	Assess	AEM, VLF, A Mag	1983	2.6171	-
Gorham Twp. (G66)	52A11/SW	205a. Redden, J. W.	Au	Assess	GL	1984	2.6798	-
Lybster Twp. (G671)	52A4/NW	205b. Redden, J. W.	Ag	Assess	Assay	1984	2.6886	-
Strey Twp. (G633)	42D14/SE	206. Rio Blanco Resources Ltd., (Gracey, K. A.)	Au	Assess	AEM, VLF, A Mag	1983	2.6384	-
Rous Lake Area (G611), Molson Lake Area (G602)	42D9/NE, 42C12/NW	207a. Ripple Resources Ltd., (Feimann, A. V.)	Au	Assess	GL, EM, Mag	1983	2.5696	-
Rous Lake Area (G611), Molson Lake Area (G603)	42D9/NE, 42C12/NW	207b. Ripple Resources Ltd., (Feimann, A. V.)	Au	Assess	GL	1983	2.5764	-
Wabikoba Lake Area (G620)	42C13/SW	208. Robert, Yvon, (Tundra Gold Mines Ltd.)	Au	Assess	EM, Mag	1983	2.5964	-
Rickaby Twp. (G161)	42E13/SE	209a. Rosenblatt, A.	Au	Assess	STR	1984	-	-
Rickaby Twp. (G161)	42E13/SE	209b. Rosenblatt, A.	Au	Assess	STR	1984	-	-
Syine Twp. (G634), Tuuri Twp. (G635)	42D15/SW	210. Rose Resource Corp.	Au	Assess	VLF, Mag	1983	2.6112	-
Errington Twp. (G479)	42E11/NE	211. Roxmark Mines Ltd.	Au	Assess	Man Work, Mech Work, DD 3-549.04 m	1983	-	-
Seeley Lake Area (G613)	42D16/SW	212. Roy, Rejean, (Westam Oil Ventex Energy Ltd. Property)	Au	Assess	IP, Mag, GL	1983	2.6239	-
Santoy Lake Area (G612)	42D15/NW	213. Royce Ventures Ltd., (Gracey, K. A.)	Au	Assess	AEM, VLF, A Mag	1983	2.6501	-

TABLE 1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
McTavish Twp. (G675)	52A10/NE	214a. Saarberg Interplan Canada Ltd.	U	Assess	GL, DD 3-699.51m	1983	-	-
McTavish Twp. (G675)	52A10/NE/SE	214b. Saarberg Interplan Canada Ltd.	U	Assess	Assay, GL, VLF	1982	2.5135	-
Tuuri Twp. (G635)	42D15/SW	215. Salo, Randy	Au	Assess	EM, Mag	1983	2.5801	-
Sawbill Bay Area (G558)	52B14/NW	216. Sande, David J.	Au	Assess	Assay, Man Work	1983	-	-
Bedivere Lake Area (G511), Weaver Twp. (G576), Wild Potatoe Lake Area (G565)	52B15/SW, 52C9/NW	217. Sawdo, P., (Davidson, B.)	Au	Assess	VLF	1983	2.5648	-
Mussy Lake Area (M29)	42D9/SE	218a. Schiralli, Rocco A.	Au	Assess	VLF, EM, Mag	1983	2.5871	-
Syine Twp. (G634)	42D15/SW	218b. Schiralli, Rocco A.	Au	Assess	AEM, VLF, A Mag	1983	2.0878	-
Tuuri Twp. (G635)	42D15/SW	218c. Schiralli, Rocco A.	Au	Assess	AEM, VLF, A Mag	1982	2.6039	-
Wabikoba Lake Area (G620)	42C13/SW	218d. Schiralli, Rocco A.	Au	Assess	VLF, Mag	1982	2.5771	-
Iorna Lake Area (G598), Seeley Lake Area (G613)	42D16/SE/SW	219a. Scott, John, (Murphy, Dan)	Au	Assess	GL, Mag	1983	2.6228	-
Seeley Lake Area (G613)	42D16/SW	219b. Scott, John, (Murphy, Dan), (Dore Explor. Ltd.)	Au	Assess	IP, GL, Mag	1983	2.6240	-
Wabikoba Lake Area (G620)	42C13/SW	220a. Seemar Mines Ltd.	Au	Assess	GL, Geochem	1983	2.6080	-
Wabikoba Lake Area (G620)	42C13/SW	220b. Seemar Mines Ltd.	Au	Assess	EM, Mag	1983	2.5725	-
Powell Lake Area (G549)	52B7/NW	221. Shebandowan Resources Ltd., (Griffis, B.)	Au, Bm	Assess	AEM, VLF, A Mag	1983	2.6505	-
Alfred Lake Area (G189)	42E15/SW	222a. Shields, Jay	Au	Assess	Man Work	1984	-	-
O'Sullivan Lake Area (G362)	42L6/NE	222b. Shields, Jay	Au	Assess	Man Work	1984	-	-
Wabikoba Lake Area (G620)	42C13/SW	223a. Shiningtree Resources, (Eden Roc Mineral Corp.)	Au	Assess	GL	1983	2.6113	-
Wabikoba Lake Area (G620)	42C13/SW	223b. Shiningtree Resources, (Eden Roc Corp.), (A. C. Howe International Ltd.)	Au	Assess	Mag, VLF	1983	2.6538	-

TABLE 1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Pic Twp. (G630), Rous Lake Area (G611)	42D9/NE	224. Sicard, E., (Morison, S.), (Scott, J.), (Filo, K.), (Way Fair Explor. Ltd.)	Au	Assess	VLF	1984	2.6691	-
Santoy Lake Area (G612), Tuuri Twp. (G635)	42D15/NW/ SW	225. Silverhawk Resources Ltd., (Gracey, K. A.)	Au	Assess	AEM, VLF, A Mag	1983	2.6502	-
Priske Twp. (G631)	42D14/SW	226. Skalesky, Paul	Au	Assess	Mech Work	1984	-	-
Pic Twp. (G630)	42D9/NW	227a. Smith, Rejean J.	Au	Assess	DD 1-60.96 m	1983	-	-
Pic Twp. (G630)	42D9/NW	227b. Smith, Rejean J.	Au	Assess	DD 1-79.24 m	1983	-	-
Seeley Lake Area (G613), Lorna Lake Area (G598)	42D16/SW/ SE	228. St. Pierre, D., (Lough/Hibbard Group)	Au	Assess	VLF	1984	2.6602	-
Richardson Lake Area (G553)	52G3/SE	229a. Steeprock Resources Inc.	Au, Bm	Assess	GL, EM, Mag	1982	2.5295	-
Schwenger Twp. (G574)	52B13/SE	229b. Steeprock Resources Inc., (Middaugh, Richard D.)	Au	Assess	VLF, Mag	1984	2.6649	-
Pic Twp. (G630)	42D9/NW	230a. Stenlund, V.	Au	Assess	Assay	1983	2.5742	-
Walsh Twp. (G636)	42D15/SE	230b. Stenlund, V.	Au	Assess	DD 1-32.30 m	1983	-	-
McComber Twp. (G166), Vincent Twp. (G163)	42E12/NW/ NE	231a. Stroud Resources Ltd.	Au	Assess	DD 6-238.04 m, Assay	1984	2.7202	-
McComber Twp. (G166)	42E12/SW	231b. Stroud Resources Ltd.	Au	Assess	Man Work, Mech Work	1983	-	-
Vincent Twp. (G163)	42E12/NE	231c. Stroud Resources Ltd.	Au	Assess	STR	1983	-	-
O'Sullivan Lake Area (G362)	42L6/NE	232a. Sutherland, Don W.	Au, Ag	Assess	Assay	1984	2.6906	-
O'Sullivan Lake Area (G362)	42L7/NW	232b. Sutherland, Don W.	Au, Ag	Assess	Assay, DD 7- 609.6 m	1983	-	-
Ashmore Twp. (G472)	42E10/NW	233a. Swerda, M., (Moore, W. G.)	Au	Assess	Mech Work, STR	1983	-	-
Ashmore Twp. (G472)	42E10/NW	233b. Swerda, M.	Au	Assess	Mech Work	1984	-	-
Opik eigen Lake Area (G361)	52P9/NE	234. Tantalum Mining Co.	REE	Assess	Mag	1983	2.5649	-

TABLE 1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Pic Twp. (G630)	42D9/NW	235. Tara Hills Gold Resources Inc.	Au	Assess	AEM, VLF, A Mag	1983	2.6181	-
Tuuri Twp. (G635)	42D15/SW	236. Teck Corp.	Au	Assess	EM, Mag	1983	2.5674	-
Lower Aguasabon Lake Area (G599)	42D14/NE	237a. Teck Explor. Ltd.	Au, Bm	Assess	GL, EM, Mag	1983	2.5625	-
Lower Aguasabon Lake Area (G599)	42D14/NE	237b. Teck Explor. Ltd.	Au, Bm	Assess	GL, EM, Mag	1982	2.5626	-
Metcalfe Lake Area (G84)	42L4/NE	237c. Teck Explor. Ltd.	Au	Assess	Mag	1983	2.5784	-
Metcalfe Lake Area (G84)	42L4/NE	237d. Teck Explor. Ltd.	Au	Assess	EM	1983	2.6550	-
Metcalfe Lake Area (G84)	42L4/NE	237e. Teck Explor. Ltd.	Au	Assess	VLF	1983	2.6549	-
Strey Twp. (G633)	42D14/SE	237f. Teck Explor. Ltd.	Au	Assess	EM, Mag	1983	2.5775	-
Tuuri Twp. (G635)	42D15/SE	237g. Teck Explor. Ltd.	Au	Assess	DD 2-424.56 m	1983	-	-
Walsh Twp. (G636)	42D15/SE	237h. Teck Explor. Ltd.	Au	Assess	EM, Mag	1983	2.5665	-
Tuuri Twp. (G636), Santoy Lake Area (G612)	42D15/SW/NW	238. Tecumseh Resources Ltd., (Gracey, K. A.)	Au	Assess	A Mag, AEM, Mag	1983	2.6510	-
Molson Lake Area (G603)	42C12/NW	239a. T.G.R. Resources Ltd.	Au	Assess	AEM, A Mag	1983	2.6016	-
Molson Lake Area (G603)	42C12/NW	239b. T.G.R. Resources Ltd.	Au	Assess	VLF, Mag	1983	2.6673	-
Croll Twp. (G491)	42E10/NW	240. Theriault, O.	Au	Assess	Man Work, Mech Work, STR	1984	-	-
Lower Aguasabon Lake Area (G599)	42D14/NE	241a. Thompson, Doug, (Springfield Resources Ltd.)	Au	Assess	AEM, VLF, A Mag	1983	2.6180	-
Pic Twp. (G630)	42D9/NE	241b. Thompson, Doug	Au	Assess	AEM, VLF, A Mag	1983	2.6178	-
Pic Twp. (G630)	42D9/NE	241c. Thompson, Doug (In trust)	Au	Assess	AEM, VLF, A Mag	1983	2.6046	-
Pic Twp. (G630)	42D9/NE	241d. Thompson, Doug (In trust), (Zenco Resources Inc.)	Au	Assess	GL	1983	2.6320	-
Castlewood Lake Area (G22)	42E13/NE	242a. Thorsteinson, David, (Cox, Nolan), (Americ Mines Ltd.)	Au	Assess	EM, Mag	1983	2.5402	-

TABLE 1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Irwin Twp. (G164), Walters Twp. (G171)	42E12/NW	242b. Thorsteinson, David	Au	Assess	STr	1983	-	-
Summers Twp. (G165)	42E12/SW	242c. Thorsteinson, David	Au	Non Assess	GL, DD 2-215.49 m, Assay	1982	63.4170	-
Summers Twp. (G165)	42E12/SW	242d. Thorsteinson, David	Au	Assess	STr	1984	-	-
Summers Twp. (G165)	42E12/SW	242e. Thorsteinson, David	Au	Assess	STr	1984	-	-
Walters Twp. (G171)	42E12/NE	242f. Thorsteinson, David	Au	Assess	VLF, Mag	1984	2.6657	-
Houck Twp. (G487)	42E15/SE	243. Thorwald, Johansen	Au	Assess	Man Work, DD 1-30.66 m	1984	-	-
Errington Twp. (G479), Lindsey Twp. (G483)	42E11/NE	244. Tombill Mines Ltd.	Au	Non Assess	Assay, EM, Mag, DD 15-894.34 m	1982	63.4136	-
Strey Twp. (G633), Priske Twp. (G631)	42D14/SE/NE	245. Tong, Danny Sung Wing, (Minichiello, Paul), (Zubroniewich, Earl)	Au	Assess	AEM, VLF, A Mag	1983	2.6262	-
Fron Lake Area (G252)	52P9/NW	246. Tough, Sherman	Au	Assess	VLF, Mag	1983	2.5937	-
Pic Twp. (G630), Rous Lake Area (G611)	42D9/NE	247. Tri-Star Resources	Au	Assess	GL, IP	1983	2.6295	-
Cockeram Twp. (G184)	52H2/SE	248a. Tri-Ven Mineral Corp.	Marl	Assess	Man Work	1983	-	-
Cockeram Twp. (G184)	52H2/SE	248b. Tri-Ven Mineral Corp.	Marl	Assess	STr	1984	-	-
Rous Lake Area/Lecours Twp. (G611)	42D9/NE	249. Tuscaloosa Oil & Gas	Au	Assess	EM, Mag	1983	2.5522	-
Molson Lake Area (G603)	42C12/NW	250a. Tylox Resources Corp.	Au	Assess	EM, Mag	1983	2.5826	-
Wabikoba Lake Area (G620), White Lake Area (N) (G622)	42C13/SW/SE	250b. Tylox Resources Corp., (McGowan, R. J.)	Au	Assess	GL, Geochem	1983	2.5910	-
White Lake Area (N) (G622), Wabikoba Lake Area (G620)	42C13/SE/SW	250c. Tylox Resources Corp.	Au	Assess	EM, Mag	1983	2.5749	-
Priske Twp. (G631)	42D14/SE	251. United Continental Energy Corp., (Livingston Energy Corp.), (Korba, E.)	Au	Assess	AEM, VLF, A Mag	1983	2.5676	-
Obonga Lake Area (G100)	52H14/NW	252a. Uranerz Explor. & Mining Ltd.	U	Assess	VLF, Mag	1981	2.4214	-

THUNDER BAY — NORTH CENTRAL REGION

TABLE 1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Obonga Lake Area (G100), Adamson Twp. (G133), McAllister/Wiggins Twp. (G98), Dorion Twp. (G651), McTavish Twp. (G675)	52H14/NW, 52H2/NE, 42D13/NW, 52A15/SE/NE	252b. Uranerz Explor. & Mining Ltd.	U	Non Assess	GL	1981	63.3943	-
Purdom Twp. (G97)	52H1/NW	252c. Uranerz Explor. & Mining Ltd.	U	Assess	EM, Mag, VLF, Geochem, GL	1982	2.5090	-
Lower Aguasabon Lake Area (G599), Strey Twp. (G633)	42D14/NE	253a. Vulcan Resources Ltd.	Au	Assess	AEM, VLF, A Mag	1983	2.6121	-
Wabikoba Lake Area (G620)	42C13/SW	253b. Vulcan Resources Ltd.	Au	Assess	GL	1983	2.6257	-
Norton Lake Area (G355)	42M14/NW	254a. Wasabi Resources Ltd.	Bm	Assess	Geochem	1981	2.6991	-
Oxtoby Lake Area (G365)	42M15/SE	254b. Wasabi Resources Ltd.	Bm	Assess	DD 3-471.52 m	1983	-	-
Oxtoby Lake Area (G365)	42M15/SE	254c. Wasabi Resources Ltd.	Bm	Assess	EM, Mag	1983	2.5650	-
Tuuri Twp. (G635)	42D15/SW	254d. Wasabi Resources Ltd.	Au	Assess	AEM, VLF, GL, A Mag	1983	2.5856	-
Powell Lake Area (G549)	52B7/NW	255. Wawaig Resources Inc.	Au	Assess	VLF, Mag	1983	2.6573	-
Castlebar Lake Area (G220), Klotz Lake Area (G295)	42E16/SE, 42F13/SW	256. Weirmeir, Archie	Au	Assess	Mag, VLF	1984	2.6689	-
Lorna Lake Area (G598)	42D16/SE	257a. Whymark, Wayne	Au	Assess	AEM, VLF, A Mag	1983	2.6155	-
Rous Lake Area/ Lecours Twp. (G611)	42D9/NE	257b. Whymark, Wayne, (Thibault, J.), (544818 Ontario Ltd.), (Bouchard, Jean-Nil), (Gulliver Creek Gold Syndicate)	Au	Assess	AEM, VLF, A Mag	1983	2.6627	-
Pic Twp. (G630)	42D9/NW	258a. Wildcat Petroleum Ltd.	Au	Assess	GL, EM, Mag	1983	2.6130	-
Pic Twp. (G630)	42D9/NW	258b. Wildcat Petroleum Ltd.	Au	Assess	AEM, VLF, A Mag	1983	2.6119	-
Tuuri Twp. (G635), Walsh Twp. (G636)	42D15/SW/SE	259. Wildrose Petroleum Ltd.	Au	Assess	GL, EM, Mag, Geochem, IP	1983	2.6104	-
Killraine Twp. (G625)	42D14/SW	260. Wilson, A., (Bond, J.), (Mocnik, D. N.), (Noranda Explor. Co. Ltd.)	Au	Assess	GL, Geochem, AEM, A Mag, Mag, EM	1983	2.5966	-
Wabikoba Lake Area (G620)	42C13/SW	261a. Woynarski, J.	Au	Assess	AEM, VLF, A Mag	1983	2.6894	-

TABLE 1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Wabikoba Lake Area (G620)	42C13/SW	261b. Woynarski, J., (Kodrat, J.), (Canova Resources Ltd.)	Au	Assess	EM, VLF, Mag	1983	2.5747	-
White Lake Area (N) (G622)	42C13/SE	261c. Woynarski, J.	Au	Assess	EM, VLF, Mag	1983	2.5746	-
White Lake Area (N) (G622)	42C13/SE	261d. Woynarski, J., (Carrera Resources Ltd.)	Au	Assess	GL, Geochem	1983	2.5911	-
Santoy Lake Area (G612)	42D15/NW	262. Young, S., (Gracey, K. A.), (Orequest Consultants)	Au	Assess	AEM, VLF, A Mag	1983	2.6511	-
Metcalfe Lake Area (G84)	42L4/NE	263a. Yzerdraat, W.	-	Assess	Res	1983	2.5883	-
Metcalfe Lake Area (G84)	42L4/NE	263b. Yzerdraat, W.	-	Assess	Res	1983	2.5885	-
Metcalfe Lake Area (G84)	42L4/NE	263c. Yzerdraat, W.	-	Assess	Res	1983	2.5987	-
Metcalfe Lake Area (G84)	42L4/NE	263d. Yzerdraat, W.	-	Assess	Geochem	1983	2.5988	-
Metcalfe Lake Area (G84)	42L4/NE	263e. Yzerdraat, W.	-	Assess	Geochem	1982	2.5918	-
Metcalfe Lake Area (G84)	42L4/NE	263f. Yzerdraat, W.	-	Assess	GL, Geochem	1984	2.6298	-
Metcalfe Lake Area (G84)	42L4/NE	263g. Yzerdraat, W.	-	Assess	Geochem	1982	2.5888	-
Metcalfe Lake Area (G84), Oboshkegan Twp. (G173)	42L4/NE	263h. Yzerdraat, W.	-	Assess	GL	1983	2.5986	-
Metcalfe Lake Area (G84), Oboshkegan Twp. (G173)	42L4/NE	263i. Yzerdraat, W.	-	Assess	GL, Geochem	1983	2.5985	-
Metcalfe Lake Area (G84)	42L4/NE	263j. Yzerdraat, W.	-	Assess	Res	1983	2.5884	-
Metcalfe Lake Area (G84)	42L4/NE	263k. Yzerdraat, W.	-	Assess	Geochem	1984	2.6052	-
Metcalfe Lake Area (G84)	42L4/NE	263l. Yzerdraat, W.	-	Assess	GL, Geochem	1983	2.6429	-
Metcalfe Lake Area (G84), Oboshkegan Twp. (G173)	42L4/NE	263m. Yzerdraat, W., (519899 Ontario Ltd.)	-	Assess	Geochem	1983	2.6428	-
Metcalfe Lake Area (G84)	42L4/NE	263n. Yzerdraat, W., (519899 Ontario Ltd.)	-	Assess	GL, Geochem	1983	2.6427	-
Pays Plat Lake Area (G606)	42D14/NW	264. Zahavy Mines Ltd.	Au	Assess	EM, A Mag	1983	2.5802	-
Mussy Lake Area (M29)	42D9/SE	265. Zone Petroleum Corp.	Au	Assess	Mag, VLF	1984	2.6575	-

EXPLORATION ACTIVITY
ON PATENTED OR LEASED MINING LANDS

TABLE 2

Number on Figure	Individual or Company	Activity
	Canamax Resources Incorporated	Diamond drilling in Klotz Lake Area
	Cominco Limited	Stripping, trenching and geology on Kenty or Langridge Prospect, Conglomerate Lake
	Corporation Falconbridge Copper	Diamond drilling and exploration in the Winston Lake Area
	Corporation Falconbridge Nickel	Line cutting, stripping, trenching, geochemical sampling, geological mapping and geophysics on the Hammond Reef Mine, Marmion Lake
	Cumo Resources Mining Corporation of Canada Limited	Geology and diamond drilling at Consolidated Louanna Gold Mine, O'Sullivan Lake
	Great Western Petroleum Corporation and Anglo-Canadian Mining Corporation	Bulk sampling at the Crooked Green Creek Mine, Pifher Township
	Ican Resources Limited	Diamond drilling on Jack Lake Prospect near Tyrell Lake in McCaul Township
	Kenergy Resource Corporation	Line cutting, geological mapping, geochemical sampling and geophysics on the J.J. Walsh claims on the north shore of Sapawe Lake in Hutchinson Township
	Lac Minerals Limited (William's Property, Hemlo)	Stripping, diamond drilling, shaft sinking, open pit
	Lytton Minerals Limited (Ontario Paper Company Option)	Line cutting, geophysics, geochemistry, geology
	Metalore Resources Limited	Diamond drilling in Irwin Township
	Micham Exploration	Exploration and geology in Syine Township
	Noranda Mines Limited (Hemlo Golden Giant Property)	Diamond drilling, shaft sinking, stripping
	Phoenix Gold Mines Limited	Geology, geophysics, sampling, trenching, stripping and diamond drilling on the Quebec-Sturgeon River Mine, Irwin Township
	Reiter, M. (Green, J.J.)	Stripping, trenching and sampling on Four-claim Property, Irwin Township
	Teck Corporation (Hemlo Corona Property)	Diamond drilling, shaft sinking, stripping
	Teck Corporation	Screening and milling of tailings material from Leitch Gold Mine, Eva Township

SUMMARY OF CLAIMS RECORDED AND ASSESSMENT WORK CREDIT

TABLE 3

Year	Claims Recorded	Claims Cancelled	Claims Active	Diamond Drilling (Man Days)	Geophysical Surveys (Man Days)	Geological Surveys (Man Days)	Total Man Days
1974	3,305	3,391	5,837	37,130.5	26,061	4,300	80,559.2
1975	3,436	2,869	6,404	38,652	53,020	4,700	105,338
1976	2,364	3,552	6,079	52,551.6	29,504	4,600	101,025.8
1977	1,964	2,966	5,077	24,879	25,601	4,870	68,727
1978	3,517	1,982	6,612	20,182	20,589	6,206	51,299
1979	3,099	2,139	7,554	11,528	69,612	14,727	101,799
1980	5,527	1,836	11,245	53,418	57,483	5,372	127,288
1981	6,768	4,162	13,851	55,256	172,366	13,863	256,686
1982	10,266	4,613	19,349	133,035	114,805	24,437	292,273
1983	15,835	1,537	33,547	113,554.3	439,992.8	64,789.1	664,891.3
1984 (to end of Nov.)	7,978	7,139	34,560	137,996.8	541,887.4	85,446.6	896,302.2

NORTH RIM PROPERTIES

Exploration activity has been focused on 2 geological environments in this area. The first is associated with a band of felsic volcanic rocks (lapilli tuffs and quartz-eye sericite schists). The area was mapped by Milne (1968). The felsic volcanic rocks form a curving band 500 m wide stretching from Theresa Lake in the east to the Black River in the west, across Pryme Energy Resources Limited-March Resources Limited (Noranda Incorporated option), Lenora Explorations Limited-Argentex Resource Exploration Corporation (Homestake Mineral Development Company option) and Eden Roc Mineral Corporation properties. Pillowed mafic metavolcanic rocks with interflow metasedimentary rocks occur to the north. Conglomerates and siltstones which have been intruded by the Musher Lake Pluton occur to the south. The general stratigraphy is similar to the main deposit area (Patterson *et al.* 1984).

The most significant gold values reported are from the McIntyre copper-nickel showing on the Pryme Energy Resources Limited-March Resources Limited property, 3 km east of Highway 614. Results from Hole A₂ returned values of 0.24 ounce gold per ton across 8.2 feet (assays by Falconbridge Nickel Mines Limited, 1970, in Resident Geologist Files, Ontario Ministry of Natural Resources, Thunder Bay). Drilling results by Noranda Incorporated in 1983 on this property report the existence of green mica, "oellacherite" within a felsic volcanoclastic unit (DDH PN4, Resident Geologist Files, Ontario Ministry of Natural Resources, Thunder Bay).

On the Lenora Explorations Limited-Argentex Resource Exploration Corporation property, 4 km west of Highway 614 near the Black River access road, trenching has exposed a series of pyrite-rich tuffs. Assays for gold are low but anomalous, up to 320 ppb (Geoscience Laboratories, Ontario

Geological Survey, Toronto). Drill logs (DDH 83B-3) from Homestake Mineral Development Company (Resident Geologist Files, Ontario Ministry of Natural Resources, Thunder Bay) reports the presence of green mica.

On the Norman Resources Limited property, just west of the Theresa Lake (under dispute), green mica associated with tourmaline occurs in a quartz-eye sericite schist (G. Cavey, Geological Consultant, OreQuest Limited, Vancouver, personal communication, 1983).

The second type of mineralization is associated with pyrite-magnetite cherty "lean" iron formations which occur as interflow metasedimentary rocks within mafic metavolcanic rocks. Mineralization of this type occurs just to the north of the felsic metavolcanic rocks on the properties of Qued Resources Corporation, Midnapore Resources Incorporated, and possibly United Westland Resources Limited and Score Resources Limited.

On the Qued Resources Corporation property, 1 km west of Theresa Lake, geochemistry, induced polarization, and trenching have traced a number of highly deformed pyritic-cherts across the property. Grab and channel samples from trenches returned 0.012 to 0.081 ounce gold per ton across 5 m (George Cross News Letter, February 27, 1984). Visible gold was noted in the nose of a small fold within sheared mafic metavolcanic rocks (J. Dumouchel, Consultant, OreQuest Limited, Vancouver, personal communication, 1984).

Drilling on the Midnapore Resources Incorporated property, southeast of Theresa Lake, intersected pyritic chert within sheared amphibolites. Gold values up to 0.3 gram gold per tonne across 1 m were reported (Resident Geologist Files, Ontario Ministry of Natural Resources, Thunder Bay).

On the Score Resources Limited property, 2 km north of the Town of Mobert, a trench, 500 m long, exposed a series of

metasedimentary rocks which have been intruded by the Cedar Lake Pluton. A sheared amphibolite, carrying 5 to 10% pyrite, assayed 0.08 ounce gold per ton (Geoscience Laboratories, Ontario Geological Survey, Toronto).

PIC RIVER PROPERTIES

These properties are located along the Pic River 8 km northeast of Marathon. The area was mapped by Milne (1967) and is underlain by felsic pyroclastic rocks on the west and mafic metavolcanic rocks to the north and east. Exploration has focused on and near a narrow unit of metasedimentary rocks consisting of graphitic schists, pelites, and massive sulphide mineralization. These metasedimentary rocks occur between the felsic and mafic metavolcanic units. This horizon occurs on the following properties: Delhi Pacific Resources Limited, Brown-McDade Resources Limited, East West Resource Corporation - Colby Resources Corporation, Gowganda Resources Incorporated, Steely Lake Mines Limited, Westam Oil Limited, Boram Oil Limited, and Carlson Mines Limited.

An occurrence is known on the Gowganda Resources Incorporated property (optioned to Homestake Mineral Development Company). In 1971, Kerr-Addison Mines Limited intersected 18.2 feet (5.5 m) of 0.08 ounce gold per ton and 1.16% zinc in drill core (Resident Geologist Files, Ontario Ministry of Natural Resources, Thunder Bay). The presence of green mica in a quartz-eye sericite schist associated with the mineralization was also reported. A lake bottom geochemical survey conducted by the Geological Survey of Canada reported anomalous values in zinc, copper, lead, and mercury (Geological Survey of Canada, Open File Report 746).

On the East West Resource Corporation property (optioned to Homestake Mineral Development Company), a grab sample from a quartz vein cutting felsic tuffs returned 2972 ppb gold and a grab sample of a fine-grained siliceous

tuff associated with green mica returned 1673 ppb gold. Whole rock assays of the felsic metavolcanic rocks showed elevated potassium values (Resident Geologist Files, Ontario Ministry of Natural Resources, Thunder Bay).

On the Colby Resources Corporation property (optioned to Homestake Mineral Development Company) green mica was reported at 2 locations; in a crystal lapilli tuff unit and associated with carbonate alteration with quartz-ladder veining. An anomalous gold assay of 498 ppb was obtained across a 4-foot (1.2 m) channel containing quartz-tourmaline veins. A grab sample from an associated fine siliceous pyritic tuff returned 384 ppb gold (Resident Geologist Files, Ontario Ministry of Natural Resources, Thunder Bay).

BARITE OCCURRENCES

A barite-rich horizon has been identified in the Hemlo area by OreQuest Consultants Limited. The western end of the horizon is located 10 km east of Marathon. On a regional scale, the barite-rich horizon occurs at the contact between mafic pillowed metavolcanic rocks to the south and metasedimentary and felsic metavolcanic rocks to the north. For a detailed description, see Patterson (1984). The baritic unit which trends 085° and dips 80° S can be traced geologically and by geophysics an additional 6 km east across properties held by Cal Dynamics Corporation, Kadrey Energy Corporation, Padre Resources Limited (optioned to Noranda Incorporated) and Northern Eagle Mines Limited (optioned to Noranda Incorporated). Other properties in the area optioned by Noranda Mines Limited include El Paso Energy Corporation, Inter-Continental Energy Corporation, Devonian Resources Limited, and the Nexus Resource Corporation.

A possible extension of the barite rich horizon occurs farther to the east on the Contact Ventures Limited property (optioned to Nexus Resource Corporation and subsequently to Noranda Incorporated

ed), which lies directly on strike with the barite occurrence on the Northern Eagle Mines Limited property. A series of trenches have exposed quartz-eye sericite schists in contact with mafic metavolcanic rocks to the south and metasedimentary rocks to the north. Within the sericite schist are massive sulphides which have returned up to 0.81% zinc and 168 ppm molybdenum across 1.01 m (unpublished report, K. Cameron, Resident Geologist Files, Ontario Ministry of Natural Resources, Thunder Bay).

LYTTON MINERALS LIMITED PROPERTY

Lytton Minerals Limited optioned the Heron Bay Gold Mine and the Bowhill Mines occurrence from V. Stenlund. The property is located near the Town of Heron Bay. Wahl and Pearson (1984) described the geology of the property:

"The volcanic succession on the property is about 3 km thick and comprises a lower sequence of mafic to intermediate flows and pyroclastics and an upper sequence felsic pyroclastic rock. The lower unit consists of feldspar porphyry flows which are overlain and intercalated with dacitic flows. Overlying these flows is a thin metasilstone-argillite unit, which marks a brief volcanic hiatus before eruption of a thick section of dacitic pyroclastic rocks. The top of this dacitic pyroclastic section grades into a transitional unit about 500 m thick which comprises a wide variety of felsic to intermediate and locally mafic volcanic rocks including the important auriferous pyritic quartz-sericite±talc units. This zone marks the transition between the lower mafic to intermediate volcanics and the overlying thick succession of felsic volcanics, chiefly tuff breccia and agglomerates. The favorable units for gold mineralization appear to be exclusively confined to this transitional zone."

Lytton Minerals Limited carried out a large drill program which has outlined an anomalous zone 1067 m long striking at 080°

and dipping 60° to the south. Values in the zone vary from 0.02 to 0.06 ounce gold per ton across 0.4 to 1 m (Field Trip Guide, Pee-Kong-Gay Property, Resident Geologist Files, Ontario Ministry of Natural Resources, Thunder Bay). Values in quartz veins up to 4.83 ounce gold per ton have been reported (The Northern Miner, February 23, 1984, p.3).

Similar occurrences are known on the Esso Resources Limited property to the west (Muir 1982).

GOLDEN SCEPTRE, NORTH ZONE

Noranda Incorporated announced a new Hemlo zone in The Northern Miner, May 10, 1984:

"The eight holes have outlined a zone about 700 feet long averaging 0.102 oz of gold per ton cut and 0.104 oz per ton (uncut), across an average true width of 35 feet. The holes were spaced 100 feet apart and intersected the zone at an average depth of 50 feet with about 6 feet of overburden.

The new zone has been traced to within 900 feet of the Golden Sceptre's eastern boundary and run east-west about 1,600 feet south of the north boundary."

The zone has been exposed in a series of trenches on the Golden Sceptre Resources Limited property. The mineralization occurs near the top of a felsic package of rocks (crystal tuffs, lapilli tuffs, and quartz-eye sericite schists). These felsic rocks make up the footwall of the main Hemlo deposit, 3 km to the east. The host rocks are highly deformed metasedimentary rocks, possibly conglomerates. A series of narrow chloritic slips with silicified margins 1 to 2 cm wide cut the metasedimentary rocks. Mineralization consists of native gold, molybdenite, and pyrite.

OTHER OCCURRENCES AND EXPLORATION PROGRAMS

No attempt has been made to summarize all exploration programs within the Hemlo belt (estimated at over 100). Rather, programs which have reported mineralization

and/or alteration similar to the Hemlo deposit are included.

1. A joint venture program between Noranda Incorporated and Teck Corporation has been carrying out a deep drill program on the Interlake Development Corporation property in an attempt to intersect the down dip extension of the main Hemlo deposit. One of the holes, north of the Golden Sceptre Resources Limited property, intersected 3.3 feet (1 m) assaying 0.093 ounce gold per ton from 5459.3 to 5462.6 feet (1664 to 1665 m) and 14.4 feet (4.4 m) grading 0.17 ounce gold per ton from 5587.3 to 5601.7 feet (1703 to 1707.4 m) (The Northern Miner, February 9, 1984, p.1).

2. Drilling by a private company, Ontario 117484, approximately 2 km south of the International Corona Resources Limited property has intersected mineralization within the contact zone between the Playter Harbour mafic metavolcanic rocks and the Pukaskwa Gneissic Complex. Values reported include 3.3 feet (1 m) of 0.04 ounce gold per ton; 2.3 feet (0.7 m) of 0.57 ounce silver per ton and 22 ounces molybdenum per ton (0.07%), and 1.7 feet (0.5 m) of 0.015 ounce gold per ton (The Northern Miner, November 3, 1983, p.3).

3. The Lynx-Canada Explorations Limited-Sparton Resources Limited joint venture property is located 1.6 km north of the Goliath Gold Mines Limited property. Drilling on a series of geochemical and VLF anomalies intersected pyrite-pyrrhotite mineralization grading up to 0.02 ounce gold per ton across 5 feet (1.5 m) (The Northern Miner, November 10, 1983, p.3).

4. A program of mapping on the Aurelian Developers Limited property, 7 km north of Rous Lake, outlined a number of quartz lenses and veins within feldspathic arenites (Resident Geologist Files, Ontario Ministry of Natural Resources, Thunder Bay).

5. The Walhalla Resources Limited-Maple Leaf Petroleum Limited joint venture property is

located northeast of Pukaskwa Park. An extensive program of geological mapping, geochemistry, geophysics, and drilling defined a number of alteration zones. The zones are hosted in sheared and altered felsic rocks. Alteration consists of silicification, carbonatization, and sericitization with minor green mica and tourmaline. A series of whole rock assays taken across the west altered zone showed K_2O and Na_2O increasing to the north. The highest gold assay reported was 285 ppb (Resident Geologist Files, Ontario Ministry of Natural Resources, Thunder Bay).

6. The Bel-Air Resources Limited property (optioned to Westfield Minerals Limited) is located due south of the Golden Sceptre Resources Limited property. A program of geological mapping, trenching, electromagnetic, and magnetometer surveys, and diamond drilling was carried out. A zone of pyrite-pyrrhotite-bearing chert and tuff units was traced 2400 feet (731.5 m) across the property. Alteration consisting of green mica and sericite is associated with the mineralization. The highest assay reported was 0.002 ounce gold per ton (Resident Geologist Files, Ontario Ministry of Natural Resources, Thunder Bay).

AMETHYST IN THE THUNDER BAY REGION

INTRODUCTION

The amethyst mining industry in the Thunder Bay area has had a long history. The existence of amethyst was first noted by the French explorers Radisson and Groseilliers in 1662. In the mid- to late-1800s, amethyst was mined in association with silver and base metals. The first recorded amethyst mine was in 1862 when the McEachern brothers mined amethyst from the Amethyst Harbour area (15 km east of Thunder Bay). The material was sold in Toronto, Niagara Falls, Pikes Peak, and Hot Springs (McKellar 1908).

Interest in the Thunder Bay amethyst deposits declined sharply around the turn of the century

with increased production from Brazil. The Thunder Bay amethyst occurrences remained a mineralogical oddity until the 1960s. At this time, Rudy Hartviksen, following up the discovery of amethyst near Elbow Lake, started mining amethyst and selling it to mineral collectors and the building stone industry. Amethyst mining received a considerable boost, when in 1975, the Honourable Leo Bernier announced in the Ontario Legislature that amethyst would be Ontario's official mineral.

Currently in the Thunder Bay area, there are 7 producing mines and 8 past producing mines. Approximately 100 000 people a year visit the amethyst mines or shops in the region. The amethyst industry creates jobs for approximately 50 to 75 people through mining, the sale of specimens, and the production of jewelry.

REGIONAL GEOLOGY

The rocks of the Thunder Bay area are Precambrian in age. The Archean rocks consist of folded mafic metavolcanic and metasedimentary rocks intruded by quartz-monzonites which all belong to the Shebandowan "Greenstone Belt". Unconformably deposited on the Archean basement are a series of nearly flat-lying sedimentary rocks of the Gunflint Formation, Rove Formation (1850 Ma, Goldich 1972) and Sibley Group rocks (1300 Ma, Wanless and Loveridge 1976). All rocks are intruded by Logan diabase sills. The veins and breccia zones that host the amethyst cut all rock types, but are most common in Archean granitic rocks at or near the unconformity with the Sibley Group rocks. The veins appear to belong to the general class of Dorion lead-zinc veins described by Franklin and Mitchell (1977).

The veins occupy fault zones of 3 general types: 1) both walls are Archean; 2) one wall is Archean, 1 wall is Sibley Group; 3) both walls Sibley Group. The veins generally contain angular blocks of altered wallrocks in a matrix of quartz, carbonate, and barite of

varying proportions. Commonly, there are clasts of breccia within the vein suggesting multiple movements. The amethyst occurs in vugs filled with fault gouge which is locally referred to as clay. The vugs are generally 5 to 15 cm in size, but vugs up to 1 by 3 by 10 m have been observed. These are lined with amethyst crystals up to 15 cm in size at the base. Individual veins are up to 10 m across and can be traced up to 500 m along strike. Usually only the pyramid faces of the amethyst are well developed.

AMETHYST AND ITS PROPERTIES

Work on the colouring agent in amethyst by Dennen and Puckett (1972) has demonstrated that the violet colour is due to iron-rich centres which have been activated by radiation. This in part explains why the highest quality amethyst is associated with veins in granitic rocks at or near the unconformity with the Sibley Group sedimentary rocks. A number of unconformity-type uranium occurrences are known in the area and some of the amethyst veins were examined for their uranium potential. On the "7Z" Property, near Crystal Beach, the veins can be traced from the granites into Gunflint Formation cherts. The quartz in veins hosted by granites is dark violet, while in the Gunflint Formation, the quartz is colourless. A similar effect can be noted in fluorite, which is green in Gunflint Formation rocks and purple in granitic rocks.

Work by S. Lukinuk (Amethyst Mine Panorama) and R. MacFagin (consultant) has demonstrated that the amethyst from the Thunder Bay area has a number of unusual properties.

1. In deeply coloured minerals such as amethyst, the colour varies with the orientation of the crystal (dichroism). At the Amethyst Mine Panorama, the amethyst is deep purple in a direction at right angles to the c-axis and a pale smokey colour parallel to the c-axis. This means that the orientation of the crystal during cutting is

crucial to producing a stone of good colour.

2. Another unusual feature is the change in colour with the type of light incident on the sample (absorption). In sunlight the amethyst has a distinct cool blue-violet colour, while in tungsten light the amethyst has a warm red-violet colour.

3. When an amethyst crystal is cut, a zonation parallel to the crystal face is commonly observed. Individual bands are from 1 to 15 mm wide, with as many as 16 bands noted within a single crystal. The colour varies from violet to smokey to white. The colour also varies within a single band, being typically darker where crystal faces meet. In larger zones irregular wave bands produce a typical 6-sector pattern (Dauphine twins).

Recently, these unusual properties of amethyst have been taken into account by Amethyst Mine Panorama, and the result is some of the highest quality amethyst ever produced locally. Currently, a number of mining methods are being experimented with at the Amethyst Mine Panorama to increase the recovery of faceting quality amethyst.

PROPERTY DESCRIPTIONS

Amethyst Mine Panorama

Formerly known as the Thunder Bay Amethyst Mine, this property has been in production since 1962. The mine is located at the eastern end of Loon Lake, McTavish Township. The area has been mapped by the Ontario Geological Survey, (McIlwaine 1971). The property is underlain by biotite-quartz monzonites. A number of strongly developed lineaments occur in the area at 000 to 020° and 050 to 080°. The main quarry (25 by 175 by 8 m) exposes a series of 4 parallel faults which trend at 110° and dip at 65 to 75°S, each with an associated quartz breccia zone. The faults are marked by zones of muscovite schist, 1 to 1.5 m in width, within the quartz monzonite host rock. The combined effect is a complex network of

quartz veins across a width of 25 m.

The composition of the vein breccia is highly variable and consists of:

- 10-85% angular clasts of quartz monzonite and Sibley Group sandstone. The plagioclase within the monzonite is generally altered to yellowish sericite. Typically, the Sibley Group rocks are bleached to a pale brown colour. The clasts are commonly 10 cm across, but clasts up to 2 m occur.

- 10-70% quartz, usually white in colour. Typically, there are several generations of quartz rimming the clasts.

- 5-30% vugs. These vugs vary in size from 3 cm by 5 cm by 5 cm to 1 m by 3 m by 10 m. Commonly they are filled with red-brown clay (fault gouge). Amethyst crystals up to 20 cm in size occur loose within the clay, as well as lining the vugs.

At the present, the main method of mining amethyst is by blasting small benches 1 m by 1 m by 7 m followed by hand-sorting of the muck. The clay with the loose amethyst crystals is removed from the vugs and sent to a washing table where the crystals are liberated from the clay. The crystals are then sorted into various grades: tumbling, building stone, and specimen. Only recently are some of the larger crystals being crushed to 5 cm in size in order to recover faceting quality amethyst.

Marlino Mountain Property

The property is located in the southern half of Mineral Location 12, McTavish Township, adjoining the Ontario Gem Company property to the south. The regional geology was mapped by McIlwaine (1971). A series of north-south elongated knobs of Archean biotite-quartz monzonite are surrounded by Sibley Group siltstones and mudstones. Amethyst occurs in 2 distinct geological environments:

1. A series of trenches have exposed a quartz breccia zone along the flank of a granitic knob. The granitic rocks occur to the northeast and the Sibley Group rocks to the southwest. The breccia zone occurs near the contact between the Archean and the Sibley. At the main trench, the zone can be traced for 36.6 m, with a 3 to 5 m width. A vug 0.6 by 2.4 by 3.7 m partly filled with clay, has recently been discovered. This vug contains amethyst crystals up to 6 cm across.

2. Approximately 100 m to the north of the breccia zone, a series of cherty Sibley Group stromatolites occur as mounds up to 1 m in size. The stromatolites rest directly on Archean granitic rocks. The stromatolites are made up of layers of chert 1 mm to 1 cm thick, varying in colour from white to grey to black. Sections have been brecciated and cemented together by white quartz. The chert is commonly draped over irregularities occurring on the unconformity.

Within the chert are vuggy sections (2 by 15 by 5 cm) with light to dark amethystine quartz; individual crystals are up to 2 cm across, often with a hematite coating or yellow-brown barite overgrowths.

SHEBANDOWAN AREA

JALNA RESOURCES LIMITED GOLD CREEK PROPERTY

Much of the exploration activity in the Shebandowan area has been focused on the Jalna Resources Limited's Gold Creek property in the southeastern portion of Duckworth Township (16 km southeast of the Village of Shebandowan). The area has recently been opened up by a series of logging roads.

Duckworth Township is underlain by the Shebandowan metavolcanic-metasedimentary belt. The belt can be divided into 4 groups with an east-west trend. The northern group consists of mafic pillowed metavolcanic rocks, with top directions to the south. The Crayfish Creek Fault separates the mafic metavolcanic rocks

from a unit of metasedimentary rocks to the south. The metasedimentary rocks are fluviatile conglomerates, wackes, arkoses, argillites, chert, and ironstone. These are similar to Timiskaming type sedimentary rocks (M.W. Carter, Geologist, Ontario Geological Survey, Toronto, personal communication, 1984). South of the sedimentary rocks is a group of felsic to intermediate metavolcanic rocks (tuffs to pyroclastic breccia). These metavolcanic rocks are host to the Jalna occurrence. A quartz monzonite stock underlies the southern part of the township. All rocks are cut by diorite and gabbro dikes.

The Goldore Joint Venture (Jalna Resources Limited (operator), GLE Resources Limited, Sutherland Resources Limited, and Austin Resources Incorporated) has carried out a program of geological mapping, geochemistry, trenching, and geophysical surveys. The program discovered 4 zones with anomalous gold values:

1. The Ternowesky Zone is a shear zone up to 2 m wide, consisting of a quartz vein hosted in a sericite schist (altered quartz feldspar porphyry tuff). The shear zone has been traced for 15 m along strike. The quartz vein is from 3 to 10 cm wide and contains pyrite, galena, tetrahedrite, chalcopyrite, and tellurides. Assays up to 4.07 ounces gold per ton and 42.2 ounces silver per ton have been obtained (Geoscience Laboratories, Ontario Geological Survey, Toronto). In the associated sericite schist a pale green mica has been noted and assays of 1880 ppb gold have been obtained (Jalna News Release, December 30, 1983).

2. The Creek Zone which parallels Gold Creek appears to be an extension of the Quartzite Mine Zone worked in the 1890s. An extensive orebody of country rock assaying \$6.00 to \$8.00 per ton (price of \$20.00 gold) was reported (Blue 1896, p.113). Recent assays have returned 205 ppb gold along a zone which can be traced 3200 feet (975 m) (Jalna News Release, December 30, 1983).

3. The North Zone has been exposed by trenching and stripping for 48.8 m along strike and 1.5 m to 4.3 m across. The host rock is a complex felsic breccia with pods and lenses of amphibole. A number of silicified zones (chert) containing 3 to 15% pyrite occur within the felsic breccia. Values from 0.05 to 0.12 ounce gold per ton, with an average of 0.10 ounce gold per ton, have been reported across the zone (Jalna News Release, May 22, 1984).

4. The South Zone is hosted within a pyrite-bearing felsic breccia. Gold values of up to 360 ppb have been obtained (Geoscience Laboratories, Ontario Geological Survey, Toronto).

CURRAN BAY RESOURCE LIMITED (POWELL SHOWING)

The property is located 90 km west-southwest of Thunder Bay, on the northern shore of Saganaga Lake. Diamond drill logs indicate the presence of quartz veins carrying pyrite within a sheared metavolcanic host. Hole 84-2 intersected 0.72 ounce gold per ton across 4.6 m (Resident Geologist Files, Ontario Ministry of Natural Resources, Thunder Bay).

BEARDMORE—GERALDTON ECONOMIC GEOLOGIST PROGRAM

J.K. Mason and G.D. White

Resource Geologists, Ontario Ministry of Natural Resources, Thunder Bay.

INTRODUCTION

The Beardmore-Geraldton Economic Geologist Program is a Northern Ontario Rural Development Agreement (NORDA) program funded jointly by the Canada Department of Regional Industrial Expansion and the Ontario Ministry of Northern Affairs. The program is staffed by John Mason and Gerry White. The object of the program is to stimulate exploration activity in the Beardmore-Geraldton area by assisting prospectors and mining companies with property visits, sampling,

TABLE 4. EXPLORATION PROGRAMS IN THE BEARDMORE — GERALDTON AREA 1984.

Company	Township/Area	Exploration
Anglo Canadian Mining Corporation (Great Western Petroleum Corporation)	Pifher Township	Bulk Sampling
BP Resources Canada Incorporated	Caribou Lake	Geology, Geochemistry
BP Resources Canada Incorporated	Fort Hope (Miminiska Lake)	D.D.H.
Bridgewest Development Corporation	Ashmore Township	D.D.H.
Callisto Minerals Incorporated	Oboshkegan Township - Metcalfe Lake	Geophysics, Geochemistry
Canadian Nickel Company Limited (Inco Limited)	Conglomerate Lake	Geology, Geophysics, Geochemistry
Canamax Resources Incorporated	Klotz Lake	D.D.H.
Cotton Valley Resources Incorporated (Projex Limited)	Longlac	Geology, Geophysics, Sampling
Craskie Mines Limited	Vincent Township	Geophysics, D.D.H.
Dome Exploration (Canada) Limited	Lindsley Township	D.D.H.
Eldor Resources Limited	Vincent Township	D.D.H.
Felmont Oil Corporation	Miminiska Lake	D.D.H., Geophysics
Field Resources Limited	Lindsley Township	D.D.H.
Forester Resources Inc.	north of Lansdowne House	Geophysics (airborne)
Getty Minerals Company Limited (Explorations Banque-Or Incorporated, New Arcadia Explorations Limited)	Klotz Lake	Geology, Sampling, Geophysics (ground and airborne), D.D.H.
Gold Fields Canadian Mining Limited	Caribou Lake	Geology, Sampling
Golden Pond Resources Limited	Croll Township	Linecutting, Geophysics

mapping, literature searches, field trips, and documentation of all occurrences in the area.

During the past year, the Southern Metavolcanic Belt type gold mineralization (Mason and McConnell 1983) was examined in detail. Visits were also made to properties in the Onaman-Tashota Metavolcanic Belt. A discussion of results from both areas follow.

PRODUCING GOLD MINES AND MAJOR EXPLORATION PROGRAMS (Table 4)

The Consolidated Louanna Gold Mine, O'Sullivan Lake, operated by Mining Corporation of Canada Limited, milled approximately 70 000 tons of ore grading 0.22 ounce gold per ton, from late 1983 until the mill closed in October 1984 (G. MacDonald, Manager, Mining Corporation of Canada Limited, personal communication, 1984).

Teck Corporation (Leitch Division) has produced 70 000 tons of screened dump material from the Leitch Gold Mine and has shipped 55 000 tons to the Teck mill (former Pan-Empire Joint Venture), located 1 km east of Beardmore. Mill grade was approximately 0.11 ounce gold per ton for 24 000 tons of ore milled to September 25, 1984 (R. Dunning, Project Superintendent, Teck Corporation (Leitch Division), Beardmore, personal communication, 1984).

Northern Concentrators' custom mill in Thunder Bay milled 327 tons of gold ore from the Crooked Green Creek (2 Zone) Mine in Pifher Township. An additional 213 tons of ore was mined (bulk sampled) and trucked to Teck Corporation's custom mill facility (Dr. N. Carter, Consulting Geologist, Victoria, B.C., personal communication, 1984). All mining (bulk sampling) and milling were performed as part of the Thunder Bay Joint Venture - Cowan - Hillsborough agreement.

The Wenzoski (Nora Lake) Gold Occurrence, in Walters Township, was bulk sampled. Less than 100 tons of ore (exact ton-

TABLE 4. CONTINUED

Company	Township/Area	Exploration
Harte Resources Limited	Walters Township	D.D.H.
H.E. Neal & Associated Limited	Toronto Lake - Junior Lake	Linecutting, Geology, Geochemistry
Holmwood Resources Limited	Meader Township	Geophysics
Holmwood Resources Limited	Sandra - Meader Townships	Linecutting, Stripping, Trenching
Inco Limited	Conglomerate Lake	Geology, Geochemistry
Kerr Addison Mines Limited	Melchett - Kapikotongwa Lakes	Geophysics
Kerr Addison Mines Limited	Toronto Lake	Geology, Sampling
Kerr Addison Mines Limited	McComber Township	Geology, Sampling
Lacana Mining Corporation	O'Sullivan Lake	Geology, D.D.H.
Lacana Mining Corporation	Humboldt Bay (Lake Nipigon)	Geology, Sampling, Geophysics, D.D.H.
Metalore Resources Limited	Irwin Township	D.D.H.
Monopros Limited	Beardmore - Geraldton Area	Heavy Mineral Sampling
Noranda Exploration Company Limited	Conglomerate Lake	Geology, Geochemistry
Noranda Exploration Company Limited	Klotz Lake	Geology
Pancontinental Mining Canada Limited	Summers Township	Stripping
Phoenix Gold Mines Limited (Quebec Sturgeon River Mines)	Irwin Township	Geology, Geophysics, Sampling, Trenching, Stripping, D.D.H.
The Quaternary Mining & Exploration Company Limited	Ashmore Township	Stripping, Trenching, Linecutting, Sampling

nage not available) was milled at the Northern Concentrators' mill.

Thorco Goldfinders Incorporated initiated a bulk sampling program on the former Cane Consolidated Exploration Limited lead-silver occurrence and the Abitibi-Price Incorporated lead-zinc-silver occurrence, both in the Onaman Lake area. Approximately 100 tons of ore has been shipped to Q.C. Explorations Limited's Porta-Mill in Thunder Bay (N. Cox, Prospector, Beardmore, personal communication, 1984).

Phoenix Gold Mines Limited conducted an exploration program on the Quebec-Sturgeon River Gold Mine property in Irwin Township.

Linecutting, geophysics, geochemistry, stripping, trenching, and diamond drilling were undertaken. The main dump is being evaluated for its ore potential. From 1936 to 1942, 73 438 ounces of gold, at a grade of 0.51 ounce gold per ton, were milled. Hand-sorting was implemented to upgrade the ore (Resident Geologist Files, Ontario Ministry of Natural Resources, Thunder Bay).

Metalore Resources Limited initiated a 6000 m diamond drill program on the Brookbank Prospect in central Irwin Township.

Three major exploration programs were undertaken in the immediate Geraldton area. Dome Exploration (Canada) Limited continued drilling, as part of a multi-year project, in Lindsley Township, proximal to the Jellicoe (Jelex) Gold Mine.

The Magnet Consolidated Gold Mine, Errington Township, operated by the Roxmark Mines Limited-Sherritt Gordon Mines Limited Joint Venture was dewatered to below the 11th level (1730 feet (527 m)). The lowest development level of the Magnet Mine was the 17th level (2610 feet (796 m)). Phase 2 of a 3-phase exploration program has been completed, consisting of 6 surface diamond-drill holes totaling 1541 m (5056 feet) and 17 underground drillholes totaling 2322 m (7617 feet). Ten of the underground

TABLE 4. CONTINUED

Company	Township/Area	Exploration
Roxmark Mines Limited-Sherritt-Gordon Mines Limited	Errington Township	D.D.H.
Ryan Energy Corporation	north of Lansdowne House	Geophysics
Sandex Mining Enterprises	Eva - Summers Township	Linecutting, Trenching
Sherritt-Gordon Mines Limited	Oboshkegan Township	Geophysics
South Atlantic Ventures Limited	O'Sullivan Lake	Geology
Stroud Resources Limited	Vincent-McComber Townships	D.D.H.
Tantalum Mining Corporation of Canada Limited	Fort Hope	Geology
Teck Corporation-Retlaw Resources	Tashota	D.D.H.
Thorco Gold Finders Incorporated	Summers Township	Stripping, Trenching, Geology, D.D.H.
Thorco Gold Finders Incorporated	Onaman Lake	Stripping, Trenching, Geology
TJN Gold Explorations Incorporated	Onaman Lake	Linecutting, Geophysics, D.D.H.
Transway Explorations Incorporated	Klotz Lake	Geophysics
Villeneuve Resources Limited	Klotz Lake	D.D.H.

holes were drilled below the Magnet Fault, which is a splay off the Bankfield-Tombill Fault. The latter is a major transcurrent fault proximal to most gold orebodies in the Geraldton camp. The Magnet Fault is a possible axial planar feature, therefore, a repetition of the original ore zone which yielded 359 912 tons grading 0.42 ounce gold per ton, may exist below the fault. Ore reserve estimates are 1.4 million tons grading 0.17 ounce gold

per ton (The Northern Miner, June, 1983, p.A16).

Quaternary Mining and Exploration Company Limited initiated an extensive stripping, trenching, and sampling program on the Hardrock Extension Property, a claim group east of the Hardrock Mine, Ashmore Township. Two gold showings have been noted. One showing is hosted within a persistent composite quartz vein exhibiting visible gold, while the second is

a stock work of quartz-tourmaline-arsenopyrite-gold veins hosted in altered feldspar porphyry. The porphyry appears similar to the Macleod-Cockshutt "F" Zone porphyry which hosted 10 million tons grading 0.15 ounce gold per ton (Resident Geologist Files, Ontario Ministry of Natural Resources, Thunder Bay).

GENERAL GEOLOGY AND STRUCTURE

The Beardmore-Geraldton area has been divided into 2 belts: the Beardmore-Geraldton Belt and the Onaman-Tashota Metavolcanic Belt are separated by the Paint Lake Fault, a major transcurrent fault. Criteria used to differentiate the belts are: 1) zircon and lead dates; 2) structural style; and 3) lithologies. Discussion of these points follows. The Beardmore-Geraldton Belt has been further subdivided into the Southern Metavolcanic Sub-belt and the Southern Sedimentary Sub-belt.

The Southern Metavolcanic Sub-belt and the Onaman-Tashota Belt will be examined in detail.

The Beardmore-Geraldton Belt is situated within an east-trending, isoclinally folded metavolcanic-metasedimentary sequence that is part of the Wabigoon Subprovince. Lithological units have been tectonically transposed into a series of alternating slices of metavolcanic and metasedimentary rocks postulated to be a wrench zone. Conglomerate, wacke, siltstone, shale, and Algoman type ironstone typically comprise the metasedimentary units. The metavolcanic rocks are intermediate to mafic in composition. The northern limit of the possible wrench zone, termed the Geraldton-Beardmore Belt, is the Paint Lake Fault. North of the fault, felsic metavolcanic flow rocks and pyroclastic rocks predominate. This northern belt has been termed the Onaman-Tashota Metavolcanic Belt.

The metavolcanic-metasedimentary rocks of the Beardmore-Geraldton area have been intruded by felsic batholiths, stocks, sills, dikes, and lenticular

mafic intrusions. Late Precambrian diabase dikes and sills intrude all rock types. The regional metamorphic grade is greenschist facies.

A detailed description of the geology and gold mineralization of the Beardmore-Geraldton area is provided in Mason and McConnell (1983) and Patterson *et al.* (1984) (modified for this text).

GEOLOGY OF THE SOUTHERN METAVOLCANIC SUB-BELT

The most southerly unit in the Wabigoon Subprovince is made up of iron- to magnesium-rich tholeiites, forming an east-trending narrow belt up to 3.0 km wide. The metavolcanic rocks consist of massive, pillowed, amygdaloidal, and rarely variolitic flows.

The mafic flows, where discernible, are described by Carter (1983) as being 15 to 25 m thick, and dark green to greenish black in colour. They typically consist of a massive, medium-grained basal part, crudely fining upward, becoming aphanitic in nature and commonly pillowed. Where undeformed, pillows range up to 0.6 by 0.4 m wide.

Intermediate to mafic tuffs are present as medium- to fine-grained, light green rocks which display a weak foliation due to the alignment of metamorphic biotite and other rock and mineral fragments.

Chemical metasedimentary rocks are common and can occur with rare thin clastic beds. These chemical metasedimentary rocks or ironstones (iron content may fall below 15%) are east trending (070° to 085°), generally 1 to 2 m wide, and occur as somewhat continuous regional features that are typically 100 m to 1 km in strike length.

Metagabbroic stocks intrude the metavolcanic rocks. These intrusions are generally medium to coarse grained and massive. Minor quartz-feldspar, feldspar porphyry, feldspar, and pegmatite dikes intrude the metavolcanic rocks.

A diabase sheet, 170 m thick, outcrops in western McComber Township. The sheet dips approxi-

mately 10° to 15° to the west and intersects the Northern Empire ore zone. Further to the west within the metasedimentary rocks the same diabase mass intersects the Leitch and Sand River Mine veins. These Late Precambrian diabase and porphyritic diabase dikes exist as minor units within the belt and consistently trend north to north-easterly.

Structural Geology

The Southern Metavolcanic Sub-belt appears to be in fault contact with turbidites on its northern and southern boundaries. The northern fault contact, as interpreted by Benedict and Titcomb (1948), was intersected in diamond drill core by Newmont Mines Limited on the Northern Empire in the 1930s. The fault is represented by a black graphitic gouge bordered by less than 2 m of intense shearing. The southern contact is marked by a regional lineament depression through the southern portion of the Blackwater River and stretched pillowed metavolcanic rocks (stretched 12 to 5:1 in the long dimension). This lineament is termed the Blackwater Fault. The fault contact area between metasedimentary and metavolcanic rocks can be observed at Clist Lake in Vincent Township.

Cleavage, foliation data combined with younging directions determined from upward fining flows, pillowed metavolcanic rocks, and amygdaloidal and variolitic textures suggest the presence of an upward-facing fold (overturned anticline) in the west-central portion of this belt (Vincent, McComber Townships) (Carter 1983).

Gold Mineralization

Eighteen gold occurrences, prospects, and deposits have been examined and/or mapped in detail in the Southern Metavolcanic Sub-belt for this study. Examples of the mineralogy from a number of properties will be used to illustrate the type of gold mineralization present.

History

Gold was originally discovered in the Beardmore Area at the Beardmore or Northern Empire Mine, 1 km east of Beardmore, in 1925 (now the Pan-Empire Joint Venture). To date, this property has been the only producer from the Southern Metavolcanic Sub-belt. Newmont Mines Limited brought the Northern Empire Mine into production in 1934. The mine recovered 153 103 ounces of gold at a grade of approximately 0.35 ounce gold per ton. The Northern Empire Mine is one of 20 gold producers within the Beardmore-Geraldton Metavolcanic-Metasedimentary Belt. This gold camp rates among the top 6 gold camps in the Canadian Shield with production of 4.12 million ounces of gold. Eleven exploration programs have been conducted in the last 2 years on 18 occurrences, prospects and deposits in the Southern Metavolcanic Sub-belt, notably in the central portion of the belt (Resident Geologist Files, Ontario Ministry of Natural Resources, Thunder Bay).

Shear Zones

The Pichette shear zone, first documented by Peach (1951), occurs in eastern Vincent Township and represents a unique type of gold mineralization in the Southern Metavolcanic Sub-belt. Gold mineralization occurs in highly sheared, pillowed, and massive basalts and in highly contorted sugary quartz veins. Gold is associated with pyrite and carbonate. Values are erratic with visible gold detectable by gold panning.

Ironstone

Conclusions, regarding the mineralogy of the ironstones or distal exhalites, have been drawn from observations made at the following properties: Delbridge, Blacksmith, Dominion, Maki - Eldor Option, Maki East, McWilliams - Beardmore, Vega, Craskie, Thorco, Dalton, and Latimer - McGowan Properties. The ironstones are banded, consisting primarily of chert, magnetite, iron amphiboles,

and carbonate mesobands. The mesobands range up to 20 cm thick (Maki Occurrence).

Chert mesobands are composed of massive to recrystallized chert. Magnetite does occur as discordant veinlets in chert, but is found primarily as bands of massive magnetite forming a matrix for subhedral to euhedral granular magnetite (Dalton Occurrence). Quartz and tourmaline veinlets, and carbonate occurs throughout the ironstones, particularly in or adjacent to chert bands (McWilliams - Beardmore Prospect).

Sulphides, including arsenopyrite, pyrite, pyrrhotite, and chalcopyrite, occur as vein-related replacement minerals within quartz veins or in association with mafic mesobands.

Sulphides are present in crude discontinuous layers or knots, consisting of coarse subhedral to euhedral grains. Gold is associated with the sulphides mainly as disseminated micro-inclusions or as coarse gold. Locally, structurally favourable sites for gold are fracture zones, fold-noses, contacts, and axial planes.

Iron amphiboles, primarily grunerite and minor cummingtonite, are associated proximal to the chert-magnetite contacts. One of the most economically significant properties is the Craskie Mines Prospect, Vincent Township, currently held by Tombill Mines Limited. It consists of 4 auriferous ironstone zones, from 1.5 to 2.0 m wide and up to 131 m long, forming a small gold deposit. The best indicated grade was 0.25 ounce Au per ton (Resident Geologist Files, Ontario Ministry of Natural Resources, Thunder Bay; Tombill Gold Mines Limited Annual Report, 1953).

Quartz-Carbonate Veins Hosted In Metavolcanic Rocks

Quartz-carbonate veining has intruded the mafic metavolcanic rocks, often discordantly proximal to the ironstones. The veins are up to 2.5 m wide, milky white, vitreous to sugary, and can form a

stockwork vein with erratic but good visible gold (Maki Property). In contrast, the Neelin-Braggan vein and Northern Empire-Spooner boudinaged composite vein systems are generally concordant with the foliation (Benedict and Titcomb 1948).

Geochemistry

Some general trends and conclusions useful to exploration can be drawn from geochemical analysis of various ironstones in the Southern Metavolcanic Sub-Belt. A total of 75 samples of ironstones (which includes banded chert, chert-magnetite, and chert-iron carbonate) and associated mafic metavolcanic rocks were taken. The samples that contained no visible sulphides had background gold values ranging from 6 to 75 ppb. In the samples that contained sulphides there appears to be a direct relationship between the arsenic and antimony, and gold concentrations.

Samples from the Delbridge Occurrence, McComber Township, have gold values ranging up to 35.1 ppm with corresponding arsenic and antimony values ranging up to 16.3% and 17.0 ppm, respectively (see Table 5). All samples were analyzed by atomic absorption. It is also important to recognize the existence of signal interference between arsenic-antimony-bismuth-selenium and that these values may be biased to some extent (Chris Chan, Chemist, Geoscience Laboratories, Ontario Geological Survey, personal communication, 1984).

Alteration and Mineralogy

A weak to moderate pervasive carbonate alteration is present throughout much of the Southern Metavolcanic Sub-belt. Locally, within the ironstone and adjacent wall rocks, silicification and carbonatization can be moderate to strong. This type of local alteration in the metavolcanic rocks represents filling of primary porosity by silica during recrystallization. Carbonate and quartz veining appears to have followed. Pyrite, arsenopyrite and gold were intro-

duced during this phase, replacing magnetite, often in the mafic layers throughout the rock.

Grunerite-cummingtonite is the result of the loss of CO₂ during metamorphism in banded oxide-carbonate ironstones or banded oxide ironstones that have experienced quartz flooding. Chert (or quartz) reacts with the carbonate to form new silicates, as documented by Klein (1973). During progressive metamorphism, often accompanied by decarbonatization and dehydration, carbonates, including the dolomite-ankerite series, siderite, calcite, and chert react to form the cummingtonite-grunerite series. The CO₂ content can vary locally. Some portions of the ironstones may have locally high CO₂ levels and as a result during metamorphism only recrystallization and increased grain size will result.

Conclusions

Gold mineralization of potentially economic quantities in the Southern Metavolcanic Belt is associated with zones of deformed and hydrothermally altered banded ironstones. Gold is associated with sulphides in veins and mesoband replacements. The ductility contrast during deformation between cherty ironstone and mafic metavolcanic rocks created a permeability that allowed the penetration of auriferous fluids into the ironstone and locally into fractures in the volcanic rocks. No primary gold-bearing sulphides were observed. Banded ironstone, void of sulphides, contain 6 to 75 ppb gold. These values are anomalous relative to the main sedimentary belt where banded ironstone contains 2 to 5 ppb gold. Chemically, gold appears plated on secondary sulphide minerals and through sulphidation (MacDonald, in press; Fyon *et al.* 1983) a portion of iron-rich mesobands are preferentially replaced by pyrite, arsenopyrite, or pyrrhotite containing gold.

GEOLOGY OF THE ONAMAN-TASHOTA METAVOLCANIC BELT

The Onaman-Tashota Metavolcanic Belt, a portion of the Wabigoon Subprovince, is a felsic to mafic metavolcanic sequence. The belt is bounded to the south by the Paint Lake Fault and is predominantly a volcanic terrain deformed into arcuate shapes by the emplacement of intervening granitic intrusions. Preliminary age dates suggest that the Onaman-Tashota Metavolcanic Belt predates the main Beardmore-Geraldton Belt. Zircon dates suggest that the Onaman-Tashota Metavolcanic Belt predates the main Beardmore-Geraldton Belt. Zircon dates of $2770 \pm$ Ma were obtained at the Headway Coulee lead-zinc-silver Deposit near Onaman River. Lead

isotope dates ranging from 2800 to 3000 Ma have been established for the Onaman River and Armstrong areas, respectively (these are lead model ages and caution should be exercised when using the same) (Dr. J.M. Franklin, Research Scientist, Geological Survey of Canada, Ottawa, personal communication, 1984).

Mafic metavolcanic rocks are intercalated with felsic pyroclastic rocks with minor quartz porphyry and rhyolitic flows. The mafic metavolcanic rocks consist of massive to foliated, pillowed, porphyritic, and amygdaloidal flows, chlorite schist, tuff lapillistone, tuff breccia, and agglomerate. Felsic metavolcanic rocks consist of rhyolite to rhyodacite, rhyolite porphyry, crystal tuff, lapilli tuff, tuff breccia, rhyolitic quartz feldspar

porphyry, and pyroclastic breccia (Amukun 1977). Metasedimentary rocks include argillite, arkose, wacke, sandstone, conglomerate, and chemical metasedimentary rocks (Thurston 1980). Gabbro, diorite, quartz diorite, monzonite, and quartz-feldspar porphyry have intruded the metavolcanic rocks. Late felsic intrusions include pegmatite, felsite, quartz and/or feldspar porphyry, alaskite, and micropegmatite (Amukun 1977). Late Precambrian diabase intrudes all rock types.

Metamorphic grade ranges from greenschist to amphibolite grade.

Gold Mineralization

Gold is hosted in 2 environments within the Onaman-Tashota Belt:

TABLE 5. GEOCHEMISTRY OF GOLD PROPERTIES, BEARDMORE-GERALDTON AREA (Geoscience Laboratories, Ontario Geological Survey, Toronto)

Craskie Prospect				
Sample No. (Grab)	As (ppm)	Sb (ppm)	Au (ppb)	Sample Description (Grab)
84-MWC-1	2250	1.0	10.0 ppm	Banded chert-magnetite ironstone containing <1% euhedral arsenopyrite
84-MWC-2	1100	1.5	455	Banded chert ironstone with cross-cutting vitreous quartz veins. Sample contains rare magnetite and disseminated sulphides (arsenopyrite and pyrite at <1%)
84-MWC-3	9500	2.4	16.7 ppm	Clear grey to white, highly fractured quartz, in contact with a sheared mafic metavolcanic rock. The metavolcanic rock exhibits prominent biotite alteration and contains 5 to 7% disseminated sulphides (pyrite, chalcopyrite, arsenopyrite)
84-MWC-4	9700	2.6	9190	The sample consists of banded chert ironstone with rare magnetite bands, sheared mafic metavolcanic rocks, and quartz veining. Mineralization consists of 3% disseminated euhedral arsenopyrite
84-MWC-5	82	0.1	21	Highly sheared, grey-green mafic metavolcanic wall rock containing no visible sulphides
84-MWC-6	1200	2.4	6670	Grey-white vitreous quartz vein in contact with sheared, altered metavolcanic rocks. The sample contains no visible sulphides
84-MWC-7	370	0.7	1730	Banded chert ironstone

TABLE 5. CONTINUED

Delbridge Occurrence

Sample No. (Grab)	As (ppm)	Sb (ppm)	Au (ppb)	Sample Description (Grab)
84-MDB-1	71	0.5	285	Banded, sugary, chert ironstone with cross-cutting veinlets of pyrite and pyrrhotite. The sample also contains later quartz-carbonate veining. The overall sulphide content is 1%
84-MDB-2	6.0%	2.8	4100	Chert-banded ironstone with cross-cutting vitreous quartz veins. The chert contains 10% fine disseminated pyrite and coarse euhedral arsenopyrite
84-MDB-3	260	1.8	24	Sugary, chert ironstone and vitreous quartz vein. The sample contains 1 to 3% coarse euhedral arsenopyrite
84-MDB-4	48	0.7	45	Highly sheared andesitic volcanic host rock with carbonate veins. The sample contains no visible sulphides
84-MDB-5	16.3%	17.0	35.1 ppm	Banded-chert ironstone and vitreous quartz. The sample contains 15 to 20% patches and disseminations of coarse euhedral arsenopyrite and fine pyrite
84-MDB-6	1800	1.3	230	Banded, dark grey massive chert. The sample contains no visible sulphides
84-MDB-7	50	0.9	65	Bleach-white banded sugary chert ironstone with no visible sulphides
84-MDB-8	64	1.3	45	Highly iron-stained, banded chert-magnetite ironstone containing 1% disseminated pyrite. From the sample location 84-MDB-7
84-MDB-9	28	0.6	30	Banded chert ironstone with no visible sulphides
84-MDB-10	4.5%	2.4	2000	Banded chert-magnetite ironstone and minor sheared andesitic volcanic rocks. The ironstone contains 10 to 15% coarse euhedral arsenopyrite and fine disseminated pyrite. From the same location as 84-MDB-9
84-MDB-11	290	0.5	170	Banded-chert ironstone with fine bands and cross-cutting fractures of magnetite. The sample contains rare (<1%) disseminated sulphides
84-MDB-12	134	0.8	75	Banded-chert ironstone with minor fine magnetite bands. The sample contains no visible sulphides
84-MDB-13	86	0.8	220	Banded-chert-magnetite ironstone with 5% disseminated euhedral arsenopyrite

TABLE 5. CONTINUED

Buffalo-Beardmore Prospect (Thorco Goldfinders Inc.)

Sample No. (Grab)	As (ppm)	Sb (ppm)	Au (ppb)	Sample Description (Grab)
84-MTS-1	6.0	0.2	20	Banded-chert ironstone with dark grey to rust stained weak magnetite bands. The sample contains no visible sulphides
84-MTS-2	1200	0.6	2070	Banded chert ironstone containing 1 to 3% euhedral arsenopyrite and pyrite
84-MTS-3	70	0.1	65	Banded-chert ironstone and vitreous quartz vein in contact with sheared, altered green metavolcanic rock. The sample contains minor disseminated pyrite (<1%)
84-MTS-4	690	0.4	21	Same as 84-MTS-3 but contains 5 to 7% anhedral pyrite along shears and fractures in quartz
84-MTS-5	4.0	0.4	3	Banded-chert-magnetite ironstone with fibrous grunerite-rich bands. The host rock consists of a sheared green mafic metavolcanic rock. No visible sulphides were noted but sample exhibits prominent gossan
84-MTS-6	220	2.5	5	Mineralized banded-chert ironstone and secondary quartz vein in contact with altered green mafic volcanic rocks. The sample contains 25 to 30% massive and disseminated pyrite

1. Vein Type - Gold is associated with quartz (carbonate) veins hosted in metavolcanic rocks, often marginal to felsic intrusions, e.g. Tashota-Nipigon Mine, Adair Prospect, Wascanna Prospect, King-Dodds Occurrence, Edgelake Prospect, and the Consolidated Louanna Gold Mine.

2. Chemical Metasediment Type - Gold is hosted by chemical metasedimentary rocks (chert, ironstone), e.g. Paulpic Prospect and Deeds Lake (New Goldview Mines) Occurrence hosted in metavolcanic rocks.

(1) Vein Type

Wascanna Prospect- The Wascanna Prospect is located in the Tashota area immediately west of Oboshkegan Township, and north-east of Lake Nipigon. It is situated 1.6 km east and 0.8 km south of the former Tashota Station, Canadian National Railway. Limited

production in the form of a 317.1 kg bulk sample was mined in the shaft between 9 and 10.5 m vertically. Average grade was 0.96 ounce gold per ton (Hopkins 1916).

Robert Wells discovered a 1.5 m wide vein containing native gold on former claim TB2892 (presently TB604759). The property was optioned to several companies in the 1930s, including Tash-Orn Gold Mines Limited, Fort Rouille Mining Corporation Limited and Wascanna Mines Limited, who, by 1937, completed sinking a 2-compartment, 98.1 m vertical shaft. Diamond drilling on the property totalled 1108 m. The Wascanna prospect is currently held and under active exploration by Teck Corporation-Retlaw Resources.

The property is underlain by pillowed or schistose to sheared basalts locally intruded by altered quartz porphyry dikes. Hopkins

(1916) described the basalts on the property as striking 030° and dipping vertically. Moorhouse (1939) noted the presence of cherty ironstone intercalated with the metavolcanic rocks. The basalts have been folded into tight drag folds with axial planes striking 160° and dipping 70° to 80°E.

Veining appears associated with a structural permeability created by the drag folding.

Gold occurs in "crack-seal" (polyphase) veins (veins that have incorporated portions of the wall rocks within the generating vein). Moorhouse (1939) and Amukun (1977) noted that veins appear to be associated with 2 general trends of faulting, one a north-northeast-erly set and the other, a west-northwesterly set. Mineralization includes pyrite, pyrrhotite, chalcopyrite, tourmaline, and gold associated with the quartz veining and intermediate metavolcanic rocks. Quartz is vitreous to sac-

charoidal. Carbonate alteration is present within the veins, predominantly adjacent to vein boundaries.

Assays of grab samples from in place and on the dump ranged up to 1.62 ounces gold per ton (Geoscience Laboratories, Ontario Geological Survey, Toronto).

King-Dodds Occurrence— The King-Dodds Occurrence is located immediately north of Kowkash Township. The area is accessible by road from Geraldton via Highway 584 north to Highway 643 and then west on the Ogoki Road to the Kawashkagama (Kowkash) River. The Kowkash River is navigable to Howard Falls. The King-Dodds Occurrence is located 300 m north from the river. The property is presently held by TCL Incorporated.

Amukun *et al.* (1979) described the geology of the Howard Falls area as being underlain by massive and pillowed mafic metavolcanic rocks. Minor granitic to porphyritic rocks intrude the metavolcanic rocks. Regional foliation strikes approximately 075° and dips to the south.

The Northern Miner, (September 11, 1915) described the occurrence as follows:

"The quartz vein is four inches wide and fourteen feet long....This four inches of quartz is almost as rich as the Munro ore, many of the specimens are a quarter metal and it is said that they are characteristic of the vein."

The vein is a crack-seal type, fractured, vitreous quartz vein with sericite-chlorite seams representing former portions of the wall rock. Pyrite and spectacular free gold are present in the quartz. Small porphyry stocks may have initially fractured the metavolcanic rocks to provide a host for auriferous hydrothermal fluids.

(2) Chemical Metasediment Type

Paulpic Prospect— The Paulpic Prospect is situated 700 m northeast of the former Tashota Station and is accessible by drill roads. The property is bounded to the

north by Tashota Lake and to the south by the Canadian National Railway. The property is currently owned by Canamax Resources Incorporated.

The Paulpic Prospect is underlain by metavolcanic rocks, intruded by minor felsic and mafic intrusions. The metavolcanic rocks consist of intermediate to mafic flows (massive to foliated basalt, medium-grained basalts, and chlorite schists), tuffs and lapilli tuffs. Minor felsic metavolcanic rocks occur as thin, 1 to 6 m, units intercalated with the mafic rocks. The felsic metavolcanic rocks are siliceous, fine grained to slightly granular, and pyritic. Chemical metasedimentary rocks and minor clastic metasedimentary rocks also occur. Pyrite containing anomalous gold and base metal values has been noted in the metasedimentary rocks. Laterally extensive cherty ironstones with a pronounced magnetic signature occur in the mafic metavolcanic rocks. Sulphide ironstones with associated gold values outcrop in old trenches. Archean gabbroic and amphibolitic dikes and stocks, granite and Late Precambrian diabase dikes intrude the metavolcanic rocks (Waddington 1979, Resident Geologist Files, Ontario Ministry of Natural Resources, Thunder Bay).

Chloritoid alteration was noted, particularly in the higher grade metavolcanic rocks which are now amphibolites.

Diamond drilling by Canamax Resources Incorporated has extended previously known limits of an auriferous ironstone to a minimum depth of 200 m. Within the ironstone 2 subparallel lenses, each grading 0.15 to 0.20 ounce gold per ton across an average width of 3.0 m, have been intersected. Gold mineralization is associated with the ironstone, which is dominantly banded chert-magnetite, and an underlying quartz stock work or stringer zone in metavolcanic rocks.

Economic potential of the zone as of December 31, 1981, was estimated at 66 tons per vertical m

(740 tons per vertical foot) (Knutson 1981, Resident Geologist Files, Ontario Ministry of Natural Resources, Thunder Bay). Tonnage to date is listed as 200 000 tonnes averaging 0.231 ounce gold per ton (Canadian Mines Handbook 1984-85).

RECOMMENDATIONS FOR EXPLORATION

The magnetic signature of the Southern Metavolcanic Belt is well defined. Exploration is recommended in the eastern extension of the belt. Surface prospecting, stripping, and channel sampling over the ironstones and possible extensions is suggested. Folded ironstone can represent structural traps for gold. They are large regional features and therefore, the possibility of a moderate to large gold deposit is present.

The pronounced gold, arsenic, and antimony association is significant for explorationists considering litho-geochemistry. Ironstones frequently host up to 3% total sulphides; thus an induced polarization survey could detect sulphide associated gold mineralization.

Historically, the Onaman-Tashota Metavolcanic Belt has experienced significant base metal exploration, particularly the Onaman Lake and Marshall Lake areas. Base metal occurrences, prospects, and deposits should be re-evaluated for their gold and silver potential. Metavolcanic terrains that potentially host lead, zinc, copper, silver, and gold mineralization should be examined.

SCHREIBER—TERRACE BAY ECONOMIC GEOLOGIST PROGRAM

B.R. Schnieders and A.A. Speed

Resource Geologists, Ontario Ministry of Natural Resources, Thunder Bay.

INTRODUCTION

In 1984, the Schreiber-Terrace Bay Economic Geologist Program entered its second year of operation. The program was initiated by the

Ontario Ministry of Natural Resources, and is funded by the Ontario Ministry of Northern Affairs. B.R. Schnieders and A.A. Speed are responsible for the program and work out of the Resident Geologist Office.

The purpose of the program is 3-fold:

1. to provide assistance and information to prospectors and mining companies working in the area
2. to document old and new mineral occurrences and establish a database
3. to stimulate mineral exploration and to monitor the exploration activity.

The program covers an area from Nipigon east to Marathon (Figure 4).

During 1984, approximately 50 properties were visited in the program area (Figure 5). All assays reported in the following property descriptions were performed by the Geoscience Laboratories, Ontario Geological Survey, Toronto, unless otherwise noted.

GENERAL GEOLOGY

The Schreiber-Terrace Bay area is underlain by Early to Late Precambrian rocks. The Archean rocks represent a portion of the Abitibi-Wawa Belt of the Superior Structural Province. These rocks are made up of a metavolcanic-metasedimentary sequence which has been intruded by granitic-syenite plutons and metagabbroic dikes and sills. The metavolcanic rocks consist of iron-rich tholeiites including mafic to intermediate massive and pillowed flows, tuff, and pyroclastic rocks. Calc-alkalic felsic metavolcanic rocks include flows, tuffs, and pyroclastic rocks (Marmont 1984). The meta-sedimentary rocks consist predominately of graded turbiditic sequences (wacke and argillite), minor conglomerate, and iron formation (ironstone). Intruding the metavolcanic and metasedimentary rocks is the Terrace Bay Batholith. This 25 km long by 8 km wide batholith consists predominately of medium-grained granodiorite, and

minor diorite, quartz monzodiorite, tonalite, and biotite-hornblende granite (Marmont 1984). Mafic intrusive rocks include gabbro and diorite. Middle Precambrian rocks unconformably overlie the Early Precambrian rocks. The Gunflint and Rove Formation sedimentary rocks consist of conglomerate, black shale, and Superior Type ironstone. Late Precambrian sedimentary rocks unconformably overlie Early and Middle Precambrian rocks. The Sibley Group consists of conglomerate, sandstone, shale, carbonates, and chert. Keweenaw rocks are represented by diabase dikes and sills, and mafic to felsic volcanic and sedimentary rocks, (Osler Group) in the Nipigon Bay-Schreiber Channel area. Late Precambrian intrusive rocks include alkalic and carbonatite complexes such as the Port Coldwell Alkali Complex and the Prairie Lake Carbonatite, as well as mafic to felsic dikes.

ECONOMIC GEOLOGY

Exploration for gold and base metals in the Schreiber-Terrace Bay area remained at a high level during 1984, with the staking of more than 90% of the "high potential" ground (metavolcanic and metasedimentary rocks). The area has been actively explored since the late 1800s. Gold was first discovered in 1875 by Donald McKellar in the Victoria Cape area. Early production came from the Empress Mine (1895 to 1900) and the North Shore Mine (1898 to 1900, and 1935 to 1937). To date, approximately 3000 ounces of gold has been produced (Resident Geologist Files, Ontario Ministry of Natural Resources, Thunder Bay). Base metals, mainly zinc and copper, were also discovered by the McKellar brothers in the late 1800s. The first production came from the Zenith Mine (Zenmac) in 1898 to 1901 and again from 1966 to 1970 (Kite 1981).

GOLD MINERALIZATION

Recent studies on controls of gold mineralization and the role of felsic intrusions in gold mineraliza-

tion, have been performed by Carter (1981), Marmont and Colvine (1981), Marmont (1983, 1984), and (Patterson *et al.* 1984). The following subdivision of gold mineralization types incorporates results of the above studies and is based on a modification of the classification suggested by Patterson *et al.* (1984).

Type 1: Terrace Bay Batholith-Contact Zone Type

Gold mineralization is concentrated in quartz \pm carbonate veins, occupying faults, fractures, and shear zones spatially related to the contact rocks of the Terrace Bay Batholith. The veins and vein systems generally occur within 0.4 km of this contact and are sub-parallel to it (Marmont 1984). Marmont (1984) suggests that the veins formed as a result of contact metamorphism and dehydration of the country rocks in a metamorphic-hydrothermal system associated with the emplacement of the Terrace Bay Batholith. The emplacement of this batholith caused variable intensities of deformation in different areas, producing numerous fractures, faults, and shear zones which acted as conduits for auriferous solutions. The auriferous veins are generally hosted by mafic to felsic metavolcanic rocks, which, combined with varying intensities of deformation, result in several distinct types of veins and alteration. The quartz veins are generally white and glassy, varying in width from a fraction of a centimetre to a few metres (Marmont 1984). Mineralization consists of pyrite, pyrrhotite, magnetite, chalcopyrite, galena, molybdenite, tellurides, graphite, silver, and gold. Accessory minerals consist of sericite, chlorite, carbonate, epidote, and hematite. Molybdenite, chalcopyrite, pyrite, silver, and gold are also commonly enriched in the altered host rocks. Examples of this style of mineralization include the Gold Range, Harkness-Hays, Hays Lake (Derragh or Jeddar), Empress, Northern Shore, Gale, and Mogatherium Properties.

Adjoins Figure 1

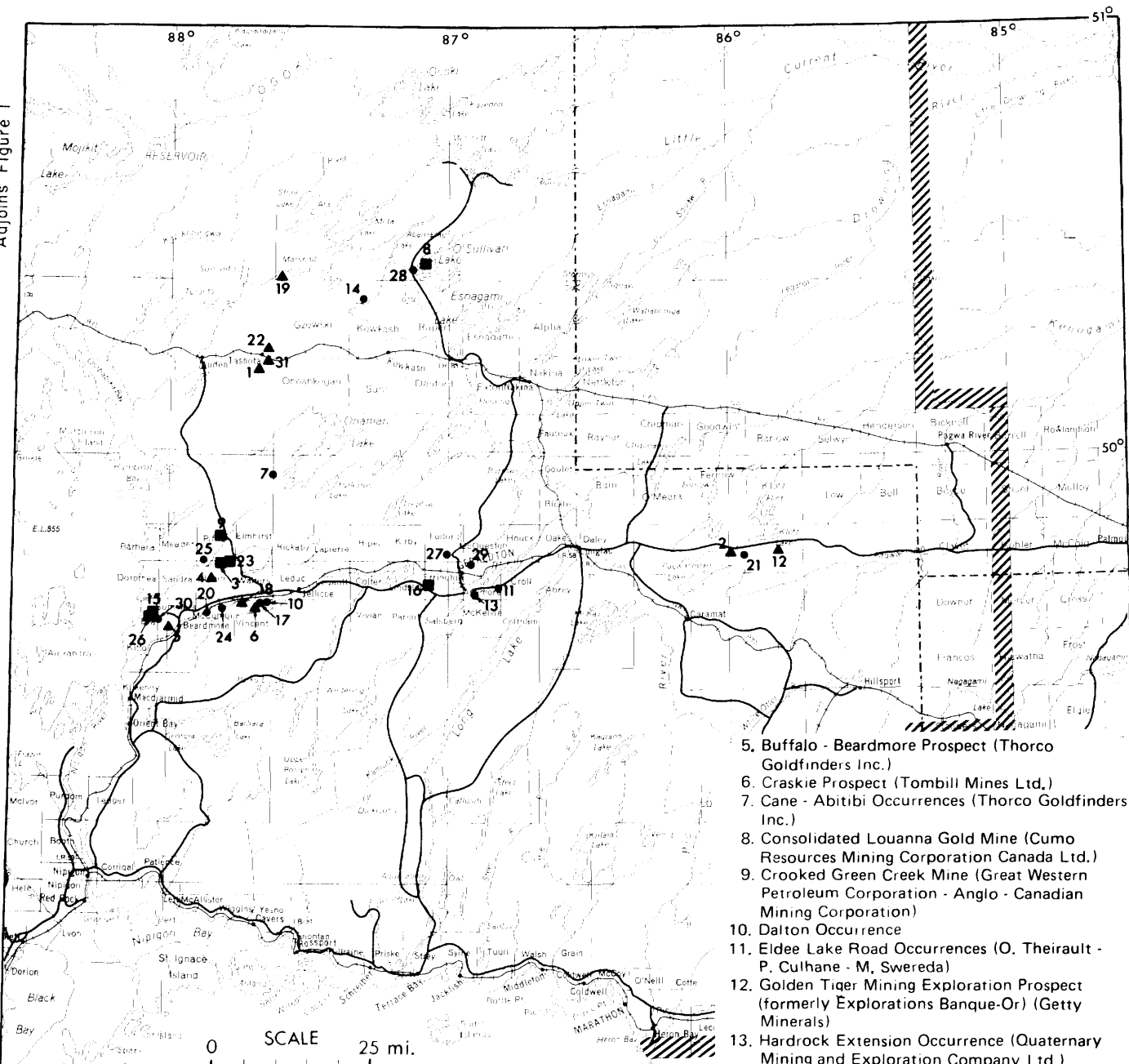


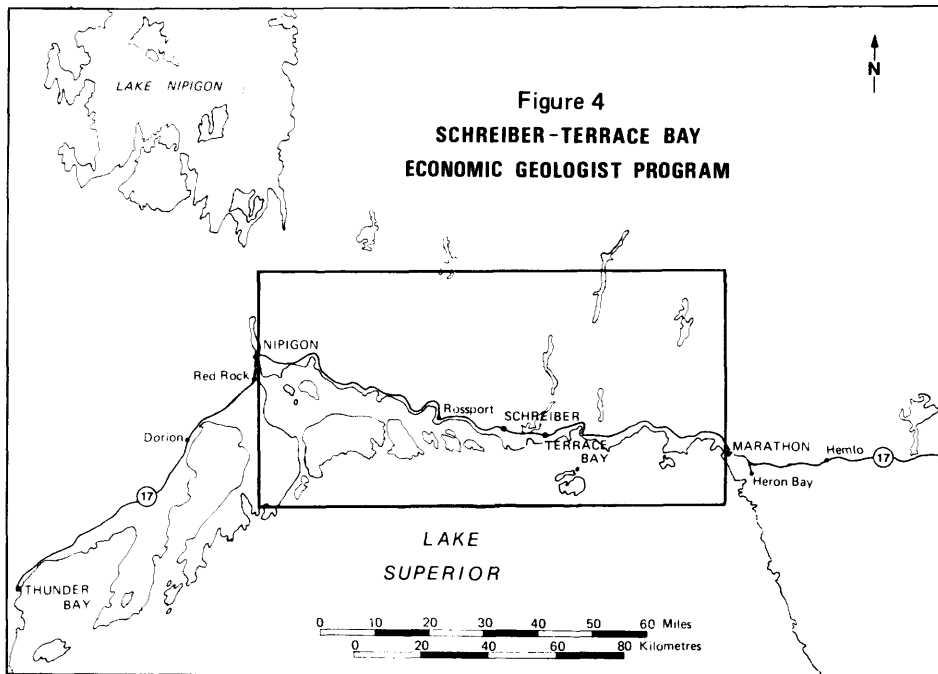
Figure 3

- MINE (including past producers) with a minimum production of not less than 100 ounces of gold
- ▲ PROSPECT with significant development work usually consisting of one or more of the following:
 - (a) Production of less than 100 ounces of gold;
 - (b) Over 100 feet of underground lateral development work;
 - (c) Over 600 metres (2000 feet) of diamond drilling.
- OCCURRENCE Little development work carried out

PROPERTY VISITS, 1984: BEARDMORE - GERALDTON
Economic Geologist Program

1. Adair Prospect (Teck Explorations Ltd.)
2. Adel Lake Prospect (Canamax Resources Incorporated)
3. Brenbar Mine (Brenbar Mines Ltd.)
4. Brookbank Prospect (Metalore Resources Ltd.)

5. Buffalo - Beardmore Prospect (Thorco Goldfinders Inc.)
6. Craskie Prospect (Tombill Mines Ltd.)
7. Cane - Abitibi Occurrences (Thorco Goldfinders Inc.)
8. Consolidated Louanna Gold Mine (Cumo Resources Mining Corporation Canada Ltd.)
9. Crooked Green Creek Mine (Great Western Petroleum Corporation - Anglo - Canadian Mining Corporation)
10. Dalton Occurrence
11. Eldee Lake Road Occurrences (O. Theirault - P. Culhane - M. Swereda)
12. Golden Tiger Mining Exploration Prospect (formerly Explorations Banque-Or) (Getty Minerals)
13. Hardrock Extension Occurrence (Quaternary Mining and Exploration Company Ltd.)
14. King-Dodds Occurrence (TCL Incorporated)
15. Leitch Gold Mine (Teck Corporation)
16. Magnet Consolidated Mine (Roxmark Mines - Sherritt-Gordon Mines Ltd.)
17. Maki East Occurrence (N. Maki)
18. Maki Main Block Prospect (Eldor Resources Ltd.)
19. Marshall Lake Cu-Zn-Ag Prospect (N.W.T. Copper Mines Ltd.)
20. Neelin-Braggan Occurrence (Pancontinental Mining (Canada) Ltd.)
21. New Arcadia Occurrence (Getty Minerals)
22. Paulpic Prospect (Canamax Resources Incorporated)
23. Quebec Sturgeon River Gold Mine (Phoenix Gold Mines Ltd.)
24. Ralph Lake Occurrences (Tenacity Mines)
25. Reiter (J. Green) Occurrence (M. Reiter)
26. Sand River Gold Mine
27. Shield Occurrence - Hutchison Lake (J. Shields)
28. Shield Occurrence - O'Sullivan Lake (J. Shields)
29. Swereda Occurrence (M. Swereda)
30. Undersill Lake Occurrence (S. Clemmer, M. Rentz, L. Cox, J. McMahon)
31. Wascanna Prospect (Teck Explorations Ltd.)



Harkness-Hays: Gold Range Properties-

The Harkness-Hays and Gold Range Properties are located north of Highway 17, in Priske Township, approximately 4 km east of Schreiber. These properties underwent development during a period from 1917 to 1941. Production was 194 ounces of gold from the Harkness-Hays Property from 1935 to 1936, and 17 ounces of gold from the Gold Range Property in 1941 (Marmont 1984). Gold mineralization is concentrated in a series of quartz±carbonate veins which are generally *en-echelon* and subparallel to the contact of the batholith. The most important veins referred to by previous workers are the No. 1, No. 2, No. 3, and No. 7 veins (Resident Geologist Files, Ontario Ministry of Natural Resources, Thunder Bay).

On the Harkness-Hays Property, several ages of veins are present. A first-order composite vein set strikes 210° to 220° and dips from 50° to 85°NW. These veins vary in width from a fraction of a centimetre up to a reported width of 1.5 m, with the average being 0.5 cm. They commonly make up

a composite vein system up to several metres in width. Vein mineralization consists of visible gold, fine euhedral pyrite, galena, molybdenite, and possible tellurides. The veins are enveloped by an alteration halo which consists of silicification, sericitization (potassic alteration), carbonatization, and pyritization of the host rock. Analyses indicate that the unaltered mafic host rock contains 9 ppb gold and 7.80% iron, and the altered host rock contains 2900 ppb gold and 9.61% iron.

Marmont (1984) refers to these veins as "micro-veinlets" and describes the fine-grained pyrite within both the veins and the associated alteration as "non-fractured" and "exclusively barren of gold".

The first-order veins are predominantly hosted by mafic metavolcanic rocks which have undergone contact metamorphism. The metavolcanic rocks in the contact zone of the Terrace Bay Batholith have been metamorphically upgraded to the amphibolite facies (Marmont 1984). Previous workers referred to this host rock as diorite, which likely represents a medium-grained, re-

crystallized mafic metavolcanic rock.

Assay results from samples of quartz vein material and altered host rock indicate values from trace up to 3 ounces gold per ton. More representative samples indicate average values of 0.33 to 0.50 ounce gold per ton over narrow mineralized widths.

In addition to the first-order vein set, a second-order set is suggested by the authors. These veins, formed later in the tectonic history, are commonly wider and cross-cut the first-order veins. They contain pyrite, chalcopyrite, galena, molybdenite, sphalerite, tellurides, magnetite, graphite, silver, and gold. The pyrite is often present as large euhedral crystals, up to 2.5 cm in size, and has been described by Marmont (1984) as being fractured and containing irregular pores.

Slabbed sections display spectacular visible gold within the pyrite crystals. These second-order veins also commonly contain brecciated fragments of mafic metavolcanic host rock. In one slabbed section, a fragment of mafic host containing a first-order vein and associated alteration was observed.

Adjoins Figure 1

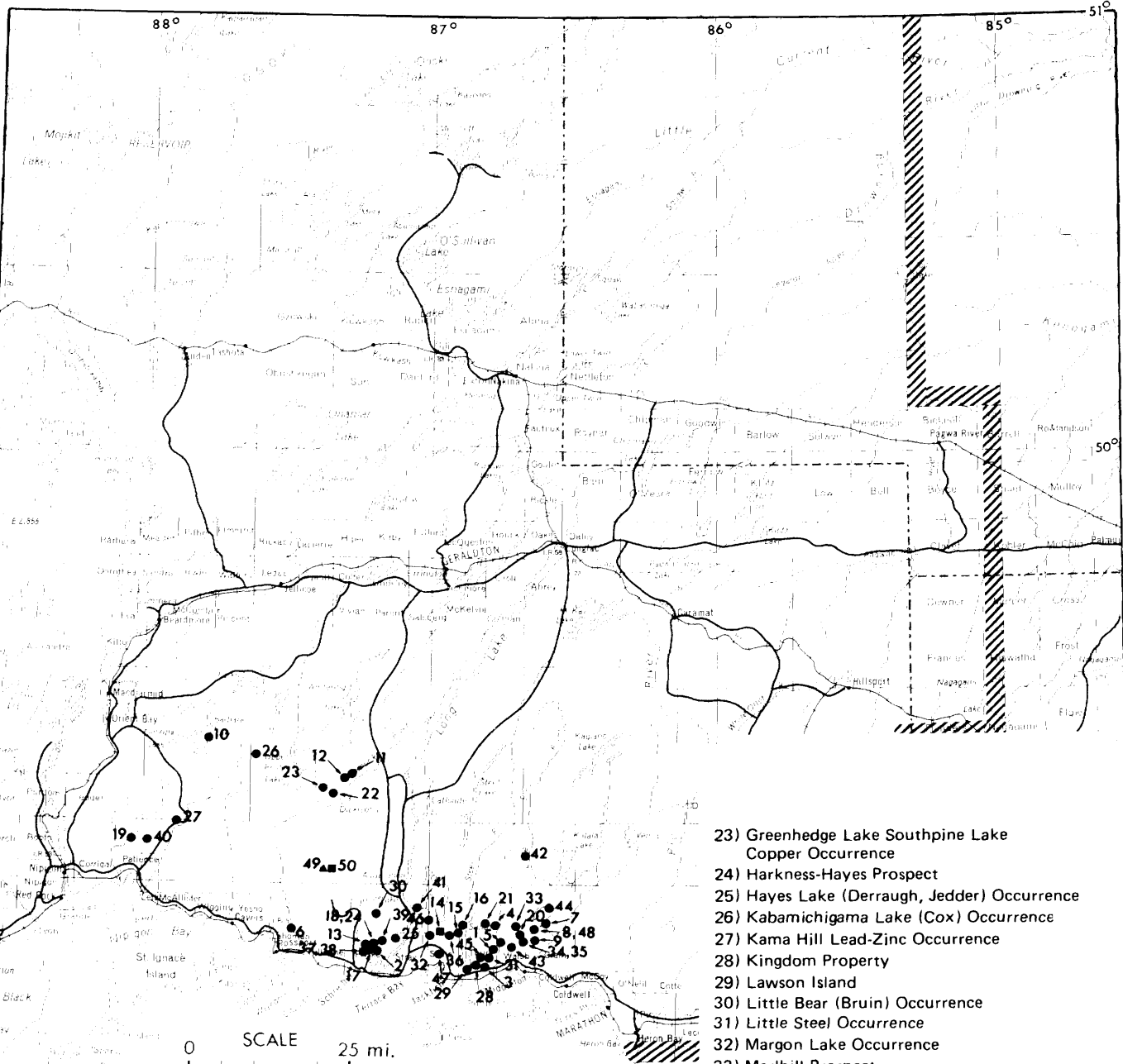


Figure 5

Property Visits, 1984: Schreiber - Terrace Bay Economic Geologist Program

PAST PRODUCER ■

PROSPECT ▲

OCCURRENCE ●

- 1) Blackfox Lake Occurrence
- 2) Blanchford Occurrence
- 3) Bottle Point Occurrence
- 4) Bozena Lake Occurrence
- 5) Cumberland Resources (Prairie River Property)
- 6) Dampier Pyrite Occurrence
- 7) Deadhorse Creek Diatreme

- 8) Deadhorse Creek (North) Occurrence
- 9) Deadhorse Creek (South) Occurrence
- 10) Dello Lake Occurrence
- 11) Dickison Lake Pyrite Occurrence
- 12) Dickison Lake Molybdenum Occurrence
- 13) Downey Occurrence
- 14) Empress Mine (Past-Producer)
- 15) Fishnet Creek Occurrence
- 16) Fishnet Lake Occurrence
- 17) Gale Occurrence
- 18) Gold Range Prospect
- 19) Gordon Occurrence
- 20) Goldbar Lake Occurrence
- 21) Granite Mountain Occurrence
- 22) Greenhedge Lake Copper Occurrence

- 23) Greenhedge Lake Southpine Lake Copper Occurrence
- 24) Harkness-Hayes Prospect
- 25) Hayes Lake (Derraugh, Jedder) Occurrence
- 26) Kabamichigama Lake (Cox) Occurrence
- 27) Kama Hill Lead-Zinc Occurrence
- 28) Kingdom Property
- 29) Lawson Island
- 30) Little Bear (Bruin) Occurrence
- 31) Little Steel Occurrence
- 32) Margon Lake Occurrence
- 33) Marlhill Prospect
- 34) McKeller Creek Diatreme
- 35) McKeller Creek Zinc-Silver Occurrence
- 36) Mogatherium Occurrence
- 37) Morley High Grade Occurrence
- 38) Morley Pyrite Occurrence
- 39) Otisse Prospect
- 40) Ozone Creek Occurrence
- 41) Patmikko Property
- 42) Renner Property
- 43) Ripple Lake Area
- 44) Sandspit Lake Occurrence
- 45) Simard-Swet Occurrence
- 46) Ursa Major Prospect
- 47) Victoria Cape Occurrence
- 48) Walton Property
- 49) Winston Lake Deposit (Corporation Falconbridge Copper)
- 50) Zenmac (Zenith) Mine (Past-Producer) Corporation Falconbridge Copper

Analytical results of samples collected from the second-order veins containing coarse pyrite crystals indicate values as high as 40 ounces gold per ton. More representative samples containing large pyrite crystals indicate average values of 1 to 10 ounces gold per ton.

It is the authors' opinion that the second-order veins represent a reconcentration of gold. The first-order veins and associated altered host rocks may have undergone further dehydration and reconcentration due to continued polyphase intrusive activity related to the Terrace Bay Batholith and other intrusive events. In some instances the second-order veins containing large pyrite crystals are in contact with carbonate-rich biotite-lamprophyre dikes. These dikes cross-cut all ages of veining and as suggested by Marmont (1984) may represent a late intrusive, concentrating event. Fine-grained pyrite and gold could have been remobilized and recrystallized to produce large euhedral and fractured pyrite crystals containing reconcentrated gold along the fractures, in pores, and as disseminations.

Several age relationships are apparent at the Harkness-Hays Property between first-order veins, second-order veins, and late granitic dikes. In one location first-order veins were observed cross-cutting a narrow granitic dike, while other granitic dikes cross-cut both the first- and second-order veins.

Type 2: Porphyry Contact Zone Type

Gold mineralization with subsidiary silver, zinc, copper, lead, and molybdenum occur in quartz, carbonate, or quartz-carbonate veins and spatially associated with felsic porphyries. Examples of this type of mineralization occur in the Big Duck Lake area, 30 km north of Schreiber. Quartz, feldspar, and quartz-feldspar porphyries intrude several rock types. The sill-like porphyry bodies strike east-west and dip steeply, 65 to 70°N, and are considered to have formed late

in the tectonic history. Pye (1964) suggested that the porphyries are genetically related to the granitic rocks. Mapping by Corporation Falconbridge Copper suggested possible extrusive and intrusive phases of the porphyry, representing a synvolcanic sublayer intrusion (Patterson *et al.* 1984).

The quartz, carbonate, and quartz-carbonate veins are hosted by a variety of rock types. However, there appears to be a preference for the contact between the porphyries and the metavolcanic rocks. At least 2 generations of veining are evident; the oldest, parallel to foliation, and the youngest set which cuts the foliation at a high angle. Alteration in the host rocks enveloping the veins includes sericitization, carbonatization, chloritization, and pyritization. Pye (1964) suggests 2 types of vein deposits: 1) sugary quartz; and 2) carbonate.

There is a crude zonal distribution in the mineralogy of the veins. Veins containing gold and molybdenum are the most abundant near Big Duck Lake, while zinc-bearing veins are more abundant near Little Duck Lake (Patterson *et al.* 1984).

A number of origins for the vein systems have been suggested by Pye (1965) and the authors:

1. The Big Duck Lake porphyry may represent an extrusive-intrusive, synvolcanic, sublayer felsic intrusion, with an associated hydrothermal system. This "volcanogenic association" is described by Marmont (1983). Gold and base metal mineralization is associated with quartz and/or carbonate veins near the more extrusive phases of the porphyry, suggesting a remobilized, syngenetic-exhalative origin.
2. Copper, molybdenum, and variable gold mineralization is associated with more "intrusive" phases or lower levels of the porphyry, suggesting an epithermal-magmatic origin.
3. Gold, base metal, and molybdenum mineralization is concentrated in quartz, carbonate, and/or quartz-carbonate veins related to

the emplacement of the felsic porphyries. Structural traps developed along the margins or contacts of the porphyries due to competency differences. Solutions produced by dehydration in a metamorphic-hydrothermal system leached gold from the country rocks and re-deposited it along the structural conduits.

Examples of this style of mineralization include the Estelle A and B, Porphyry Shaft, Burstrom, Gray, Trabe, Beaver, or McQuaig and Little Duck Properties.

Type 3: Metavolcanic Hosted - Dilatent Zone Type

Gold mineralization occurs in quartz and carbonate veins within shear zones, fractures and cleavage dilation zones. Carter (1980a, 1980b) defines these deposits as structurally controlled and related to northwesterly striking shear zones. The gold is associated with silver, copper, zinc, lead, and molybdenum. Numerous ages of veining may be present. The metavolcanic-metasedimentary host rocks generally display sericitization, silicification, and carbonatization. Examples of this style of mineralization may include the Schreiber-Pyramid, Empress, McKenna-McCann, Morley High Grade, and the Little Bear (Little Bruin) Properties. The Little Bear Property might more adequately represent an example of gold being reconcentrated from a chemical sediment (Type 4). It is possible that an overlapping of granitic models occurred.

Little Bear (Little Bruin) Property-

The Little Bear Property is located approximately 7.5 km north-northeast of Schreiber, near the southwestern side of Little Bruin Lake. The showing was discovered in the Summer of 1937 by surface prospecting. The property is described as a narrow, cherty quartz vein averaging 15 cm in width and containing erratic gold values over a length of 60 m (Bartley 1939). Bartley (1939) further describes the vein as follows:

"The vein strikes N50°W, dips 75°SW, and occurs in sheared brown-grey rhyolite near the contact of the granite and the greenstone. It appears to be filling a tension fracture, which has cut across the main shear zone at a high angle. The cherty quartz is mineralized with massive sphalerite and chalcopyrite, finer pyrite, galena and native gold. The gold is light-yellow in colour and is intimately associated with the pyrite. The shear zone is heavily mineralized with massive sulphides, but no visible gold was noted."

Carter (1981a) described the property:

"The vein occurs in mafic metavolcanics and is mineralized with gold, sphalerite, chalcopyrite, pyrite and galena. The examination by the writer showed the vein to be 5 feet wide and 150 feet long on which an 8 by 5 foot shaft had been put down. Chalcopyrite, sphalerite and pyrite occur as stringers, disseminated specks and in the massive state."

The mineralization on the property is exposed in 2 trenches; the northwestern trench is approximately 20 m long, 2 m wide, and 2 m deep, and the southeastern trench is approximately 25 m long, 1 m wide, and 1 m deep. There is also a 2.4 m by 1.5 m shaft which is 7.3 m deep (Laurie Halonen, Prospector, Thunder Bay, personal communication, 1984).

A narrow stratiform chert unit consisting of finely laminated or bedded chert bands, less than 1 mm in size, strikes 125° and dips 60°SW. Interbedded pyrite with possible sphalerite is also present. The chert is lenticular and contains some highly brecciated sections. The brecciated chert contains fine-grained pyrite, pyrrhotite, chalcopyrite, and sphalerite in both massive and stringer form. The sulphides are laminated or bedded in appearance and have undergone folding, as indicated from cut and polished sections. Analytical results indicated up to 0.20% zinc within the massive sulphides and chert unit.

Within the brecciated chert sections secondary quartz veins and lenses are present. The veins display both a crack-seal texture and brecciated texture indicating several periods of deformation and mineralization. One quartz vein up to several centimetres in width is located in the northwestern trench striking 140° and dipping 60°SE. The vein contains pyrite, pyrrhotite, chalcopyrite, coarse sphalerite, galena, tellurides, and gold. Accessory minerals include a white mica (sericite?), chlorite, and carbonate.

Both the chemical sedimentary unit and the quartz veins appear hosted by altered metavolcanic and/or metasedimentary rocks. This area is within 0.5 km of a granitic intrusion.

Preliminary analytical values from samples collected by the authors on the property indicate erratic values of up to 0.34 ounce gold per ton and 0.54 ounce silver per ton. A spectacular sample of a quartz vein containing abundant visible gold, possible tellurides, carbonate, hematite, and limonite gossan was submitted to the Resident Geologist Office in Thunder Bay by Laurie Halonen. The sample was said to be representative of the 1 ton of ore which was mined from the shaft area in the late 1930s. This ton of ore produced \$1600 worth of gold, in 1936, at a gold price of approximately \$33 per ounce (grading approximately 48.5 ounces gold per ton) (Laurie Halonen, Prospector, Thunder Bay, personal communication, 1984; John Halonen, Prospector, Thunder Bay, personal communication, 1983).

Type 4: Chemical Sediment-Stratabound Type

Gold mineralization is often associated with "Algoman-type banded iron formation" (ironstone) and related chemical and clastic sedimentary rocks. The ironstone and exhalative sedimentary rocks commonly occur at metavolcanic-metasedimentary contacts or at pauses between volcanic events. Numerous occurrences of

Algoman-type ironstone in the Terrace Bay and Schreiber areas were identified by previous workers. Walker (1967) identifies 3 types of ironstone in the Jackfish-Middleton area; 1) chert, 2) sulphide-rich, and 3) siliceous graphitic schist. Walker (1967) further stated that the predominance of sulphides over magnetite, plus the occurrence of graphite, suggests a strongly reducing depositional environment. Walker also added that the sulphide mineralization within the ironstone may represent a later hydrothermal or epigenetic concentration of re-precipitated iron and sulphur. Carter (1980a, 1980b) described both oxide and sulphide ironstone inter-layered with sedimentary and volcanic rocks in the immediate Schreiber-Terrace Bay area. Sulphide facies ironstone predominates in the Schreiber-Terrace Bay area, and these "ironstone units" commonly consist of bedded pyritic-graphitic shales, inter-laminated pyrite and massive pyrite, graphite shale, and massive and laminated chert. Variable amounts of pyrrhotite, chalcopyrite, galena, sphalerite, silver, and gold are present. Gold content within the "ironstone units" is commonly anomalous ranging from 10 to 300 ppb (Resident Geologist Files, Ontario Ministry of Natural Resources, Thunder Bay). Examples of this style of mineralization include the Kingdom, Simard-Swetz, Little Steel, Blackfox Lake, Morley Pyrite and Morley Road, Otisse, and possibly the Little Bear Properties.

Simard-Swetz Property- The Simard - Swetz Property is located in Tuuri Township approximately 0.5 km east of the Steel River, and about 10 m south of the Canadian Pacific Railway line.

The occurrence was discovered by George Simard and Peter Swetz in 1951, likely during construction of Highway 17. The occurrence was described as consisting of graphitic schists containing narrow bands of pyrite, hosted by quartzites and intermediate

metavolcanic rocks. Walker (1967) describes the property as follows:

"Galena, sphalerite, pyrrhotite and pyrite are found in a graphitic schist 1/4 mile east of the Steel River bridge and just south of the railway.

Analytical results from samples collected in 1951 indicated 0.10 ounce gold per ton, 0.28 ounce silver per ton, 0.53% lead, and 0.21% zinc across 12 feet (3.6 m) (Resident Geologist Files, Ontario Ministry of Natural Resources, Thunder Bay). The occurrence consists of sulphide facies ironstone and related chemical and clastic metasediments. The clastic metasediments consist of fine-grained argillites, siltstones, and shale. Fine-grained pyrite and graphite are present in some sections of the shale. Interlaminated with the shale unit are layers of massive and banded pyrite and minor pyrrhotite. This interlaminated pyrite unit, massive pyrite unit, and pyritic and graphitic shale unit is approximately 2 m wide. In contact with this clastic unit is a chemical metasediment unit consisting of a 2 m wide finely laminated chert or cherty ash and a more massive chert or cherty ash. Within the bands or beds of chert is fine-grained disseminated to bedded pyrite. Sphalerite and galena have also been noted."

The chemical and clastic metasedimentary rocks strike 050° to 60°, dip near vertically, and are situated at the contact between graded turbiditic metasedimentary rocks and medium-grained metavolcanic rocks. It is not certain if the host metavolcanic rocks are of intrusive or extrusive origin. The ironstone unit has undergone extensive deformation producing a highly schistose zone. It appears to have been the focus of the deformation, due to its structural location at the contact between metavolcanic and metasedimentary rocks. Numerous quartz veins and veinlets have been produced from recrystallized chert, and secondary euhedral pyrite occurs within these veins. The sphalerite and galena mineralization appears associated to the late quartz veining. Assays

of the chert returned 9 to 30 ppb gold, 0.42 to 0.96% zinc, and 0.28 to 0.96% lead. Associated slates returned 22 to 125 ppb gold, 129 to 1010 ppm zinc, and 420 ppm lead.

BASE METALS

Type 1: Volcanogenic Massive Sulphide Deposits

In the Schreiber-Terrace Bay area, base metals are associated with calc-alkalic felsic volcanic rocks. To date, the most significant discovery is that of Corporation Falconbridge Copper (formerly Falconbridge Copper Limited) on their Winston Lake Property. The property is located 27 km northwest of Schreiber and includes the Zenith Deposit (Zenmac), which was discovered in the late 1800s. Minor production occurred from 1898 to 1902, producing 1065 tons averaging 45% zinc (Tanton 1931). The Zenith is further described by Severin and Balint (1984):

"Minor production is reported for the period 1899 to 1902 but no serious exploration was initiated until Zenmac Metal Mines Ltd. acquired the property during the early 1950's. Diamond drilling indicated a mineral inventory of 141,000 tons grading 23% Zn and 0.25% Cu but planned development was suspended due to low (\$0.105/lb) zinc price. By the autumn of 1963 the price of zinc had risen to \$0.13/lb and the long range forecasts were optimistic. A decision was made to proceed to production and a 13.5 mile gravel road was completed by July of 1964. Shaft sinking commenced in September 1964 and was completed to 425 feet by November. Three levels were established at depths of 150, 275 and 400 feet. During the period April 1, 1966 to April 29, 1970, 180,000 tons of 16.5% Zn were milled."

The Zenith Deposit is part of a volcanogenic massive sulphide deposit which was rafted into a gabbroic intrusive (Kite 1981). In 1978 and 1979, Falconbridge Copper Limited conducted reconnaissance lithochemical-geological surveys west of the Zenith Deposit,

which resulted in the staking of a large section of the metavolcanic-metasedimentary sequence. In 1980, Corporation Falconbridge Copper optioned the Zenith property from Zenmac Exploration Limited, and carried out a detailed program of geological mapping, geochemical surveys, diamond drilling, and down hole geophysical surveys. A new deposit located approximately 0.5 km west of the Zenith Deposit was discovered. Severin and Balint (1984) describe the deposit:

"The Winston Lake massive sulphide deposit occurs at the southwest end of the Big Duck Lake volcanic belt and is located at the top of the Winston Lake calc-alkalic felsic volcanic package which is overlain by a series of Mg to Fe rich tholeiitic basalts. The contact between these two contrasting sequences is marked by a composite sill-like gabbro intrusion. The gabbroic intrusion(s) is thought to have dislocated a portion of the Winston Lake Deposit during its emplacement. This small (165,000 tonnes) segment of massive sulphides, known as the Zenith Deposit was mined by Zenmac Metal Mines Limited during 1966 to 1970."

and

"The Winston Lake massive sulphide deposit occurs at the top of the Winston Lake felsic volcanic sequence and is intimately associated with a cherty ash that marks the top of a package of felsic to intermediate volcanoclastics. The sulphide deposit occurs as a relatively thin sheet with an 'average' true thickness of 4.3 metres and a length and width of 700-800 metres and 300-400 metres, respectively."

and

"Surface diamond drilling suggests a mineral inventory (diluted) of 2,675,000 tonnes of 17.81% Zn, 0.94% Cu, 25.3 gm/t Ag and 0.85 gm/t Au."

Hydrothermal alteration of the mafic to felsic metavolcanic and metasedimentary rocks includes cordierite - anthophyllite - biotite, biotite - cordierite, quartz - mus-

covite - biotite, quartz - cordierite - sillimanite - biotite knots \pm staurolite \pm garnet and quartz - cordierite - anthophyllite \pm sillimanite \pm staurolite \pm garnet assemblages (Severin and Balint 1984).

Drilling by Corporation Falconbridge Copper in 1983 indicated high grade gold values immediately below the massive sulphide zone of up to 0.58 ounce gold per ton (uncut) across 3.55 m (The Northern Miner, July 28, 1983).

Dello Lake Occurrence- The Dello Lake zinc-lead property is located about 42 km (26 miles) northeast of Nipigon and is held by R. Michon and P. Nevins both of Manitowadge, Ontario. Access to the showing is north of Highway 17, via the Little Bear Quarry Road (Camp 81 Road), approximately 21 km (13 miles) east of Nipigon. The showing occurs on the south side of a small rock outcrop, 1.2 km (0.75 mile) east of Dello Lake.

The area was mapped by Pye (1965) as being predominantly granite with a few small isolated remnants of metasedimentary rocks. However, no metasedimentary rocks are indicated on his map in the vicinity of the showing. The occurrence is hosted by biotite-quartz schist or gneiss, and meta-wacke, which strike approximately east. The foliation in the host rock is due to the parallel to sub-parallel alignment of biotite crystals. This foliation also parallels the bedding. Individual beds range in thickness from <2.54 cm (1 inch) to 12 or 15 cm (5 or 6 inches). The metasedimentary rocks have been silicified, due perhaps in part to the intrusion of a vertically dipping quartz vein striking north across the bedding. The quartz vein has a maximum width of 1 m (3 feet) and appears to be barren of mineralization. Near the walls of the quartz vein, sulphide minerals, sphalerite and galena appear to have been remobilized, into blebs and clots in the host rocks. Elsewhere, the mineralization consists of semi-massive to disseminated sphalerite and galena with mi-

nor chalcopryrite and pyrite. The sphalerite mineralization, in particular, occurs as near massive layers separated by highly silicified metasedimentary rocks. This banding or layering parallels the bedding. Since the dip of the beds is about 45°N, into the side of the hill, the true thickness of the deposit could not be determined.

An east-trending trench, about 9.1 m (30 feet) long, 0.75 m (2 feet) deep and 1 to 1.2 m (3 to 4 feet) wide exposes the mineralization. Assay results of 4 grab samples taken from the trench indicated zinc values as high as 15%, lead values up to 0.37%, 0.26 ounce silver per ton and trace values in gold.

Type 2a: Zinc-Lead-Silver Veins-Metavolcanic Type

Zinc, lead, and silver mineralization is concentrated within narrow carbonate and quartz veins within shear zones, faults, and fractures, associated with metavolcanic and metasedimentary rocks. Mineralization generally consists of massive sphalerite and galena within a banded carbonate vein. Silver appears in concentrations proportional to the galena content. The veins also contain minor chalcopryrite and gold mineralization. Accessory minerals include quartz, epidote, chlorite, sericite, and ankerite. Examples of this type of mineralization include the Deadhorse Creek North, Deadhorse Creek South, Morley High Grade and McKellar Creek properties.

Deadhorse Creek South Prospect (Hannam Property)- The Deadhorse Creek South Prospect, or Hannam Property, is located on the east and west sides of Deadhorse Creek, 0.4 km (0.25 mile) north of the Canadian Pacific Railway and 1.6 km (1.0 mile) south of Highway 17, in Walsh Township.

In 1952 and 1953, Saratoga Exploration Company Limited sank a shaft to 15.5 m (51 feet) on the west side of Deadhorse Creek and developed a drift west for 15.2 m (50 feet) at this level. An adit

was also driven west from the shaft collar for about 91 m (300 feet).

The showing consists of a narrow zone of sphalerite and galena associated with carbonate alteration. The alteration zone cross-cuts the host meta-wacke in the vicinity of a north-trending diabase dike. Red syenite dikes cut the metasedimentary rocks in the vicinity of the showing. Galena, sphalerite and pyrite are found with calcite and minor amounts of quartz in a 30 cm (12 inch) fracture that strikes 150° and dips steeply to the northeast. A zone of shearing, carbonatization, and disseminated sulphides adjacent to the fracture is up to 60 cm (2 feet) or more in width and appears to be richest where it comes in contact with the diabase dike.

Two zones have been recognized in previous work. The north zone lies on the east side of Deadhorse Creek, while the second zone lies 46 m (150 feet) to the south, on the west side of the creek. It seems quite probable that the 2 zones are actually 1 zone that has been displaced by a fault underlying the north-trending creek.

About 0.75 tons of cobbed ore were taken from a pocket of the shaft, and an average grade of 60.49 ounces silver per ton, 52.94% lead; and 15.60% zinc was reported (Resident Geologist Files, Ontario Ministry of Natural Resources, Thunder Bay). Assays of a grab sample containing abundant galena and sphalerite yielded 27.04% lead, 16.84% zinc, and 56.40 ounces silver per ton (Walker 1967, p.35).

Fourteen diamond-drill holes by Saratoga Explorations Limited in 1952, totaling 1681 m (5514 feet), were drilled along a 122 m (400 foot) length of the zone, on both the east and west sides of the creek. It is reported that the mineralized zone was intersected in all but 2 holes (Resident Geologist Files, Ontario Ministry of Natural Resources, Thunder Bay).

Ore reserves in the south zone were estimated at 35 000 tons averaging 27.65 ounces silver per

ton, 19.87% lead and 9.08% zinc. The north zone was reported to contain 36 000 tons of ore (Resident Geologist Files, Ontario Ministry of Natural Resources, Thunder Bay).

Type 2b: Lead-Zinc-Barite Veins—Unconformity Type

The lead-zinc-barite veins have been previously investigated by Tanton (1931), and Franklin and Mitchell (1977). The latter classified the lead-zinc-barite deposits of the Dorion property as spatially associated with the unconformity between Proterozoic and Archean rocks.

Franklin and Mitchell (1977) described the deposits as follows:

“The veins are coarse-grained, and mineralogically zoned with galena-calcite in the central zone, sphalerite-quartz surrounding the central zone, and barite (\pm chalcopyrite) in the vein extremities. Veins occur near the pinch-out of the “Pass Lake Formation” (basal Sibley Group), within the dolomite of the overlying “Rosspart Formation”, or in the nearby basement fractures. Rosspart dolomite, where it forms a vein wall, is highly altered to metal-enriched chert and calcite. Archean wallrocks are not altered.”

and

“The deposits formed from metal leached from either basement rocks or breakdown of Sibley sandstone matrix. Metals and sulphide moved through the permeable sandstone, probably as chlorite-iron complexes, and precipitated at the sandstone pinch-out. Reduced sulphur, possibly derived from organic decay, and probably held in a gas trap at the sandstone pinch-out, caused precipitation of sulphides by reaction with metal-bearing brines.”

Examples of Type (2b) include the Enterprise, Ozone, Dorion, Hilma, Silver lake, Caribou, and Gordon properties.

Gordon Occurrence— The Gordon lead-zinc-barite occurrence is located approximately 2 km (1.25 miles) north of Highway 17 on the east bank of the Jackfish River. The showing is a composite vein, striking east and dipping vertically. It is composed of calcite, barite, quartz, and a small amount of amethyst. The host rock is granite, which is white to pink, depending on the quartz and feldspar content and, locally, contains abundant dark-coloured biotite and hornblende. The vein contains inclusions of the granitic host. The main vein, which has a maximum width of 1.2 m (4 feet) is composed primarily of medium-to-coarse crystalline calcite with minor barite and galena. A short distance to the east the main vein branches into 2 separate veins both trending in the same easterly direction. The south vein has a maximum width of 30 cm (12 inches), is composed chiefly of calcite and is poorly mineralized. The north branch of the vein has a maximum width of 60 cm (24 inches) and contains barite, quartz, and calcite. The barite, which is pink to pinkish red in colour, varies from platy, to massive, to radiating needle-like in form. The quartz is both massive and crystalline and ranges in colour from milky white to purple. This vein contains minor galena.

Analyses of 2 grab samples, 1 from the main vein and 1 from the north branch of the vein revealed 370 and 3560 ppm lead, 750 and 940 ppm zinc, 170 and 5900 ppm barium, and 1.50 and 34.2% calcium, respectively.

Type 3: Copper-Molybdenum Vein Type

This type of mineralization could in places represent a sub-type of the gold-bearing veins associated with the Terrace Bay Batholith. The copper-molybdenum-bearing veins are predominantly hosted in metavolcanic rocks.

Both vein types are classified according to their mineralogy, alteration, and gold content. The copper-molybdenum mineraliza-

tion occurs in quartz veins, quartz-feldspar offshoots, and aplitic and pegmatitic dikes (Marmont 1984). The veins are generally lenticular, discontinuous and erratic, displaying a banded, laminated or crack-seal texture. Mineralization consists of chalcopyrite, molybdenite, pyrite, pyrrhotite, silver, and minor gold (generally less than 0.10 ounce of gold per ton). Accessory minerals include chlorite, carbonate, sericite and hematite. Alteration of the felsic intrusive host rock consists of sericitization, silicification, and hematization.

Marmont and Colvine (1981), suggest a magmatic-hydrothermal system of origin for the copper-molybdenum veins. This occurred within higher levels of the Terrace Bay Batholith during emplacement. Marmont and Colvine (1981) further suggest as does Marmont (1984) that the western, central, and southern sections of the batholith represent these higher levels. This is supported by numerous xenoliths, roof pendants and mineral occurrences located in these sections.

Type (1) gold mineralization properties such as the North Shore Gold Mine have similarities in alteration, mineralogy and vein style when compared to the Type (3) copper-molybdenum veins. The emplacement of the Terrace Bay Batholith could have produced magmatically derived solutions which in certain cases may have acted to leach or concentrate gold mineralization from surrounding country rocks. Marmont (1984) concludes:

“The coincidence of the molybdenum-copper mineralization with the western part of the intrusion as well as the inter-relationship of the quartz veins with quartz-feldspar dikes, indicate that the western part of the batholith was the site of crystallization of a later phase: the potassic-molybdenum-bearing, residual hydrous phase of the granitic magma, which migrated outward and upward and was deposited in cooling fractures and other conduits.”

Therefore, it is suggested that the copper-molybdenum veins are younger in age than the gold veins associated to the initial emplacement of the Terrace Bay Batholith. These gold-bearing veins such as the first-order veins observed in the Harkness-Hays-Gold Range area would likely be older in age than the gold-bearing veins of the North Shore Property. Further work on lead isotopes of galena samples collected from the related vein types is suggested. Thus, the North Shore Property gold veins and the copper-molybdenum veins in the western and central sections of the Terrace Bay Batholith may prove to be genetically related.

EXPLORATION GUIDELINES

Gold

Exploration for gold in the Schreiber-Terrace Bay area should include a thorough re-examination and re-evaluation of past producers, prospects, and occurrences, discovered in the past 100 years.

Properties such as the Harkness-Hays, Gold Range, Hays Lake, and Empress have undergone minor development and production. Recent work on such properties indicates that several ages of veining are present and that complex intrusive and deformational events are related to the emplacement of the Terrace Bay Batholith. Exploration programs concentrating on large scale structures (conduits) or lithological variations where auriferous solutions may have been focused, are recommended. Marmont (1984) recommends detailed structural analyses of the vein systems in an attempt to reveal a more extensive zone of mineralization. The exploration targets for this type of gold mineralization commonly include pyritized host rocks and *en echelon* vein systems, for which an induced polarization survey may prove to be a useful tool.

Numerous auriferous veins are associated with the contact zones and peripheries of intrusions, including the Big Duck Lake Porphyry and Terrace Bay Batholith. Further exploration in these areas

as well as in the vicinity of other felsic intrusions is warranted.

Northeast and northwest-trending lineaments should be explored and tested in the metavolcanics, metasediments, and peripheries of the intrusions. Highly deformed (sheared and faulted) and pervasively altered metavolcanic rocks such as those observed near the Empress Mine (Micham Exploration Incorporated) area make excellent host rocks for gold mineralization.

Algoman sulphide and oxide facies ironstone in the Schreiber-Terrace Bay area should be sampled and analyzed for gold in the parts per billion range. Although many of these units contain anomalous yet sub-economic levels of gold mineralization, they may represent protore in the sedimentary-exhalite source rocks. A later concentrating event, possibly related to deformation or intrusive events, could develop economic second-generation deposits.

Base Metals

Exploration for volcanogenic massive sulphide deposits in the Schreiber-Terrace Bay area is recommended 3 general areas:

1. Winston Lake-Big Duck Lake Area: Exploration by Corporation Falconbridge Copper has recently discovered a zinc - copper - silver - gold deposit hosted by calc-alkalic intermediate to felsic metavolcanic rocks in contact with a gabbroic intrusion(s). The host metavolcanic rocks consist of pyroclastic flows, debris flows and laminated ash deposits. Intense hydrothermal alteration of these and associated metavolcanics have been responsible for the misidentification of such indicator rocks. Exploration by Corporation Falconbridge Copper has identified large areas of intense hydrothermal alteration, representing excellent exploration target areas.

2. Santoy Lake-McKellar Lake Area: A large felsic metavolcanic unit trends west-northwest and hosts numerous base-metal occurrences including the Marlhill, Goldbar Lake, Bozena, Prairie River,

and Granite Mountain properties. Felsic pyroclastic flows were observed in the Granite Mountain area. These clast-supported flows contained considerable garnet mineralization in the matrix component. Felsic metavolcanic rocks in the Fishnet Lake area have been mapped as "andalusite-bearing tuffs" by Walker (1967) and may represent altered rocks. Ironstone and the related chemical and clastic metasedimentary rocks commonly contain anomalous zinc, lead, copper, silver, and gold concentrations and should be explored.

3. Schreiber Point-Worthington Bay Area: Numerous narrow base-metal bearing veins, gold-bearing veins and sulphide facies ironstone within mafic to intermediate metavolcanic rocks are present. Sulphide facies ironstone and the related chemical and clastic metasedimentary rocks appear to represent stratabound chemical exhalative sediments which contains low, however, anomalous concentrations of copper, zinc, silver, and gold. The ironstone units may represent distal portions of volcanogenic base-metal deposits.

Exploration is recommended within the metavolcanic and metasedimentary rocks near the western contact of the Port Coldwell Alkalic Complex. Several zinc-lead-silver rich veins have been discovered in this area.

RECENT EXPLORATION ACTIVITIES

Corporation Falconbridge Copper continued the development of its Winston Lake Deposit (Figure 5). Sinking of the proposed 510 m development shaft began in the Spring of 1984 and reached a depth of approximately 300 m in the Fall of 1984. Completion is expected in early 1985. Reserves at Winston Lake, held under option from Zenmac Explorations Limited, are an estimated 2 950 000 short tons, at a grade of 0.94% copper, 17.8% zinc, 0.74 ounce silver per ton and 0.025 ounce gold per ton (The Northern Miner, March 22, 1984). A production de-

cision is expected in 1985. Underground development at Winston Lake will include 747 m of crosscutting and drifting on the 510 m level, along with 16 764 m of underground drilling (The Northern Miner, July 5, 1984). Other developments include the completion of 20 km, 115-kv powerline and a road feasibility study.

Noranda Incorporated continued exploration in the Schreiber-Terrace Bay area during 1984. One property consisted of an option agreement made with United Westland Resources Limited and Ascona Petroleum Limited, on 71 claims in the Big Bruin Lake-Victoria Lake area. The area has a high potential for gold, silver, and volcanogenic massive sulphide mineralization (The Globe and Mail, June 19, 1984).

Nuinsco Resources Limited conducted a 1707 m drill program on its Prairie Lake property. The alkalic-carbonatite complex is said to contain significant quantities of columbium (niobium), wolastonite, phosphate, uranium, tantalum, and rare earth elements. Results appear encouraging (Resident Geologist Files, Ontario Ministry of Natural Resources, Thunder Bay).

Kingdom Resources Limited completed an aerial geophysical survey accompanied by prospecting, linecutting, ground geophysical surveys, and lithochemical sampling, on its 36 claim block near Santoy Bay. Analysis of samples collected by the authors indicate anomalous gold values within Algoman sulphide facies iron formation.

Silver Sceptre Resources Limited conducted approximately 1219 m of diamond drilling on its Terrace Bay property. The program tested 12 electromagnetic and magnetic conductors. The results indicated low but anomalous gold values related to exhalative chemical sedimentary rocks (Resident Geologist Files, Ontario Ministry of Natural Resources, Thunder Bay).

Micham Explorations Incorporated conducted diamond drilling

on their Terrace Bay property which includes the Empress Mine (past-producer) and the Ursa Major Prospect. Several zones were tested including a 366 m section of the 2743 m Empress Zone (The Northern Miner, March 1, 1984). Drillhole number 8 intersected a 0.6 m wide section assaying 1.29 ounces gold per ton (Resident Geologist Files, Ontario Ministry of Natural Resources, Thunder Bay).

Melrose Resources Limited conducted trenching, mapping, and sampling on its Terrace Bay Property. Samples collected indicated up to 0.2 ounce gold per ton (North American Gold Mining, February 15, 1984).

Stralak Resources Incorporated holds 50% interest in a silver-lead-zinc property in Walsh Township, near Deadhorse Creek, located between Terrace Bay, and Marathon. Drilling in 1983 encountered values along a 213 m strike length. Drilling is scheduled in 1984 (The Northern Miner, June 28, 1984).

Dynamic Oil Limited, Cumberland Resources Limited, Redfern Resources Limited and Saco Resources Limited have conducted geological mapping and geochemical surveys on their Terrace Bay Property. Two large mineralized zones are characterized by strong alteration (pyrite, silica, and carbonate). The north zone is reported to be 1700 m long and ranges from 10 to 150 m wide, while the south zone is 800 m long and 30 m wide (George Cross News letter, No. 164, 1984).

An 8 hole drill program was completed in late August, testing a wide pyritic zone. One hole intersected volcanogenic massive sulphide mineralization over a true thickness of 4.3 m. Low, but encouraging gold and zinc values were reported (George Cross News Letter, No. 183, 1984).

Numerous local prospectors and junior mining companies continued work on their Schreiber-Terrace Bay Properties.

RESEARCH ACTIVITIES IN THE SCHREIBER-TERRACE BAY AREA

B.R. Schnieders, part-time graduate student, Lakehead University, Thunder Bay, continued research on sulphide-facies ironstone units as part of a M.Sc. thesis. Research began in late 1983 and will continue into 1985. Research in 1984 included detailed mapping, logging, sample collection and preparation, detailed structural analyses and stratigraphy of confined sections.

Further research on these iron-rich units is planned by P. Fralick (Lakehead University), and T.J. Barrett (University of Toronto).

ATIKOKAN COBALT - BASE METALS - PLATINUM GROUP ELEMENTS PROJECT

A.D. MacTavish, and R.J.A. Dutka

Resource Geologists, Ontario Ministry of Natural Resources, Thunder Bay.

INTRODUCTION

The Atikokan Cobalt-Base Metals-Platinum Group Elements Project is a 3 year program, initiated in May 1984, funded by the Ontario Ministry of Northern Affairs, and staffed by A.D. MacTavish and R.J.A. Dutka. The objectives of the program are:

1. To stimulate exploration for base metals, cobalt, the platinum group metals, and gold in the Atikokan Area.
2. To assist prospectors and junior mining companies in the area with property visits, advice, and literature searches.
3. To assist the mining companies interested in conducting exploration programs in the area by providing up-to-date information and files on the area's mineral occurrences.

The program involves detailed geological mapping, sampling, assaying, and petrographic work on the significant cobalt, base metal and platinum group metal occurrences. Emphasis is placed on the copper-nickel-cobalt occurrences

along a 28 km portion of the Quetico Fault Zone, and the copper-nickel-platinum group element mineralization within the mafic/ultramafic plugs, dikes, and stocks east of Atikokan. At the program's end a report with maps will be prepared to document the location of all occurrences visited and outline the geological setting, assay results, petrochemistry, and mineral potential. Orientation field trips will be provided to interested groups and individuals. Mineral and rock suite displays will be prepared for the Resident Geologist Office in Thunder Bay and for the Ontario Geological Survey Geoscience Seminar in Toronto.

At the time of writing, most of the initial reconnaissance sampling, assaying, and geological mapping has been completed. This information will be used to rank those occurrences, prospects or abandoned mines that will be examined in detail during the 1985 and 1986 field seasons. A total of 47 showings in 18 different areas were examined in the Atikokan area. Three base-metal occurrences were visited in the Rainy Lake-Mine Centre areas for familiarization and comparison purposes. Also examined were 5 gold occurrences in the Atikokan areas and 4 gold occurrences in the Mine Centre area. Several informal field trips to the significant occurrences were conducted for Ontario Geological Survey personnel. All assays quoted in the following text were performed by the Geoscience Laboratories, Ontario Geological Survey, Toronto.

GENERAL GEOLOGY AND STRUCTURE

The project area lies within the southern portion of the Superior Province of the Canadian Precambrian Shield. Most of the rocks are Archean in age although there are a few isolated diabase dikes of Keweenawan age. The northern portion of the area is underlain by the rocks of the Wabigoon Subprovince and according to Borradaile (1982):

"... comprises schistose metavolcanic sequences intruded by syntectonic tonalitic diapirs and younger post-tectonic intrusions. The metavolcanics occur as slivers, of tens of square kilometres, almost separated from one another by the intervening intrusions."

Fenwick (1976) and Pirie (1978) described the Wabigoon Subprovince as consisting primarily of large, deformed, and undeformed felsic intrusive batholiths composed of a range of lithologies including biotite and hornblende granites, trondhjemites, quartz monzonites, and quartz porphyries. These rocks intrude a number of curvilinear "greenstone belts" composed of mafic to intermediate metavolcanic rocks, intercalated with felsic to intermediate metavolcanic rocks, and assorted clastic and chemical metasedimentary rocks. The metamorphic grade of these rocks ranges from lower greenschist facies to amphibolite facies.

The southern portion of the area is underlain by rocks of the Quetico Subprovince which Percival and Stern (1984) state to consist of:

"... marginal metasedimentary rocks with a metamorphic transition from chlorite-muscovite grade at the outside to migmatites adjacent to the core, which is dominantly granite and migmatite."

In the Atikokan area the centre of this core is dominated by the Quetico Park Batholithic Complex which is composed of granite, syenite, tonalite and diorite. Borradaile (1982) describes the Quetico Subprovince as a turbiditic sequence that is migmatized along its central axis.

The contact between the above 2 subprovinces is defined by the Quetico Transcurrent Fault Zone. Kennedy (1984) describes the zone as:

"... a steeply dipping zone of dynamically metamorphosed rock... exhibiting evidence of both brittle and ductile deformation."

The fault zone is generally quite narrow, ranging from 10 to

300 m in width. It exhibits a major sense of dextral movement and has a very complex system of associated splay faults that curve into both of the subprovinces.

DEPOSIT TYPES

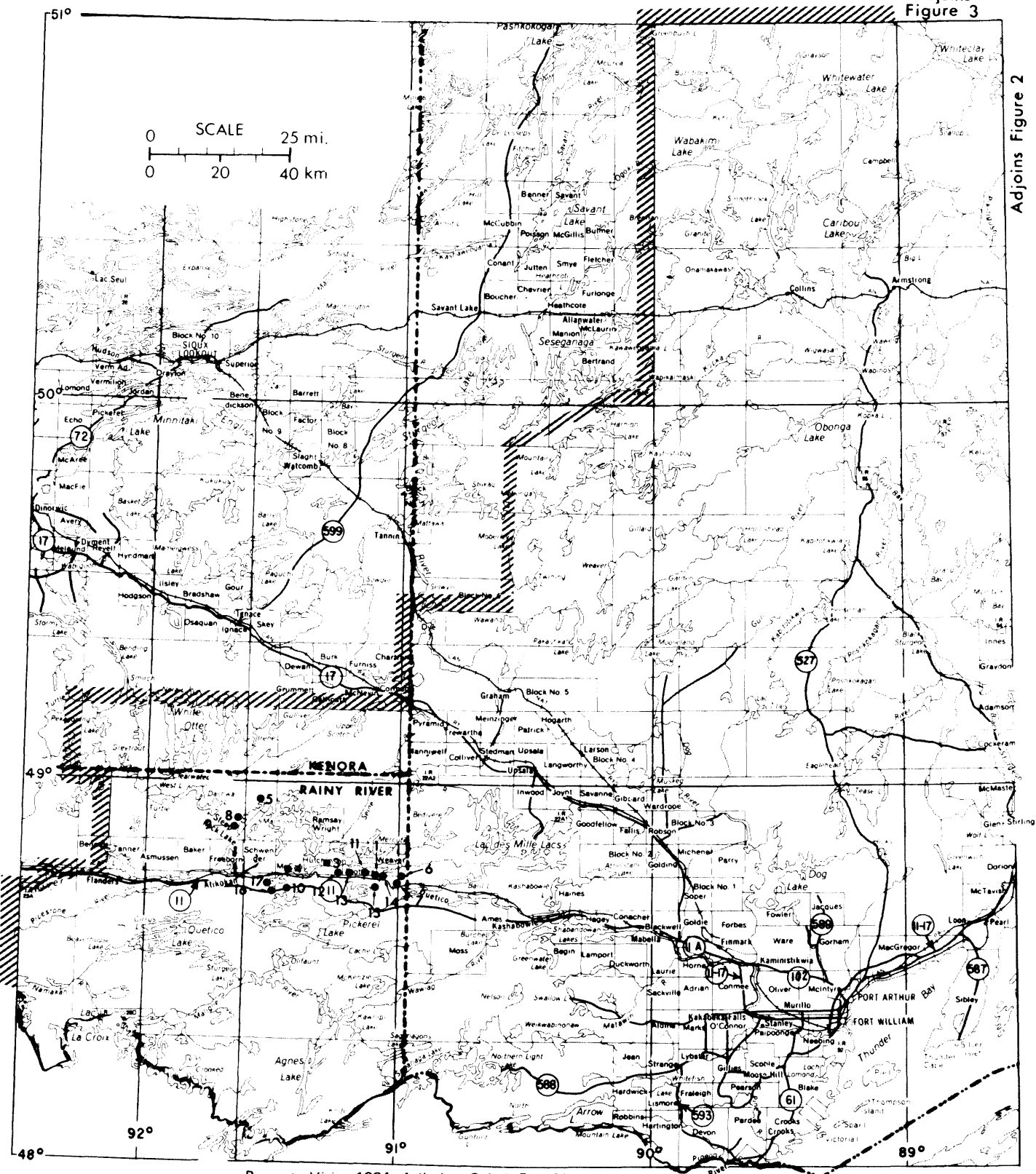
Reconnaissance work by the authors during the 1984 field season has revealed the presence of 5 preliminary "deposit" or occurrence types which might host cobalt, base metal, or platinum group elements mineralization. It should be noted that these divisions are preliminary and are subject to revision with the acquisition of more data. The deposit types are:

1. The Quetico Fault Zone-hosted Intrusions
2. The Quetico Intrusions (Metasedimentary-hosted)
3. Chemical Metasedimentary Rocks within Metavolcanic Terrain
4. Shear Zones within Metavolcanic Terrain
5. Quartz Veins.

These types are discussed below with respect to general geological, geochemical, and structural characteristics.

(1) The Quetico Fault Zone-Hosted Intrusions

Along 28 km of its length, from Crooked Pine Lake west to Atikokan, the Quetico Fault Zone is host to at least 6 syntectonic mafic to ultramafic intrusions that appear to have a similar origin. These intrusive bodies are dike-like in appearance, very resistant to erosion and in most cases tend to form high steep-sided ridges. Rock compositions range from hornblende gabbro to serpentinite. Syntectonic emplacement has resulted in almost pervasive shearing, the amount of which increases from the centre of the intrusions outward. Slickensides are common and the original texture of the rock is usually destroyed near the contact with the fault rocks. Lenses of massive, semi-massive, and disseminated magnetite are ubiquitous, and lenses and zones of disseminated to massive pyrrhotite, pyrite, and chalcopyrite are com-



Property Visits, 1984: Atikokan Cobalt-Base Metal
Platinum Group Element Study

Figure 6

- Past-Producer
- Occurrence

- 1) Abiwin Cu-Ni Occurrence
- 2) Anderson Occurrence
- 3) Atikokan Iron Mine (Past-Producer)
- 4) Atikokan River Occurrence
- 5) Canadian-Addicks Occurrences
- 6) Elbow Lake (North) Stock
- 7) Elbow Lake (South) Stock
- 8) Fin-Ian Copper Mines Ltd. Occurrences

- 9) Finlayson Lake Sulphide Occurrences
- 10) Fire Lake - Highway 11 Mafic Bodies
- 11) Heward Lake Mafic Body
- 12) Kawene Lake Cu-Ni Occurrence
- 13) Kawene Lake Mafic/Ultramafic Bodies
- 14) Mud Lake Cu-Ni Occurrence
- 15) Nydia Road Mafic Bodies
- 16) Plateau Lake Cu-Ni Occurrence
- 17) Plateau Lake Mafic Bodies

mon. Good net-textured pyrrhotite and chalcopyrite have been observed locally, indicating that an immiscible sulphide liquid was present in the original magma. Subsequent shearing has largely remobilized the sulphide mineralization.

Atikokan Iron Mine- The easternmost intrusive, located 1200 m east of Sapawe Lake occurs at the abandoned Atikokan Iron Mine. It is a lenticular, dike-like mass 1100 m long and up to 100 m wide. Its lithologic range is gabbroic to pyroxenitic(?), with gabbro predominating. Some exotic lithologies are present along the intrusive's boundaries. These "slices", which include magnetite-chert-iron formation and chert-carbonate rocks, appear to have been emplaced by faulting and are not genetically related to the deposit. The deposit was mined intermittently from 1900 to 1913, and produced 90 680 short tons at 58.9% iron, with a variable sulphur content. Numerous estimates of the remaining tonnage and grade exist. The most recent estimate (The Northern Miner, October 26, 1972), which includes tonnage estimates for 3 similar bodies to the adjacent west, gives 24 000 000 short tons to a depth of 91 m, at a minimum of 35% iron, and 0.40% copper, with some indications of nickel and cobalt. Rock exposure at the mine is good due to the past mining activities. Sample values ranged from 0.115 to 0.267% copper, 0.029 to 0.076% nickel, and 0.408 to 1.30 pounds cobalt per ton.

(2) Quetico Intrusions

Intruded into the metasedimentary rocks of the northern Quetico Subprovince are a series of mafic to ultramafic dikes, plugs, and stocks. They occur within a 47 km zone between Plateau Lake in the west, and Chief Peter Lake in the east. Twelve of these intrusions were examined in 1984 and although of variable size, were found to have similar characteristics. Lithologies include hornblende gabbro, feldspathic hornblende, hornblende, pyroxenitic hornblende, and occa-

sionally serpentinized peridotite. The larger intrusions are usually multiphased, with the last stages dioritic. Contact zones exhibit hybrid characteristics due to assimilation of the metasedimentary country rocks. Reaction rims are found at the contacts of the different intrusive phases and country rock xenoliths. Textures range from fine to very coarse grained, to locally pegmatitic. Possible cumulate textures have been observed locally within the larger intrusions, such as the Elbow Lake Stock. Some of the smaller dike-like bodies have been intruded by later granitic dikes as at the Abiwin Occurrence or have been folded and faulted as at Fire Lake and on Highway 11. In the occurrences examined, mineralization consists of irregular zones or pods of finely disseminated to semi-massive pyrrhotite, chalcopyrite, pyrite, and sometimes pentlandite. Significant assays have been received from the Abiwin Occurrence and the Kawene Occurrence.

Abiwin Occurrence- The Abiwin Occurrence is a small, slightly irregular dike-like body, 400 m in length and 50 m in width located 2.8 km northwest of Nydia Lake. It is composed of medium to very coarse-grained hornblende gabbro, feldspathic hornblende and hornblende. Mineralization consists of small, irregular sulphide pods up to 20 m in length containing 10 to 35% disseminated pyrrhotite, pyrite, chalcopyrite, and possibly pentlandite. Assays indicate between 0.123 and 2.20% copper, 0.10 to 0.168% chromium, 0.17 to 0.23 ounce silver per ton, and in one sample 0.11 ounce palladium per ton, 1.15 ounces platinum per ton and between 30 and 300 ppb rhodium.

Kawene Occurrence- The Kawene Occurrence is an elongate, plug-like body approximately 520 m in length and up to 185 m in width located 400 m west of Kawene Lake. It is composed of fine-grained to pegmatitic feldspathic hornblende, hornblende, pyroxenitic hornblende and ser-

pentized hornblende peridotite (Larsen 1974). Sulphide mineralization consisting of pyrrhotite and chalcopyrite, occurs interstitial to the mafic silicate minerals and is locally concentrated. One mineralized zone, approximately 100 m in length and 40 m in width yielded significant assay values. Some of the values obtained are 0.13 to 1.26% copper, 0.084 to 0.248% nickel, 0.25 to 0.50 pounds cobalt per ton, 260 to 1100 ppb palladium and 230 to 1100 ppb platinum. One sample was slightly enriched in rhodium.

(3) Chemical Sedimentary Rocks in Metavolcanic Terrain

The chemical metasedimentary rocks examined to date are located in the Finlayson Lake area, northwest of Atikokan. According to Fenwick (1976) the chemical metasedimentary rocks occur as 2 basic types:

1. Massive pyrrhotite, nodular pyrite, and minor chalcopyrite, associated with cherty iron formation
2. Massive to locally banded pyrite deposits associated with the uppermost felsic metavolcanic unit in a well-differentiated volcanic pile.

The "Type 1" chemical metasedimentary rocks range between 10 cm and 5 m in width and are slightly to highly folded. They are usually well-banded with alternating, white to grey, recrystallized, sugary-textured chert and iron-rich laminae. The iron-rich laminae are composed of either magnetite, hematite, iron silicates, pyrrhotite or occasionally pyrite. Massive, semi-massive, and disseminated pyrrhotite, with associated pyrite, are the most common iron minerals. Pyrite usually occurs as radial or concentric nodules up to 10 cm in diameter within the laminae, and along fractures or joints. Chalcopyrite is a minor constituent that is usually associated with remobilized quartz blebs within nearly massive pyrrhotite. Graphitic zones are observed locally. These "Type 1" chemical metasedimentary rocks were observed in association with felsic and mafic

metavolcanic rocks and clastic metasedimentary rocks.

The "Type 2" chemical metasedimentary rocks exhibit many of the same characteristics as "Type 1" metasedimentary rocks. The major differences are: (1) the predominance of pyrite as the main iron mineral; (2) a tendency to be associated with tuffaceous and other pyroclastic, felsic metavolcanic rocks, and; (3) a close association with intertuff graphitic argillites and shales.

Both of the above chemical metasedimentary types tend to form in a reducing environment (Fenwick 1976), although "Type 1" metasedimentary rocks may contain magnetite or hematite. Beds of recrystallized carbonate were observed locally; and crosscutting and sub-concordant lamprophyre, diabase, and other mafic dikes are widespread.

Assays are anomalous, ranging from 515 ppm to 1.18% copper, 1260 to 3720 ppm zinc, 280 to 990 ppm cobalt, and 0.13 to 0.34 ounce silver per ton. The most significant assays came from the main showing on the old Fin-Lan Copper Mines Limited property, located in the west-central portion of Finlayson Lake. The showing consists predominantly of a 0.5 to 3 m wide, folded and faulted, "Type 1" banded chemical metasedimentary rock containing near massive pyrrhotite, pyrite, and minor finely disseminated chalcopyrite. The sulphide mineralization tends to occur within the most highly folded areas of the rock. Pyrite nodules are very common. Numerous lamprophyre and mafic dikes, of variable width, crosscut the main chemical metasedimentary unit creating isolated blocks. The northernmost part of the showing is composed of a 2 to 7 m wide, near massive sulphide zone containing pyrite (both massive and nodular forms), pyrrhotite, and up to 10% disseminated chalcopyrite. Assay values over the showing range from 515 ppm to 1.18% copper, 100 to 990 ppm cobalt, and 410 to 1000 ppm zinc.

(4) Shear Zones within Metavolcanic Terrain

Shear zones were observed in 3 areas: 4 in the Finlayson Lake Area, 1 north of the Atikokan Iron Mine, and another west of Lumby Lake. The shear zones observed in the Finlayson Lake Area are characterized by rusty weathering, friable quartz-sericite schists, carbonate-chlorite-sericite schists and chlorite schists. The sulphide mineralization varies considerably from <5% to \approx 50% as finely disseminated and stringer pyrite, pyrrhotite and minor chalcopyrite. Graphite was observed locally. The zones tend to occur along lineaments and probably indicate faulting.

A recently discovered, highly sheared and deformed quartz-carbonate zone is located approximately 1 km north of the Atikokan Iron Mine. This zone is composed of very limonitic, highly folded quartz, quartz-carbonate, and carbonate stringers and veins, hosted in a highly sheared, mafic metavolcanic rock (now a carbonate-chlorite schist). It is possible that a splay fault associated with the Quetico Fault Zone, 1 km south, passes through this area, accounting for the highly deformed nature of the rock. The sulphide mineralization is restricted to <1% pyrite with very minor chalcopyrite, and a moderate percentage (<4%) of a yet unidentified cobalt arsenide mineral, which has weathered to erythrite (Geoscience Laboratories, Ontario Geological Survey, Toronto, x-ray analysis) on fracture surfaces.

Anderson Occurrence- The Anderson Occurrence is in a shear zone located 1 km west of Lumby Lake in the northern part of the Atikokan District. This shear zone is 10 to 15 m wide and is composed of carbonate-sericite-quartz schist, carbonate-chlorite-sericite schist and numerous boudinaged quartz stringers and veins. The original rock types appear to have been mafic volcanic flows and interbedded felsic, quartz-porphyry flows or sills(?). Finely disseminated pyrite, <3%, occurs within the

shear zone schists. Local concentrations of sphalerite, pyrite, and chalcopyrite were observed and within some of the quartz veins. One sample returned 905 ppm copper; another sample 330 ppm chromium.

(5) Quartz Veins

Small amounts of base-metal sulphide mineralization are commonly found in many quartz veins throughout the Atikokan area (Schnieders and Dutka, in preparation). These quartz veins are commonly hosted within shear zones. Mineralization consists primarily of chalcopyrite, sphalerite, and galena in amounts of up to 20%, and occasionally as massive lenses. They are predominantly found in association with pyrite, sericite, and occasionally chlorite, along the slip planes of "crack-seal" type quartz veins, or as isolated blebs, masses or crystals within the main body of the quartz vein. Auriferous quartz veins of the Atikokan area will usually contain some base-metal sulphide mineralization. Assay returns gave between 710 to 4600 ppm copper, 430 to 2720 ppm lead, and 1290 to 4450 ppm zinc. A series of small quartz veins in the Finlayson Lake area returned an assay of 1500 ppm molybdenum.

SUMMARY

Cobalt, base metal and platinum group elements mineralization in the Atikokan area has been tentatively assigned to 5 "deposit" types determined on the basis of lithology, structure and associated sulphide mineralogy:

1. "The Quetico Fault-hosted Intrusions" contain significant cobalt, copper, and nickel sulphide mineralization closely associated with disseminated to massive magnetite lenses within sheared, syntectonic gabbroic to ultramafic intrusive rocks. A similar potential for cobalt and base metals may exist within other intrusions of this type. The possibility of platinum-group elements enrichment is high in the presence of copper and nickel sulphides.

2. "The Quetico Intrusions" are mafic to ultramafic bodies exhibiting high local concentrations of copper, nickel cobalt, platinum, and palladium. The base metals occur as pods and zones of disseminated chalcopyrite, pyrite, and pentlandite. The minerals as yet unspecified containing the platinum group elements are probably closely associated with chalcopyrite, and pentlandite mineralization (Crocket 1981). Base metal, and especially platinum-group element potential, in these and other similar bodies is high and should be investigated further.

3. The deformed, banded chert and iron-rich chemical meta sedimentary rock of the Finlayson Lake area locally contain copper, cobalt, and minor zinc and silver within primary exhalative(?) sulphide mineralization (Fenwick 1971; MacMillan 1979). The sulphide mineralization is very fine to coarse grained, banded to nodular, disseminated to massive, pyrrhotite, pyrite, and occasionally disseminated chalcopyrite, and sphalerite. The possibility of copper-zinc mineralization in other chemical metasedimentary rocks within the Finlayson Belt is high.

4. and 5. Shear zones and quartz veins throughout the Atikokan District exhibit localized disseminated copper, lead, and zinc mineralization. Cobalt was observed in association with a possible splay fault of the Quetico Fault Zone.

Work planned for 1985 will include detailed geological mapping and rock geochemistry of the Quetico Intrusions and the 6 Quetico Fault Zone-hosted mafic bodies. Further reconnaissance is planned for the Atikokan area, the Calm Lake area, the Lumby Lake-Redpaint Lake area and portions of the Shebandowan area.

BUILDING AND MONUMENT STONE

M.C. Kennedy and P.M. Gertzbein

Resource Geologists, Ontario Ministry of Natural Resources, Thunder Bay.

INTRODUCTION

Stone has long been considered the most prestigious of building materials. It has earned this distinction because of its great beauty and durability. A rejuvenation in the popularity of stone as a building material is being experienced in the 1980s as trends move away from the steel and glass structures of past decades (Engineering News-Record, March 8, 1984). The durability and insulating properties of stone, as well as its aesthetic appeal, have contributed to its rise in popularity. Improvements in stone installation technology have made stone easier and more economical to work with. At the present time much of the stone used by the building and monument industries in Canada is imported (Les Consultants Sogir Incorporated, 1984) in spite of the fact that the production of high quality stone can be a lucrative industry. For instance, Les Consultants Sogir Incorporated (1984) note that a basic local granite for construction use has a value of up to \$400 per m³ at plant site. Special granites such as the anorthosites from Scandinavia, Indian-red granites and African-black granites command \$800 or more per m³.

The North Central Region of Ontario Ministry of Natural Resources would appear to be an area with high potential for good quality stone deposits. With this in mind, an inventory of potential dimension stone was initiated in April 1984. The "Building Stone Inventory" is a 2-year project funded jointly by the Federal and Provincial Governments under the Northern Ontario Rural Development Agreement (NORDA). The study is being carried out by M.C. Kennedy assisted by P.M. Gertzbein. A similar study has recently been completed in the North-western Region.

The purpose of the project is to encourage the development of the stone industry in the North Central Region. This will be accomplished by:

1. Identifying areas and rock types having high potential for the

production of good quality building and monument stone.

2. Making information on all aspects of the building stone industry, such as quarrying, finishing and marketing, available to the private sector.

The project involves detailed documentation of occurrences of good quality stone and reconnaissance mapping of areas of high potential. Samples collected from potential stone deposits are cut and prepared for display. These samples are available for viewing at the Thunder Bay Resident Geologist Office. Laboratory testing of physical properties will be carried out on selected samples.

TERMINOLOGY

The terminology used in the stone industry is quite different from standard geological terminology. The term dimension stone refers to all natural rock that has been quarried and shaped to certain specifications for use in the building, construction and monument industries. This includes rough stone, blocks, panels, and polished material but no crushed or powdered stone used as an aggregate or reconstituted to form artificial stone (Allison, P., Industrial Minerals, July, 1984, p.19-35). The principal types of stone produced are granite, marble, limestone, sandstone, and slate. Commercial "granite" includes all intrusive igneous rocks regardless of composition as well as gneissic rocks. "Black granite" refers to dark coloured igneous rocks such as diabase or anorthosite. Commercial "marble" comprises any carbonate rock which polishes and includes serpentinite, travertine and onyx. "Limestone" includes any carbonate rock which will not take a polish. "Sandstone" as used in the stone industry refers to any granular sedimentary rock composed primarily of quartz and feldspar. Commercial "slate" and "schist" include true slates and foliated rocks of varying lithologies and metamorphic grade which can be split into thin slabs for use as flagstone.

GEOLOGICAL CRITERIA FOR STONE DEPOSITS

Dimension stone deposits must possess specific characteristics to be economic. The stone itself must be sound (meet American Society for Testing and Materials' criteria) and must suit the specific purpose for which it is being quarried. For example, granite quarried for monument production must polish to a flawless finish. It must be fine-grained and have sufficient contrast between the polished and sandblasted surfaces so that lettering is distinct.

Storey (1983) has outlined the criteria for granite dimension stone deposits. These criteria, outlined below, generally can be applied to granite, marble, and sandstone deposits. Exceptions are noted where applicable.

1. Fracturing and jointing control the size and shape of blocks which can be quarried. Ideally, fracturing and jointing are absent, permitting the quarryman to remove blocks of any size to suite his requirements. This is rarely the case. Favourable deposits contain jointing which is widely spaced, allowing the removal of the largest blocks possible in order to minimize waste and handling. A reasonable sized block would be 3 m by 1.5 m by 1.3 to 2 m (Les Consultants Sogir Incorporated, 1984). Orthogonal jointing systems are desirable, permitting the removal of rectangular blocks, thus minimizing waste.

2. The colour and texture of the stone must be uniform throughout the deposit. This ensures that the appearance of the material removed remains consistent during a quarry's lifespan. Textures in marbles are commonly quite heterogenous but the colour must be consistent. Such features as knots, lines, foliation, veins, and other irregularities are considered textural flaws. Layering in sandstones is quite acceptable.

3. Colour and texture must be commercially desirable. A stone duplicating a colour which is already being produced is not as desirable as a "new" colour, except

in the case where it could replace an expensive import.

4. Deleterious minerals must be absent. Any mineral, such as pyrite, which breaks down rapidly due to weathering is undesirable. This is not as important in marble for interior use as for other stone commonly used for exterior cladding and monuments. The presence of soft ferromagnesian minerals, olivine and altered feldspars is undesirable as they weather poorly and often will not sustain a polish. Very hard minerals can cause problems in polishing. Biotite in concentrations greater than 5% may be plucked out of the surface during polishing.

5. The deposit should be large enough so that it could be quarried for 20 to 50 years or more. Storey (1983) suggests a minimum size of approximately 1 km².

DIMENSION STONE IN THE NORTH CENTRAL REGION

A wide variety of good potential building and monument stone exists in the North Central Region. Although there are no dimension stone quarries presently operating within the study area, the stone industry of the region has been, historically, quite important. Sandstone, marble, and granite were quarried in the past, and around the turn of the century prospecting for quality stone was carried out. Past-producing stone quarries and past and present stone prospects are listed in Tables 6a and 6b and located on Figure 7.

In the Thunder Bay area diabase was quarried, as large blocks, for breakwater construction on Lake Superior.

Crushed stone quarries are listed in Table 6a and located on Figure 7. These have been documented but are not directly part of the study. Crushed stone was also important in the region in the past and is produced intermittently from a number of small quarries.

SANDSTONE

High quality sandstone for building purposes was produced from a number of quarries in the region from the early 1880s to the 1900s. The sandstone is part of the Proterozoic Sibley Group sedimentary rocks. Red to brown coloured sandstone of the Rosspoint Formation was quarried at Vert Island and La Grange Island in Nipigon Bay. Cream or buff-coloured sandstone of the Pass Lake Formation was quarried as Simpson Island, Quarry Island, and the Wolf River area.

Most of the information concerning these quarries is derived from local newspapers published at the time the quarries were active. This newspaper research is being carried out by K.G. Fenwick, Regional Mineral Resources Coordinator.

The earliest produced sandstone was shipped to the Chicago and Winnipeg areas as rough blocks. Stone cutting plants were established in Fort William and Port Arthur (now Thunder Bay) between 1905 and 1910. Many buildings were constructed from this locally derived sandstone, principally from Vert Island and Simpson Island. These buildings, now 75 to 80 years old, serve to illustrate the durability and lasting beauty of the local sandstone. The author is compiling an inventory of buildings in Thunder Bay which incorporated local stone in their construction.

Vert Island Sandstone Quarry

The red sandstone location on Vert Island in Nipigon Bay of Lake Superior was first secured by Duncan McEachan in 1881 (Thunder Bay Sentinel, July 29, 1881). In the spring of 1882, Cummings and Company of Chicago began work at the site with 16 men employed in constructing dock facilities and buildings (The Daily Sentinel, April 1, 1882). In July of 1882, 1000 tons of stone were ready for shipment to Chicago. The stone was reported to be remarkable because of its quality and accessibility; it only needed to be moved 250 feet from the quarry to the docks.

TABLE 6a. BUILDING STONE QUARRIES

Name	Past Producing Quarries Commodity	Date
1. Vert Island Quarry	sandstone	1880s-90s
2. La Grange Island Quarry	sandstone	1880s
3. Simpson Island Quarry	sandstone	early 1900s
4. Quarry Island	sandstone	late 1880s
5. Wolf River Quarry	sandstone	? (late 1880s)
6. George Point, Black Bay Peninsula	sandstone	? (early 1900s)
7. V18 - Sibley	sandstone	? (early 1900s)
8. Nipigon Marble Quarry	marble	1880s
9. Black Bay Mine and Quarry Co.	marble	1890s
10. Cooke Point, Lake Nipigon (Lawrence Quarry)	marble	1930s, 40s
11. Pearl Quarry	granite	? early 1900s and recently
12. CPR Quarry-MacKenzie	granite	1880s
13. Angler Quarry	red and black syenite	early 1930s
14. Peninsula Granite Quarries Ltd.	red syenite	1927-31
15. Cold Spring Granite Co. Ltd.	black syenite	early 1930s
16. Cold Spring Granite Co. Ltd.	black syenite	early 1930s
17. CPR Quarry Peninsula	black syenite	1880s and late 1920s
18. Lakeshore Drive Quarry—Breakwater Construction	diabase	? 1880s and present
19. Caribou Island	diabase talus	1880s
20. Silver Harbour	diabase	? (early 1900s)
21. Great Lakes Dredging Co.	diabase talus	1910s
22. Marrigan Trap Quarry	diabase, cr. Diabase and shale	1920s
23. Mountain Stone Co. Ltd.	cr. diabase	1920s
24. City of Fort William (rifle range)	diabase	1925-30s
25. Nelson Road	diabase	?
26. Intercities Quarries Co. Ltd. (Stewart and Hewitson Quarry)	cr. diabase and shale	1920s and 30s
27. Quinn Stone and Ore Co.	cr. Diabase and shale	late 1920s
28. Stewart Quarry*	cr. diabase	early 1900s
29. Hewitson Quarry*	diabase and shale	early 1900s
30. Government Rock Quarry*	diabase	1870s
31. Winnipeg Flagstone Supply (Alsip Quarry)	shale (flagging)	1880s
32. Hoorigan Bay	shale (for brick)	early 1900s
	shale (for brick)	late 1910s

*now non-existent

Blocks as large as 15 x 15 x 4 feet are reported to have been removed (The Weekly Herald, August 5, 1882). Although no change of ownership was described, the quarry is called the "Chicago and Vert Island Sandstone Quarry" in 1883 accounts, with no mention of Cummings and Company being involved. It appears to have operated continuously until the early 1900s. A reported 30 000 to 50 000 cubic feet of stone were shipped annually to Chicago and approximately 50 men were employed (Port Arthur Illustrated, 1889). The sandstone was used in 1885 in the construction of the Canadian Pacific Railway bridge over the Nipigon River where it can still be seen today.

The authors made a brief visit to the quarry site which is located on patented land on the west shore of Vert Island. The quarry site is indicated by the remnants of 4 docks. The cribbing of the docks is gone but the stone rubble promontories remain. The site is entirely grown over.

The old quarry face is approximately 120 m from the shore, about 200 to 250 m in length and generally 9 to 10 m in height. The brick red sandstone is attractive and appears to be quite homogeneous. The location will be examined in greater detail to determine its potential for future quarrying. The stone is suitable for restoration purposes, particularly for red sandstone buildings in Southern Ontario (Martin Weaver, Heritage Canada, Ottawa, personal communication, 1984).

Simpson Island Sandstone Quarry

Tanton (1931) mentions that sandstone was produced from this site, but no documentation of production figures has been found. It apparently operated in the early 1900s and as a result, several of the more prominent buildings (e.g. Port Arthur Collegiate), in Thunder Bay, were built of stone from this quarry.

The quarry, located on crown land on the north side of Simpson

TABLE 6b. BUILDING STONE QUARRIES

Name	Prospects Commodity	Date
1. East shore of Thunder Bay (Sibley Peninsula)	sandstone	1880s
2. Lunmac Marble	marble	current
3. Muskrat Lake	marble	current
4. Greenspar Quarry	porphyritic diabase	1960s
5. Bamooos Lake	black syenite	current
6. Port Coldwell	red syenite	pre-1910
7. Morrison Claims	black syenite	1931
8. Lake Superior Stone Syndicate	black syenite	1960
Reports		
1. Middleton	black syenite	early 1930s
2. East shore of L. Nipigon	slate	1860s
3. West of Whitefish Lake	granite	1880s
4. Kowkash Area (CNR mileage 37, 51)	granite	1931
5. Lambert Island	diabase talus	1930

TABLE 6c. BUILDING STONE QUARRIES**Occurrences**

1. Trout Lake Pluton (porphyritic granite)
2. Barnum Lake Pluton (porphyritic granite)
3. Eye-Dashwa Lakes Pluton (pink granite)
4. MacKenzie Pluton (pink granite)
5. Stedman Lake Pluton (white to pink granite)

Island in Lake Superior, was visited during the summer of 1984. The old quarry face is 55 m in length and 3 to 10 m in height. The sandstone is buff-coloured with some hint of pink. In part of the quarry the sandstone is thinly bedded and splits into slabs 2.5 to 5 cm thick forming beautiful natural flagstone. Much interest has been expressed in the potential of this material as flagging. In other parts of the quarry the maximum thickness of slabs which could be removed is approximately 50 to 75 cm. The size of blocks removed for building purposes when the quarry was active is unknown but the author suggests that the material must have been removed in large, relatively thin sheets.

MARBLE

Marble was quarried in the region on a small scale in the late 1800s and the 1930s (see Table 1). The marble in the Thunder Bay area is comprised of carbonate-rich portions of the Sibley Group.

The site of the Black Bay Mine and Quarry Company property near Ouimet has recently been rediscovered by a local prospector, N. Lafontaine. It appears that only a few blocks of stone were extracted. The stone is an attractive pink to coral-coloured stromatolitic marble.

An occurrence of layered green marble near Muskrat Lake is being examined by a local prospector, W. Dutchak.

Lunmac Marble Property

This most notable property in the region owned by H. Lundmark and W. McAteer, is located near Eaglehead Lake, east of the Spruce River. It consists of 2 separate groups of claims on which similar rocks are exposed along north-facing cliffs. The property comprises a nearly flat-lying sequence of carbonate rocks and mudstones overlain by a Keweenaw diabase sill. The geology of the claim groups has been described in detail by Redden (1980) (Resident Geologist Files, Ontario Ministry of Natural Resources, Thunder Bay), and was previously described in Fenwick and Scott (1977). Lundmark and McAteer carried out substantial manual and mechanical work on the property exposing 4.5 to 5 m of dolomite overlain and underlain by purple to reddish brown mudstone. From top to bottom the sequence includes:

1-1.15 m layered variable-coloured dolomite

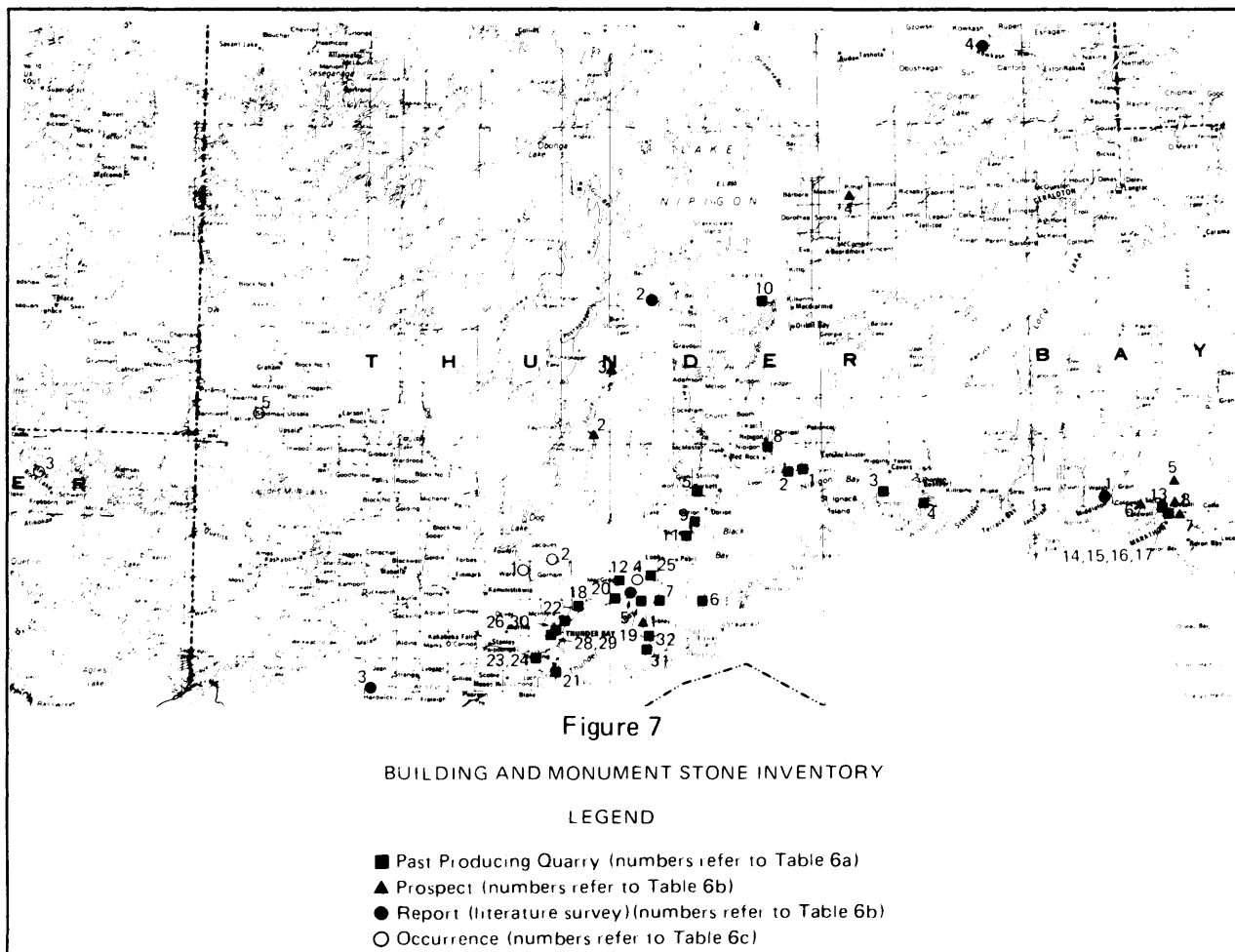
3 m blue-grey stromatolitic dolomite

0.5 m green to brown dolomite with some grey dolomite.

Locally the blue-grey dolomite grades into white brucite marble where it is in contact with diabase. The white marble retains the stromatolitic structures of the grey dolomite.

The blue-grey and white "marbles" may be removed in fairly large blocks. These marbles have been subjected to physical tests and are suitable for dimension stone purposes. All the shades of marble polish well. The white marble has a soft sheen rather than a bright polish. At present, the marble is being made into attractive ornamental objects which are sold locally.

Extraction of the marble by traditional quarrying methods will be difficult due to approximately 5 to 7 m of diabase overlying the marble on the cliff face.



GRANITE

Granite was quarried at a number of sites in the region in the late 1800s by the Canadian Pacific Railway for bridge construction. One site is a small quarry near MacKenzie Station where a large pile of pink granite blocks shaped for bridge abutment construction remain. The Canadian Pacific Railway also quarried black syenite near Peninsula Station (now Marathon) in the 1880s.

Quarries In the Marathon Area

The Peninsula area was the site of dimension stone quarrying in the 1920s and 1930s. The black and red "granites" which were produced are part of the Port Coldwell Alkalic Complex. The black "granite" is a medium- to coarse-

grained, dark green to black augite syenite. It is composed primarily of augite, and feldspar (labradorite) which is often iridescent. The augite syenite has been compared to the Norwegian laurvikites. The red "granite" is a hornblende syenite. It is commonly rose-coloured comprising alkali feldspar and black amphibole.

Active development of the area began in 1927. Peninsula Granite Quarries Company held 17 claims along the Canadian Pacific Railway and the shore of Lake Superior north of Peninsula Station. Quarrying was carried out at several sites. The first shipments of stone were made in 1928. Thomson (Canadian Mining Journal, 1930, p.1198) reported that 36 carloads of black and red stone

were shipped to points in Canada and the United States. The black granite property was sold to the Cold Spring Granite Company of Cold Spring, Minnesota in 1931. They operated in the area until 1932.

A small amount of red and black syenite was produced at Angler, 6 miles north of Peninsula, by Angler Granites Limited at about the same time as Peninsula operations.

During the 1984 field season the Angler quarry and 5 quarries in the Marathon area (4 in black syenite, 1 in red syenite) were examined.

Jointing patterns at the sites are generally orthogonal with some crosscutting joints. Locally the jointing is widely spaced (2 m and

greater) especially near the red granite quarry, 3.5 km north of Marathon. In some areas colour and texture are homogeneous as well. Both the black and red syenites at the old quarry sites are promising. Cut and polished samples indicate that both are high quality stone. The colour and texture of the syenites are attractive and the material polishes well.

Noranda Mines Limited has recently staked this area for its dimension stone potential.

EXPLORATION AND MARKET POTENTIAL

There are good potential dimension stone deposits in the North Central Region. The black and red syenites of the Port Coldwell Alkaline Complex, at and near the old quarry sites, exhibit the characteristics required of deposits. Large areas underlain by these rocks remain to be examined. Other late granitic intrusions also make good exploration targets for dimension stone. Several of these granitic intrusions have been examined in the early part of this study and a few, which exhibit good potential, are listed in Table 6c and located on Figure 7. Granite for construction purposes such as curbing should not be overlooked. Marble in the region exhibits a variety of colours and is very attractive. The occurrences examined appear to be highly suitable for ornamental purposes and may prove to be suitable as dimension stone. Marble occurs at many other locations where the Sibley Group rocks are exposed. These sites warrant examination.

The sandstone at the quarry sites examined has excellent potential and may be particularly suitable for restoration purposes and for flagging. Deposits of slate and schist have not yet been considered by this study. The potential for deposits of flagging material is high, particularly near large fault zones.

Stone must be marketable for a deposit to be considered economic. A market study commissioned by the Ministry of Natural Resources, Northwestern Region concludes that there is definite, al-

though limited potential for the development of a building stone industry in Northwestern Ontario (Les Consultants Sogir Incorporated, 1984). The study was principally concerned with granite, slate, and schist as marble and sandstone are not found in the Northwestern Region. Many of their recommendations, however, apply to all stone types. Les Consultants Sogir suggest that any ventures into this industry proceed cautiously; starting small and growing carefully. They recommend making use of all available assessment and evaluation techniques before significant development and investment take place.

QUATERNARY GEOLOGY

F.J. Kristjansson

Quaternary Geologist, Ontario Ministry of Natural Resources, Thunder Bay.

INTRODUCTION

A program, of detailed surficial geological mapping at a scale of 1:50 000, of the planning areas of Geraldton and Terrace Bay was carried out. Funding support for this program was provided by the Ontario Ministry of Northern Affairs. A phased approach (i.e., I. Data Collection and Review, II. Field Reconnaissance, and III. Report and Map Production) was considered.

The study began with a literature search and review. Ontario Ministry of Environment's water well records, and Ontario Ministry of Transportation and Communications' sand and gravel inventory data were reviewed. Satellite imagery enlargements, at a scale of 1:250 000, and conventional aerial photography, at 1 inch to 1 mile and 1 inch to 1/4 mile scales, were obtained. A preliminary aerial photograph interpretation was conducted.

During the second phase of the project, all preliminary interpretation was subjected to a program of field verification. The objective was to obtain as many points of ground truth as possible in the

study areas. Roads were traversed by vehicle, and all sand and gravel pits and borrow pits were examined. Detailed verification of the geomorphology and surficial geology of the study areas was obtained. The locations of approximately 500 field stations, each representing a point of ground truth, were recorded.

During the third phase of the study, a report outlining the glacial history and a map depicting the surficial geology of each study area will be produced. Although the intent was to document the occurrence, character, and distribution of all classes of surficial material in each study area, special emphasis was placed on till and glaciofluvial sediments. Till is a prime sampling medium for mineral exploration in areas of glaciated terrain. Areas dominated by glaciofluvial sedimentation represent important source areas for sand and gravel. In this regard, aggregate potential and coarse aggregate probability maps derived from prepared surficial geological mapping will be prepared.

GERALDTON AREA

A tentative sequence of glacial events for the Geraldton area is as follows: (1) The deposition of a gritty, sand till, of local derivation; and a fine-grained, calcareous till, which exhibits remarkable similarities to the fine-grained, calcareous till documented in the Hemlo area during the 1983 field season, (Patterson *et al.* 1984). (2) The disintegration of glacier ice, and an essentially contemporaneous ponding of meltwater, leaving relatively large blocks of stagnant glacier ice grounded in a glacial lake. (3) The deposition of supraglacial morainic debris and ice contact stratified sediment, in belts of hummocky terrain, which demarcate the margins of remnant glacier ice.

TERRACE BAY AREA

Tentatively, the following picture of late glacial dynamics has emerged: (1) The deposition of a gritty, silt till, which exhibits similarities to the calcareous, grit-

ty, silt till documented in the Hemlo area. (2) The recession of glacier ice, which results in the emergence of major bedrock upland areas as nunataks and, with continued ice wastage, ice divides. This would confine glacier flow to the more substantial lowland areas. For example, it is considered that an isolated mass of glacier ice, confined by the Aguasabon River-Hays Lake basin, in juxtaposition with Glacial Lake Minong, may have constructed the large, kettled outwash plain at Terrace Bay. This interpretation reflects, at least, in general detail, recent field investigation by Phillips (Department of Geography, Lakehead University, Thunder Bay, Ontario, personal communication, 1984). (3) The continued disintegration and eventual stagnation of remnant glacier ice, which can be inferred from the variety of glaciofluvial ice contact features that occur in lowland areas. In this regard, large glaciofluvial, ice contact terraces, which may be observed from the Winston Lake Road, in the vicinity of Lyne and Horneblende Lakes, may be representative.

HISTORICAL RESEARCH PROJECT

The Regional Mineral Resources Co-ordinator's Office continued its historical research project initiated in 1981. This project is an in-depth search of the old literature (mining journals, newspapers, magazines, etc.) for information on mineral occurrences in the North Central Region.

Each description of an occurrence is copied, referenced, and filed in the Mineral Deposits Files. In 1984, research was concentrated on *The Northern Miner*, covering the time period from September 4, 1915 to December 27, 1934. Table 9 in Patterson *et al.* 1984, p.102, indicates the articles researched in previous years.

RESULTS

1. Valuable information has been added to the files on the gold occurrences (known but not previously documented) in the At-

ikokan, Beardmore-Geraldton and Schreiber-Terrace Bay areas. An example of an undocumented occurrence follows:

"Wilgar Creek Mining Syndicate, under the management of C.S. Gifford, has been formed to explore a group of claims in the Kowkash mining division, Ontario, three miles west of Paska, on the Canadian National Railway.

Mineralization has been proved by trenches and test pits along a length of 600 feet. The width at one point is 48 feet between well-defined walls; the other trenches indicated similar widths. A large dike has been located from which material assayed \$7.60 to 40 cents in gold have been secured." (*The Northern Miner*, May 14, 1931, p.9).

2. There may be potential for gold in the old silver and lead-silver occurrences in the Thunder Bay area. Library research has documented, in the newspapers from 1880 to 1892, the mention of gold in 12 different occurrences. For example:

"C.H. Miles, engineer in charge of operations of Animikies Mines, presented a statement of results from 11 tons of ore taken from the old abandoned dumps and run through a mill for test purposes. This ore showed upward of \$35 per ton in silver and gold, the latter running about \$4 per ton (gold per ounce in 1933 was \$28.94)." (*The Northern Miner*, May 25, 1933, p.3).

and

"An important discovery of gold has been made on location 173T, owned and worked by the Queen Gold and Silver Mining and Milling Co. of St. Paul. It is situated in the Whitefish Lake region. Mr. C.G. Kimball, one of the directors, now being on the ground, is in charge of the operations. So far but little work has been done but that has been in the way of sinking on the vein with the result that free gold in the form of small nuggets, about twice the size of a pin's head has been found." (*The Weekly Herald*, Saturday, July 16, 1887).

3. A silver-processing Porta-Mill is located in Thunder Bay; it therefore may be worthwhile assessing dumps at the sites of the old silver occurrences, noted for example, in the following quotes:

"Paid a visit to Pic Island Silver Mine with John McKellar: Having 'taken in' the sight of that location we next wended our way to the shaft house, passing between immense piles of silver bearing rocks, estimated at containing 2500 tons which it is thought will average \$60 or over, per ton (*silver per ounce in 1882 was \$1.14*)." (*Port Arthur Herald and Algoma Mines*, June 17, 1882).

and

"There are a number of mines with ore on the dumps as follows:

Crown Point	1000 tons
Silver Fox	500 tons
Queen	400 tons
Silver Star	400 tons

All the foregoing is considered fair ore." (*Daily Sentinel*, Wednesday, February 25, 1891).

GEOLOGICAL RESEARCH IN THE NORTH CENTRAL REGION

ONTARIO GEOLOGICAL SURVEY ACTIVITIES

Details of research carried out by the Ontario Geological Survey are given in Wood *et al.* (1984). A summary of these programs is listed below:

T.L. Muir, A Map of Hemlo Deposit; G.M. Siragusa, Geology of the White River Area; J.A.C. Fortescue, Geochemistry of the Williams Deposit, Hemlo; B. Geddes, Quaternary Mapping in the Hemlo Area; M.W. Carter, Geology of Goldie and Horne Townships and a Portion of the Dawson Road Lots; L. Chorlton and G.H. Brown, Geological Setting of Gold Mineralization at Shebandowan; S. Buck and H.R. Williams, The Nature of the Quetico-Wabigoon Contact Near Longlac; J.E. Riley, Peat Inventory Studies. Table 7 lists maps and reports published during the year by the Ontario Geological

TABLE 7. MAPS AND REPORTS PERTAINING TO THE NORTH CENTRAL REGION PUBLISHED DURING 1984 BY THE ONTARIO GEOLOGICAL SURVEY, MINISTRY OF NATURAL RESOURCES

Ontario Geological Survey Reports Report 235	Preliminary Maps - Geological Series P. 241 (revised, 1984) P. 257 (revised, 1984) P. 267 (revised, 1984) P. 2701 P. 2702	Coloured Maps 2469 2199 (reprint) 2200 (reprint) 2201 (reprint) 2393 (reprint) 2452 (reprint)
Open File Reports OFR 5401 OFR 5407 OFR 5409 OFR 5411 OFR 5412 OFR 5417 OFR 5419 OFR 5435 OFR 5436 OFR 5493 OFR 5497 OFR 5500 OFR 5514	Geological Data Inventory Folios GDIF 186 GDIF 187 GDIF 188 GDIF 189 GDIF 190 GDIF 191 GDIF 192 GDIF 193 GDIF 194	Mineral Resources Branch Publications MDC 25 Miscellaneous Reports MP 117 MP 118 MP 119

Survey, Ontario Ministry of Natural Resources.

RESEARCH BY OTHER ORGANIZATIONS

Geological Survey of Canada

Activity by the Geological Survey of Canada included a metallogenic study on the relationship of gold to ironstones in the Beardmore-Geraldton area by L. Anglin and J. Franklin. A regional geological compilation of Northwestern Ontario, emphasizing the granitic terrains, is being compiled by J. Percival. I. Cameron and K. Hattori (University of Ottawa) are carrying out a number of isotope geology studies in the Hemlo area. P. Harris is carrying out detailed mineralogical studies in the Hemlo area.

Lakehead University

B.Sc. Theses (In progress)

Alford, C.
Structure Analysis of Multiply Deformed Metasedimentary and Metavolcanic Strata in the Mawn Lake Area.

Gliddon, D.J.

Chemical Sedimentation and Depositional Environment of Barite and Associated Chemical and

Clastic Sediments Near Hemlo, Ontario.

Harvey, P.G.

Lateral Secretion at the Rabbit Mountain Mine, Mainland Belt Silver Region, Thunder Bay District.

Martin, A.

Structural Analysis of Multiply Deformed Metasedimentary and Metavolcanic Strata in the Max Lake Area.

O'Brien, M.

Volcanics of the Poplar Lodge Area, Beardmore, Ontario.

Schuster, R.A.

Depositional Setting and Landform Evolution Depicted by Pleistocene to Recent Sediments North of Thunder Bay, Ontario.

Scott, B.M.

Alteration Surrounding Gold-Bearing Quartz-Carbonate Veins in Clastic Hosted Banded Iron Formation, Jellicoe-Geraldton Area, Ontario.

Sinclair, T.J.

Alteration Surrounding Gold-Bearing Quartz-Carbonate Veins in Volcanic Hosted Banded Iron Formation, Jellicoe, Ontario.

Sinumovic, A.

Strain Analysis of Clastic Sedimentary Rocks and Pillow Lavas from the Wabigoon Subprovince in the Vicinity of Max Lake.

B.Sc. Theses Completed in 1984

Evans, N.J.

Rare Earth Geochemistry of Lamprophyre Dikes from the Coldwell Alkaline Complex.

Laderoute, D.

A Mineralogical and Geochemical Analysis of Metavolcanic Zonation Around Ultra-mafic Inclusions in Rocks of the Killala Lake Area.

Nelson, B.W.

Felsic Volcanic Rocks of Big Duck Lake, Near Schreiber, Ontario.

Smyk, M.C.

A Comparative Study of Silver Occurrences, Island Belt Silver Region, Thunder Bay District, Ontario.

M.Sc. Theses (In progress)

Brown, G.H.

Structure and Stratigraphy of Timiskaming Rocks in the Shebandowan-Shabaqua-Finmark-Lappe Areas.

Devaney, J.R.
Depositional Environment of Coarse Clastics in the Archean Beardmore-Geraldton Sedimentary Belt, Ontario.

Jennings, E.A.
Fluid Geothermometry of Silver Vein Deposits of the Thunder Bay Area, Northwestern Ontario.

Laderoute, D.
Petrology and Geochemistry of Lamprophyres and Other Dike Rocks from the Coldwell Complex.

Schnieders, B.R.
Geology, Structure and Depositional Environment of Chemical and Clastic Sediments in the Steel River Area, Terrace Bay, Ontario.

Thomson, K.
Depositional Setting of Chemical and Clastic Sediments in the Greenstone Belt Between Marathon and White River.

Zayachivsky, B.
Geochemistry and Mineralogy of Rare-Element Pegmatites in the Georgia Lake Area, Northwestern Ontario.

M.Sc. Theses Completed in 1984

Kennedy, M.C.
The Quetico Fault in the Superior Province of the Southern Canadian Shield.

Other Staff Research Activities

Borradaile, G.J.
(1) Structure of the Margins of the Quetico and Wabigoon "Belts", especially between Atikokan and Mine Centre.
(2) Structure and Strain Analysis of Greenstone Wedges in the Wabigoon Subprovince.
(3) Strain and Magnetic Anisotropy of Archean Metasedimentary Rocks, Especially Seine River Sequence.
(4) Rock Mechanics Testing and Seismic Anisotropy of Plutonic Archean Rocks to 3 kb and 300°C With/Without Pore Fluid Pressures.

Fralick, P.W.
The Depositional Environment of Oxide and Sulfide Facies Al-

goman Banded Iron Formation.

Hale, C.J., and Steward, J.D.
Petrography and Paleomagnetism of the Gunflint Formation with Reference to Paleo-Indian Artifacts.

Kehlenbeck, M.M.
(1) Character of the Quetico-Wabigoon Boundary Zone in the Beardmore-Geraldton-Longlac Area.
(2) Deformation of Non-Spherical Objects in Rocks from the Jellicoe-Geraldton Area.
(3) Progressive Deformation and Fold Evolution in Meta-Sedimentary Rocks of the Quetico-Wabigoon Boundary Zone.
(4) Progressive Inhomogeneous Simple Shear and Uniform Homogeneous Strain as Related to Folds in the Beardmore-Geraldton Boundary Zone.

Kissin, S.A.
Diagenetic Reactions in the Gunflint Formation.
Liquid Immiscibility in the Logan Diabase Sills, Northwestern Ontario.

Mitchell, R.H.
Petrology and Geochemistry of the Coldwell Complex.

Other Universities

Bajc, A.
History and Development of the Pro-Glacial Lake Deposits in the Black River Area, University of Waterloo.

Barnett, B.
Geology of the Williams Deposit, Hemlo, Ontario, Ph.D. Thesis, University of Western Ontario.

Bree, D.G.
Investigation Into the Nature of Gold in Humus and its Significance to Geochemical Exploration, Hemlo, Ontario, Queen's University.

Burke, R.
The Geology of Corona Deposit, Hemlo, Ontario, M.Sc. Thesis, Queen's University.

Carigan, B.
Isotopic Composition of the Gunflint Rocks, M.Sc. Thesis, University of Ottawa.

Cheadle, B.
Stratigraphy of Sibley Ground Rock, Thunder Bay, Ontario, Queen's University.

Cogulu, E.
Petrology of Great Lake Nickel Deposit, University of Ottawa.

Cohen, D.R.
Biogeochemistry, A Geochemical Method for Gold Exploration, Hemlo, Ontario, Queen's University.

Goad, R.
Regional Geochemistry, Noranda Mines Limited, M.Sc. Thesis, University of Western Ontario.

Hugon, M.
Structure and Deformation at Hemlo, Ontario, Post. Doc. Project, University of Toronto.

Kuhns, R.
Geology of the Goliath Deposit, Hemlo, Ontario, Ph.D. Thesis, University of Minnesota.

Osterberg, S.
Massive Sulphide Deposits in the Onaman River Area, University of Minnesota at Duluth.

Shelp, G.S.
The Nature of Gold in Glacial Sediments and Soils Associated with Mineralization, Hemlo, Ontario, Queen's University.

Wilks, M.
The Geology of the Marmion Lake Batholith, M.Sc. Thesis, University of Saskatoon.

Woods, E.
Relationship of Quaternary Sediment to Lake Water Acidity, Hemlo Area, H.B.Sc. Thesis, University of Western Ontario.

REFERENCES

Amukun, S.E.
1977: Geology of the Tashota Area, District of Thunder Bay; Ontario Geological Survey, Report 167, 90p. Accompanied by Map 2354, scale 1:31 680 or 1 inch to 1/2 mile.

- Amukun, S.E., Sawitsky, E., and Maharaj, M.
1979: Howard Falls Area, Southern Half, District of Thunder Bay; Ontario Geological Survey, Preliminary Map, P.2311, Geological Series, scale 1:15 840 or 1 inch to 1/4 mile. Geology 1978.
- Bartley, M.W.
1939: The Northwestern Part of the Schreiber Area; Ontario Department of Mines, Annual Report for 1938, Volume 47, Part 9, p.24-45. Accompanied by Map 47j; scale 1:31 680 or 1 inch to 1/2 mile.
- Benedict, P.C., and Titcomb, J.A.
1948: The Northern Empire Mine; p.389-399 in Structural Geology of Canadian Ore Deposits, Canadian Institute of Mining and Metallurgy.
- Blue, A.
1896: A Tour of Inspection in Northwestern Ontario; Ontario Bureau of Mines, Annual Report for 1895, Volume 5, p.107-190.
- Borradaile, G.J.
1982: Comparison of Archean Structural Styles in Two Belts of the Canadian Superior Province; Precambrian Research, 19, p.179-189.
- Carter, M.W.
1980a: Controls on Gold and Copper-Molybdenum Mineralization in the Schreiber-Terrace Bay Area (Abstract); p.4 in the Geoscience Research Seminar, December 10-11, 1980, Abstracts, Ontario Geological Survey, 21p.
1980b: Terrace Bay Area, District of Thunder Bay; p.42-46 in Summary of Field Work, 1980, by the Ontario Geological Survey, edited by V.G. Milne, O.L. White, R.B. Barlow, J.A. Robertson, and A.C. Colvine, Ontario Geological Survey, Miscellaneous Paper 96, 201p.
1981a: Precambrian Geology of the Schreiber Area, East Part, Thunder Bay District; Ontario Geological Survey, Preliminary Map, P.2391, Geological Series, scale 1:15 840 or 1 inch to 1/4 mile. Geology 1979.
1983: McComber and Vincent Townships, District of Thunder Bay; p.32-36 in Summary of Field Work, 1983, by the Ontario Geological Survey, edited by John Wood, Owen L. White, R.B. Barlow and A.C. Colvine, Ontario Geological Survey, Miscellaneous Paper 116, 313p.
- Crocket, J.H.
1981: Geochemistry of the Platinum-Group Elements; p.49-64 in Platinum-Group Elements: Mineralogy, Geology, Recovery, by the Canadian Institute of Mining and Metallurgy (CIM), Special Volume 23, edited by L.J. Cabri, p.49-64.
- Dennen, W.H., and Puckett, A.M.
1972: On the Chemistry and Colour of Amethyst; Canadian Mineralogy, Volume 11, p.448-456.
- Fenwick, K.G.
1971: Origin of a Stratabound Pyrite Deposit in Predominantly Volcanic Derived Strata in the Finlayson Lake Area, District of Rainy River, Ontario; unpublished M.Sc. Thesis, Department of Geology, Michigan Technological University, 90p.
1976: Geology of the Finlayson Lake Area, District of Rainy River; Ontario Division of Mines, Geoscience Report 145, 86p. Accompanied by Maps 2297 and 2298, scale 1:31 680 or 1 inch to 1/2 mile.
- Fenwick, K.G., and Scott, J.F.
1977: 1976 Report of the North Central Region Geologist; p.38-56 in Annual Report of the Regional And Resident Geologists, 1976, edited by C.R. Kustra, Ontario Geological Survey, Miscellaneous Paper 71, 142p.
- Franklin, J.M., and Mitchell, R.H.
1977: Lead-Zinc-Barite Veins of the Dorion Area, Thunder Bay District, Ontario; Canadian Journal of Earth Sciences, Volume 14, Number 9, p.1963-1979.
- Fyon, J.A., Crocket, J.H., and Schwarcz, H.P.
1983: The Carshaw and Malga Iron-Formation-Hosted Gold Deposits of the Timmins Area; p.98-110 in The Geology of Gold in Ontario, edited by A.C. Colvine, Ontario Geological Survey, Miscellaneous Paper 110, 278p.
- Goldich, S.S.
1972: Geochronology in Minnesota; p.27-37 in Geology of Minnesota: A Centennial Volume, edited by R.K. Sims and G.B. Moreg, Minnesota Geological Survey, University of Minnesota, Minneapolis, Minnesota.
- Hopkins, P.E.
1916: Kowkash Gold Area, Thunder Bay District, Ontario; Ontario Bureau of Mines, Annual Report for 1916, Volume 25, Part 1, p.264-274. Accompanied by Map 25A, scale 1:253 440 or 1 inch to 4 miles.
- Kennedy, M.C.
1984: The Quetico Fault in the Superior Province of the Southern Canadian Shield; Unpublished M.Sc. Thesis, Lakehead University, Thunder Bay, Ontario.
- Kite, B.T.
1981: The Geology of the Zenith Zinc Deposit Near Schreiber, Ontario; Unpublished B.Sc. (Honours) Thesis, Lakehead University, Thunder Bay, Ontario.
- Klein, C., Jr.
1973: Changes in Mineral Assemblages with Metamorphism of Some Banded Precambrian Iron-Formations; Economic Geology, Volume 68, p.1075-1088.
- Larsen, C.R.
1974: The Silicate and Sulphide Petrology of the Kawene Lake Intrusion; Unpublished B.Sc. Thesis, Lakehead University, Thunder Bay, Ontario.
- Les Consultants Sogir Inc.
1984: Market Study of Stone in Northwestern Ontario, Ontario Geological Survey, Open File Report 5493, 186p., numerous tables and photos.

- Macdonald, A.J.
in press: Gold Mineralization in Ontario. I: The Role of Banded Iron Formation; Ontario Geological Survey, 35p.
- MacMillan, R.N.
1979: The Geochemistry of the Sulphide Iron Formation Around Finlayson Lake, Ontario; Unpublished B.Sc. (Honours) Thesis, University of Western Ontario, London, Ontario.
- McIlwaine, W.H.
1971: McTavish Township (West Part of North Half), District of Thunder Bay; Ontario Department of Mines and Northern Affairs, Preliminary Geological Series Map P.720, scale 1:15 840 or 1 inch to 1/4 mile. Geology 1971.
- McKellar, P.
1874: Mining on the North Shore, Lake Superior; Library, Resident Geologist's Office, Ontario Ministry of Natural Resources, Thunder Bay, 26p.
- Marmont, S.
1983: The Role of Felsic Intrusions in Gold Mineralization; p.38-47 in *The Geology of Gold in Ontario*, edited by A.C. Colvine, Ontario Geological Survey, Miscellaneous Paper 110, 278p.
- 1984: The Terrace Bay Batholith and Associated Mineralization; Ontario Geological Survey, Open File Report 5514, 95p., 10 photos, 7 figures, 4 tables, and 1 map in back pocket.
- Marmont, S., and Colvine, A.C.
1981: The Geology and Mineralization of the Terrace Bay Batholith, Mink Lake Stock, and Cairo Stock; p.230-241 in *Summary of Field Work, 1981*, by The Ontario Geological Survey, edited by John Wood, O.L. White, R.B. Barlow, and A.C. Colvine, Ontario Geological Survey, Miscellaneous Paper 100, 255p.
- Mason, J.K., and McConnell C.D.
1983: Gold Mineralization in the Beardmore-Geraldton Area; p.84-97 in *The Geology of Gold in Ontario*, edited by A.C. Colvine, Ontario Geological Survey, Miscellaneous Paper 110, 278p.
- Milne, V.G.
1967: Geology of Cirrus Lake-Bamoos Lake Area, District of Thunder Bay; Ontario Department of Mines, Geological Report 43, 61p. Accompanied by Map 2098, 2099, scale 1:31 680 or 1 inch to 1/2 mile.
- 1968: Geology of the Black River Area, District of Thunder Bay; Ontario Department of Mines, Geological Report 72, 68p. Accompanied by Maps 2143, 2144, 2145, 2146, 2147, scale 1:31 680 or 1 inch to 1/2 mile.
- Moorhouse, W.W.
1939: Geology of the South Onaman Area, Thunder Bay District; Ontario Department of Mines, Annual Report for 1938, Volume 47, Part 8, 30p. Accompanied by Map 47h; scale 1:63 360 or 1 inch to 1 mile.
- Muir, T.L.
1982: Geology of the Heron Bay Area, District of Thunder Bay; Ontario Geological Survey, Report 218, 89p. Accompanied by Map 2439, scale 1:31 000 or 1 inch to 1/2 mile.
- Patterson, G.C.
1984: A Field Trip Guidebook to the Hemlo Area, Ontario Geological Survey, Miscellaneous Paper 118.
- Patterson, G.C., Mason, J.K., and Schnieders, B.R.
1984: Report of Activities 1983, Thunder Bay Resident Geologist Area, North Central Region; p.47-106 in *Report of Activities 1983, Regional and Resident Geologists*, edited by C.R. Kustra, Ontario Geological Survey, Miscellaneous Paper 117, 275p.
- Peach, P.A.
1951: Preliminary Report on the Geology of the Blackwater-Beardmore Area; Ontario Department of Mines, Preliminary Report 1951-7, 6p.
- Percival, J.A., and Stern, R.A.
1984: Geological Synthesis in the Western Superior Province, Ontario; p.397-408 in *Current Research, Part A*, Geological Survey of Canada, Paper 84-1A, 666p.
- Pirie, James
1978: Geology of the Crooked Pine Lake Area, District of Rainy River; Ontario Geological Survey, Report 179, 73p. Accompanied by Map 2405, scale 1:31 680 or 1 inch to 1/2 mile.
- Pye, E.G.
1964: Mineral Deposits of the Big Duck Lake Area; Ontario Department of Mines, Geological Report Number 27, 47p. Accompanied by Map 2023, scale 1:15 840 or 1 inch to 1/4 mile.
- 1965: Geology and Lithium Deposits of the Georgia Lake Area, District of Thunder Bay; Ontario Department of Mines, Geological Report Number 31, 113p. Accompanied by Map 2065, scale 1:63 360 or 1 inch to 1 mile.
- Schnieders, B.R., and Dutka, R.J.A.
in prep.: Property Visits and Reports of the Atikokan Economic Geologist, 1979-1983.
- Severin, P.W.A., and Balint, F.
1984: Geological Setting of the Winston Lake Massive Sulphide Deposit; p.B1-B18 in *Hemlo-Manitouwadge-Winston Lake, Metallogenesis of Highly Metamorphosed Archean Gold-Base Metal Terrain*, Canadian Institute of Mining and Metallurgy (CIM) Geology Division Guidebook, CIM Geology Division - District 4, Field Trip Oct. 1-4, 1984, edited by R.H. McMillan and D.J. Robinson, Western Resources.
- Storey, C.C.
1983: Preliminary Report of the Building and Ornamental Stone Inventory, Kenora and Rainy River Districts; Ontario Geological Survey, Open File Report 5446, 143p., 20 tables and 37 figures.
- Tanton, T.L.
1931: Fort William and Port Arthur and Thunder Cape Map

Areas, Thunder Bay District, Ontario; Canada Department of Mines, Memoir 167, 222p. Accompanied by Map 276A, scale 1:253 440 or 1 inch to 4 miles.

Thurston, P.C.

1980: Geology of the Northern Onaman Lake Area, District of Thunder Bay; Ontario Geological Survey, Report 208, 81p. Accompanied by Map 2411, scale 1:31 680 or 1 inch to 1/2 mile and Chart A.

Wahl, D.G., and Pearson, W.N.

1984: Finding the Next Hemlo; Canadian Mining Journal, April 1984, p.41-46.

Walker, J.W.R.

1967: Geology of the Jackfish-Middleton Area, District of Thunder Bay; Ontario Department of Mines, Geological Report 50, 41p. Accompanied by Maps 2107 and 2112, scale 1:31 680 or 1 inch to 1/2 mile.

Wanless, R.K., and Loveridge, W.D.

1976: Rb-Sr Isochron Age Studies, Report Number 2, Geological Survey of Canada, Paper 69-2A.

Wood, John, White, Owen L., Barlow, R.B., and Colvine, A.C.

1984: Summary of Field Work, 1984, Ontario Geological Survey, Miscellaneous Paper 119, 309p.

Timmins Resident Geologist Area, Northern Region

L.E. Luhta¹ and P.J. Sangster²

¹Resident Geologist, ²Resource Geologist, Ontario Ministry of Natural Resources, Timmins

INTRODUCTION

Staff at the Timmins office includes: W.O. Mackasey, Mineral Resources Co-ordinator; L.E. Luhta, Resident Geologist; P.J. Sangster, Resource Geologist; and D.C.Egerland, Secretary. In addition, D. Draper and R. King were employed as geological assistants on a contract basis. The position of secretary was held by J. Hunter and later by K. Cheff during the first few months of 1984. P. Blomberg and L. Perron provided assistance under the Experience '84 and Ontario Youth Corps programs respectively. C.D. Hamblin has been hired as Drill Core Librarian under a contract administered by the Timmins District Office, Ontario Ministry of Natural Resources.

The level of exploration activity in the area, especially gold exploration, remained high in spite of the low price of the metal during 1984.

The staff spent considerable time in consultative duties with over 1900 office consultations recorded. Emphasis was placed on examining and reporting on properties currently being explored and/or developed. Other staff activities included providing geological input to land use plans and completing geological assessment of proposed candidate parks and reserve area. Conducting geological field trips, organizing discussion group meetings and seminars, and presenting lectures on local exploration and development to various groups were additional tasks completed by this office in 1984.

CORE LIBRARY PROGRAM

The official opening of the Porcupine Mining Division Drill Core Library was held on June 26, 1984. To date 130 representatives of government and industry have made use of the core library facilities. Since March 31, 1984, 43 500 m of core have been collected. The collection housed in the Core Library now totals over 93 000 m.

Of that total, 44 773 m of core samples representing 180 000 m of core drilled has been catalogued and entered into a computer indexing system.

During 1984 drill core was donated by the following companies/organizations:

Canamax Resources Incorporated, Newmont Exploration of Canada Limited, Abitibi Price Incorporated, Noranda Incorporated, Placer Development Limited, Ontario Geological Survey, Samim Canada Limited, and Chevron Canada Resources Limited.

CLAIM STAKING ACTIVITY

From January to December, 1984, over 7228 claims were staked in the Porcupine Mining Division. During the same time period in 1983, 11 160 claims were staked. Active stakers in 1984 included H. Gonzalez, Mid-Canada Gold and Copper Mines Limited, and Ingamar Exploration Limited.

As in 1983, intensive staking occurred in the Swayze Belt area in 1984. Additional areas of intensive claim staking were the 60 townships in the immediate Timmins area; the Three Portage Rapids area, Flintry Township, Feagan Lake area; and the Sunday Lake-Lower Detour Lake area.

At present there are 26 209 active claims in this Mining Division as compared to 29 836 active claims at this time last year. These active claims represent approximately 1 049 000 acres of land being explored. Additional exploration programs on patented ground and on areas held under Exploratory Licences of Occupation are not included in this acreage. Although the number of claims staked this year has decreased by 35% since 1983, the amount of work submitted for assessment credit has increased by 30% from last year's totals.

EXPLORATORY LICENCES OF OCCUPATION

Three companies hold exploratory licences of occupation in the Cre-taceous Basin.

Selco Incorporated, a division of BP Resources Canada Limited, was granted an area of 243 000 acres in 1980. In 1982, Selco Incorporated surrendered part of this area retaining 146 560 acres and in 1983 further reduced the area to 7200 acres. This area was maintained for 1984. The Ontario Energy Corporation was granted 1 050 000 acres in 1980. In 1982 the licence was transferred to On-exco Minerals Limited, a subsidiary company and reduced to 279 600 acres. In 1983 the acreage was decreased further to 150 000 acres. No subsequent reductions were made in 1984.

The Douglas Taylor Joint Venture licence has maintained an area of 10 400 acres since 1981.

OPERATING MINES

BASE METALS

Although the actual 1984 figures are unavailable at the time of writing, the projected production for 1984 at the Kidd Creek Mines Limited base metal mine in Kidd Township is 4 850 000 tonnes. In 1983, the company produced and processed 4 154 000 tonnes of ore from which 389 000 tonnes of zinc concentrate, 388 000 tonnes of copper concentrate and 22 000 tonnes of silver-lead concentrate were produced. The company's zinc plant in Timmins produced 107 000 tonnes of zinc from 211 000 tonnes of zinc concentrate. The remaining 178 000 tonnes were sold. From 168 000 tonnes of copper concentrate, 53 000 tonnes of refined copper were recovered, and 37 000 tonnes of copper were produced from the remaining concentrate on a toll basis elsewhere in Canada. Total silver recoverable in 1983 was 197 000 g, and cadmium recovered was 400 tonnes. Seventy-six percent of Kidd Creek's production came from the Number One Mine with most of

the ore coming from between the 1200-foot and 1600-foot levels. Most of the deposit is mined out above the 1200-foot level. Approximately 80 000 tonnes remain there. At the Number Two Mine most of the production came from between the 2600- and 3400-foot levels. Only 1 stope remains between the top of Number Two Mine (2600-foot level) and the 2800-foot level. At this time the 3400-foot level is the bottom producing level, with the 4000-foot level being presently developed for production.

Proven and probable reserves to the end of 1983 totaled 74 million tonnes grading 3.1% copper, 4.9% zinc, and 67 g of silver per tonne.

In 1984, development at the Number One Mine totaled 11 200 m (7000 m of lateral and 4200 m of vertical development). At the Number Two Mine, development totaled 4575 m (including 2625 m of lateral and 1420 of vertical development). This compares with the 1983 figures of 9867 m at the Number One Mine and 6150 m at the Number Two Mine. Underground diamond drilling totaled 22 400 m of which 6000 m was classified as exploration. Three thousand metres of surface exploratory drilling was done on the mine site.

The number of persons employed in mining and metallurgy at Kidd Creek Mines Limited in Timmins in 1984 was 2808. The 1983 figure was 2832 (Kidd Creek Mines Limited, personal communication, 1983).

PRECIOUS METALS

The \$92 million expansion program started in 1981 at the Dome Mine in South Porcupine, was completed in 1984. Mill expansion was completed in 1983. The new shaft (Number 8 Shaft) was completed in March 1984, reaching a depth of 5374 feet (1638 m). All ore and waste passes and all lateral development connecting the bottom levels of the mine to the shaft and the ore and waste passes were finished.

The 1983 production figures are currently unavailable; however, production has increased from 2300 tons per day at the start of the year to 2900 tons per day in September. The planned rate of 3000 tons per day will be reached in early 1985. In 1983, 762 000 tons of ore were milled producing 100 602 ounces of gold. Mill recovery was 95.7%. The average mill head grade was 0.138 ounce gold per ton. An additional 37 418 ounces of gold were recovered by cleaning up the old mill circuits. Total gold production for 1984 is expected to be higher due to the increased tonnage mined and milled. The grade is expected to remain the same. Ore sources by mining method are: 33% cut and fill, 61% long hole, and 6% from development.

Ore reserves by the end of 1983 were estimated to be 2 600 000 tons grading 0.182 ounce gold per ton. Over 50% of the mill feed is still extracted above the 2000-foot level. The lowest working level at the Dome is 4000 feet (1220 m) below surface with the main ore structures being traced below this level.

In 1984, 21 550 feet (6568 m) of lateral development (cross-cuts, drifts, and sill drifts) and 2720 feet (829 m) of raising was done. The 1984 total is slightly higher than the 1983 total of 21 727 feet (6622 m). Underground diamond drilling totaled 54 500 feet (16 612 m), of which exploratory drilling totaling 3526 feet (1075 m) was done in the new Eight Shaft area between the 34th and 37th levels (4000 and 5200 feet (1220 and 1585 m) below the surface). A total of 766 people were employed by Dome Mines Limited at their operations in South Porcupine during 1984 (Dome Mines Limited, personal communications, 1984).

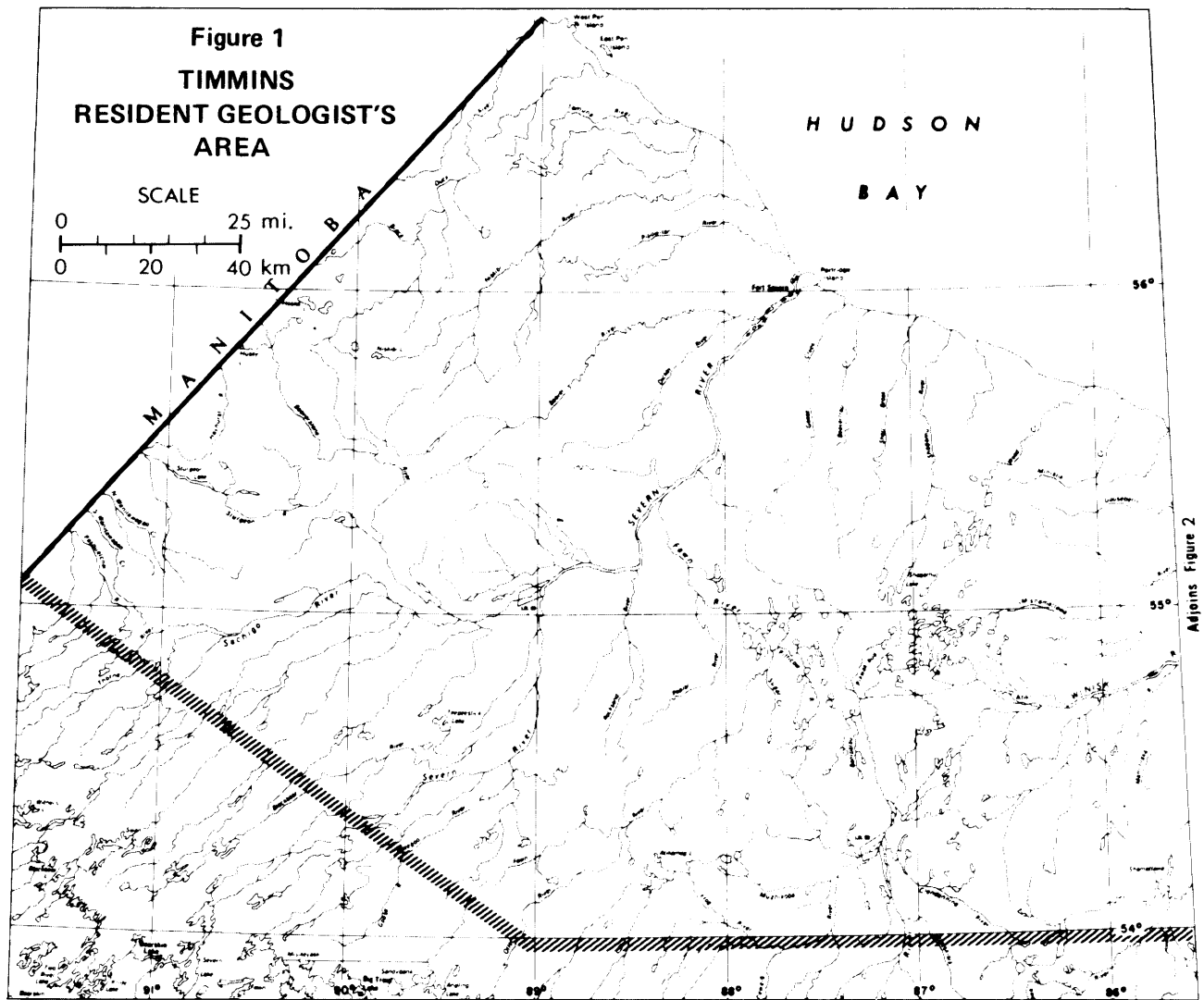
The Detour Lake Joint Venture, owned jointly by Amoco Canada Petroleum Company Limited and Campbell Red Lake Mines Limited using open pit methods, began commercial production on November 1, 1983. During the last 2 months of 1983, 124 000 tons of ore were proces-

sed at a grade of 0.100 ounce gold per ton. During the first half of 1984, 435 958 tons were milled producing 39 670 ounces of gold. The average grade was 0.102 ounce gold per ton and mill recovery was 93.1%. The average ore reserve grade is 0.113 ounce gold per ton. The projected production to the end of 1984 is 806 000 tons (year-end figures are not available at the time of writing). This is an average of 2208 tons per calendar day. The mill target is 2500 tons per day. Factors identified as affecting production and gold grade include: lower than planned grinding rate in the mill; higher than anticipated dilution in ore from the open pit; and the tie-up of gold in the new grinding circuit. Grade control has been reported to be improving with new procedures in both mining and geological practices being implemented. A program to study and implement corrective measures to the grinding circuit has been undertaken. The pit reserves have not proven out as well as expected and a shortened pit life is anticipated. Because of this, and the low price of gold, the planned mill expansion to 4000 tons per day may be cancelled. The underground mine will be brought into production ahead of schedule, that is, the beginning of 1987. Shaft sinking started December 10, 1984. The headframe, hoistroom, and compressor installations have been completed.

At the end of 1984, there were 308 permanent employees working for the Detour Lake Joint Venture (Detour Lake Joint Venture, personal communication, 1984).

The 1984 production figures for Pamour Porcupine Mines Limited are not yet available. However, it is estimated that the company will mine and process 1 500 000 tons of its own gold ore. The grade is expected to be similar to that of 1983 when the company produced 1 306 022 tons of ore grading 0.090 ounce gold per ton. An approximate breakdown for the 1984 production is given below:

Pamour Number 1 (underground): 630 000 tons



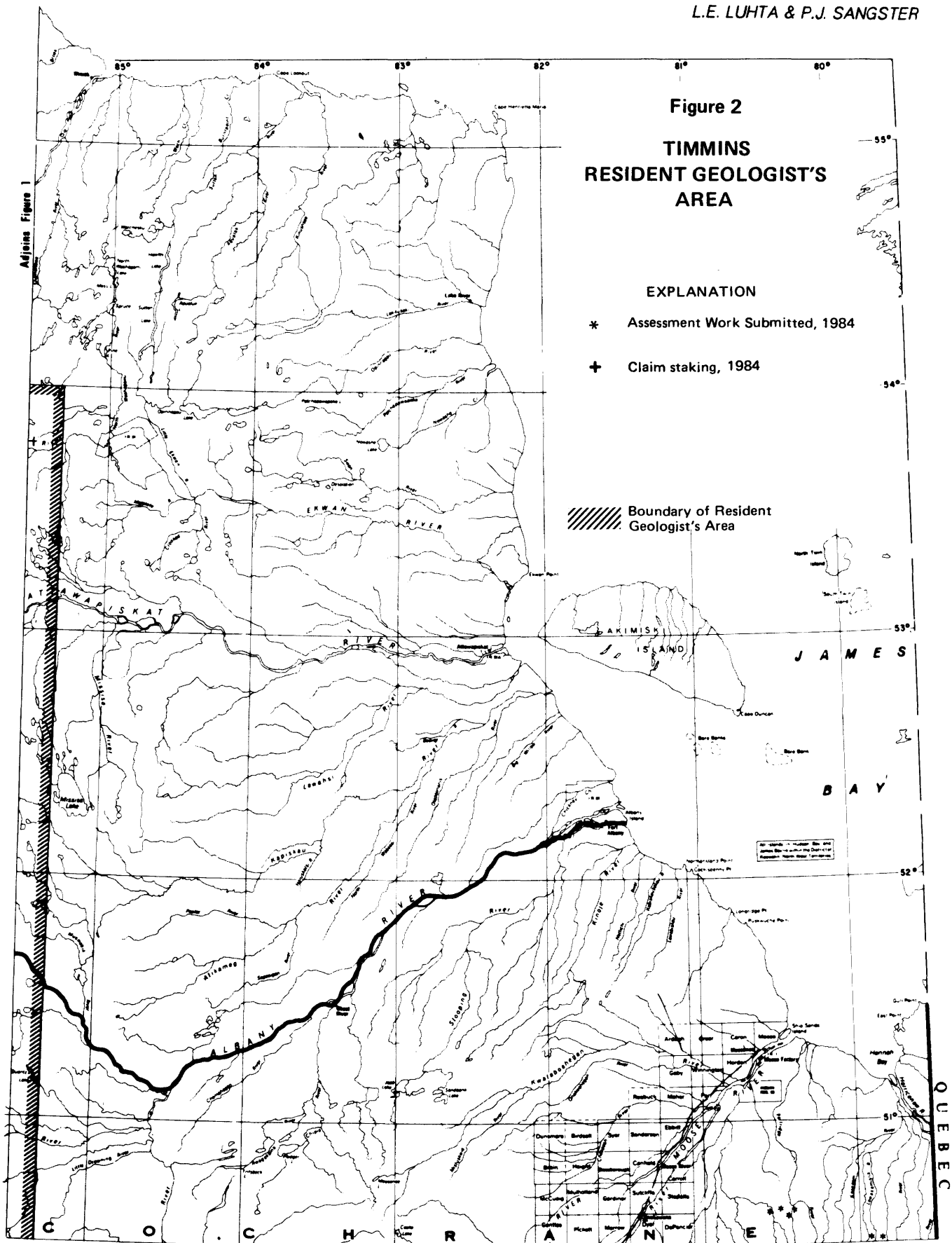


Figure 2

**TIMMINS
RESIDENT GEOLOGIST'S
AREA**

EXPLANATION

- * Assessment Work Submitted, 1984
- + Claim staking, 1984

Boundary of Resident Geologist's Area

Adjoins Figures 3 and 4

Adjoins Figure 2

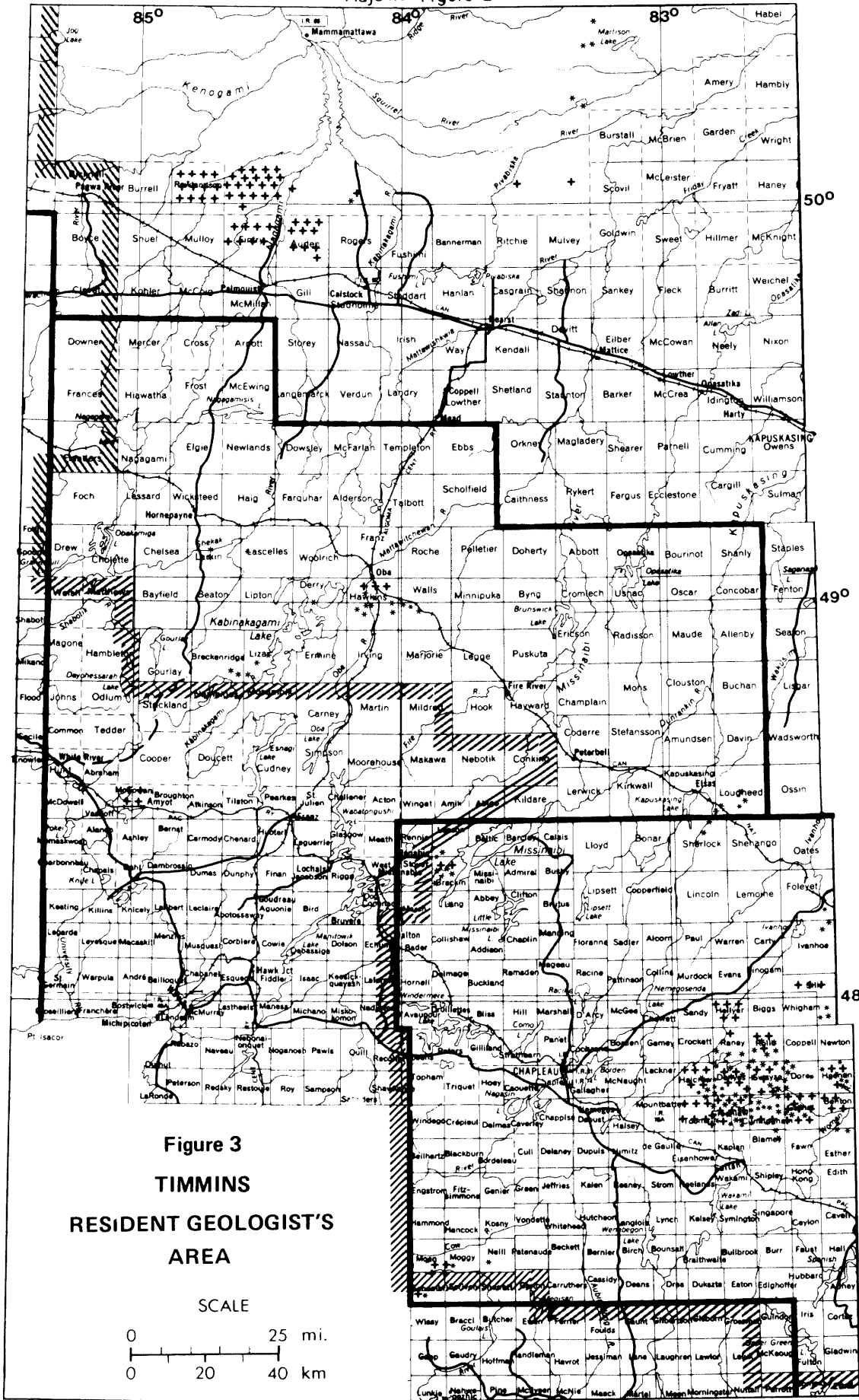


Figure 3
TIMMINS
RESIDENT GEOLOGIST'S
AREA

SCALE
0 25 mi.
0 20 40 km

Adjoins Figure 4

Adjoins Figure 2

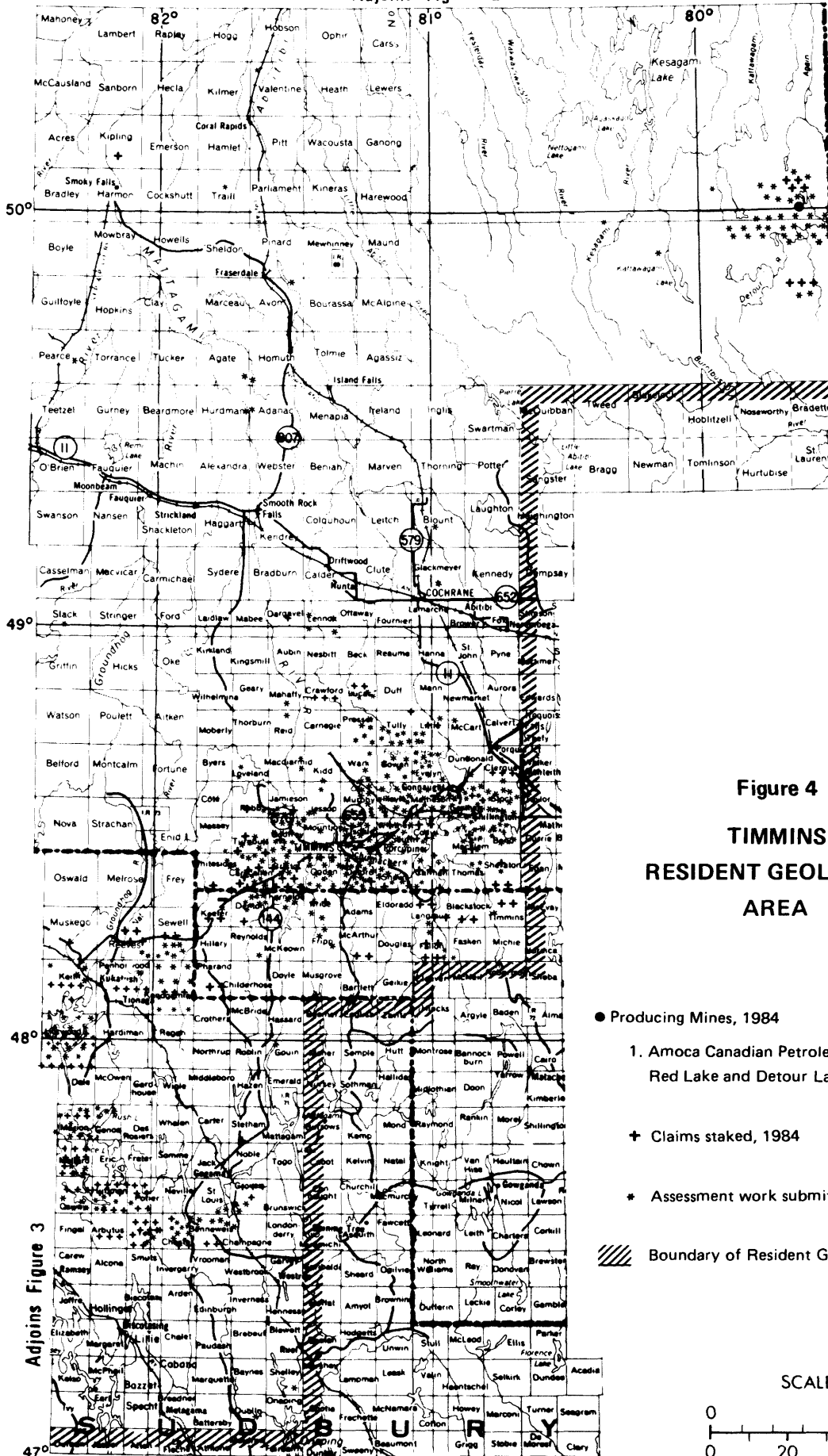
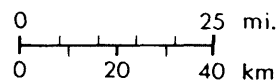


Figure 4
TIMMINS
RESIDENT GEOLOGIST'S
AREA

- Producing Mines, 1984
 1. Amoca Canadian Petroleum Ltd. Campbell Red Lake and Detour Lake Mines. . . . Au
- + Claims staked, 1984
- * Assessment work submitted, 1984
- ▨ Boundary of Resident Geologist's Area

SCALE



Adjoins Figure 3

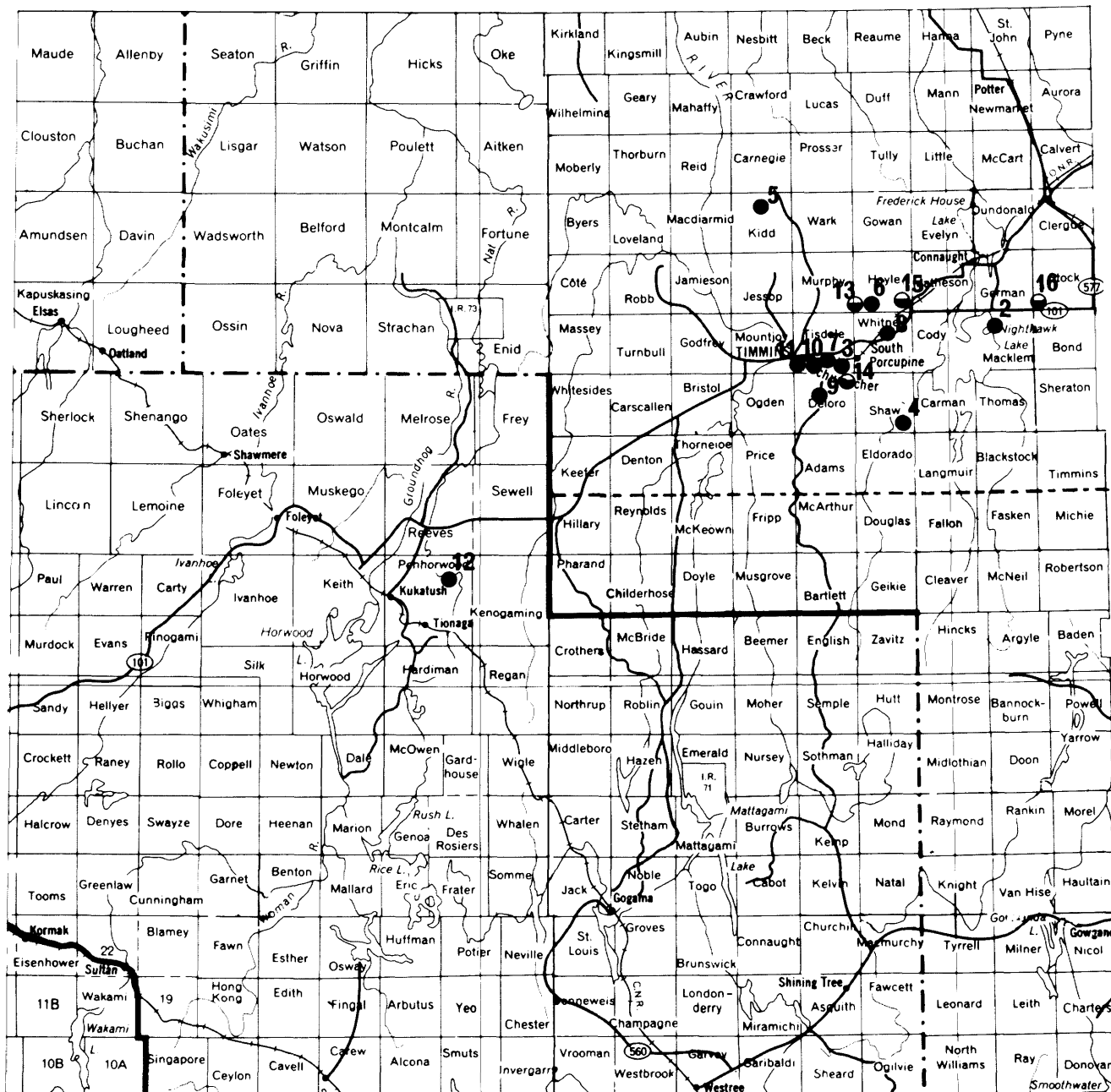


Figure 5

● Producing Mines, 1984

- 2. Asarco Exploration of Canada Ltd. Au
- Aquarius Property Au
- 3. Dome Mines Ltd. Au
- Dome Mine Au
- 4. Gail Resources Ltd. Au
- Shaw Twp. Au
- 5. Kidd Creek Mines Ltd. Cu, Zn, Ag, Pb, Cd, Sn
- Kidd Creek Mine
- Owl Creek Mine Au

Pamour Porcupine Mines Ltd. (7-11)

- 7. Carium Property Au, Cu, Mo
- 8. No. 1 Property Au, Ag
- 9. No. 3 Property Au, Ag
- 10. Schumacher Property Au, Ag, Cu
- 11. Timmins Property Au, Ag

- 12. Steetley Talc Ltd. talc
- Penhorwood Mine.

● Mines and/or Properties Under Development

- 13. Canamax Resources Inc. Au
- Hoyle Twp.
- 14. Diepdaume Mines Au
- Preston Property, Deloro Twp.
- 15. Kidd Creek Mines Ltd. Au
- Hoyle Pond Property
- 16. St. Andrew's Goldfields Au
- Stock Twp.

TABLE 1. MAPS AND REPORTS PERTAINING TO THE TIMMINS RESIDENT GEOLOGIST AREA PUBLISHED DURING 1984 BY THE ONTARIO GEOLOGICAL SURVEY, MINISTRY OF NATURAL RESOURCES

<p>Open File Reports OFR 5396 - Geology of the Argor Carbonatite Complex OFR 5398 - Geology of the Borden Twp. Carbonatite Complex OFR 5400 - Geology of the Cargill Twp. Carbonatite Complex OFR 5402 - Geology of the Clay-Howells Alkalic Rock Complex OFR 5404 - Geology of the Gold Ray Carbonatite Complex OFR 5405 - Geology of the Hecla Kilmer Alkalic Rock Complex OFR 5406 - Alkalic Rocks & Carbonatites of the James Bay Lowlands OFR 5408 - Geology of the Lackner Lake Alkalic Rock Complex OFR 5410 - Geology of the Nemogosenda Lake Alkalic Rock Complex OFR 5415 - Geology of the Shenango Township Alkalic Rock Complex OFR 5418 - Geology of the Valentine Township Carbonatite Complex OFR 5436 - Literature Review of Alkalic Rocks - Carbonatites OFR 5492 - Peat and Peatland</p>	<p>Evaluation of the Foleyet Area, 5 volumes OFR 5495 - Lignite Resource Assessment Project: 1983 Winter Drilling Program, Moose River Basin, James Bay Lowlands OFR 5511 - Lignite Assessment Project - Winter 1984 Drilling Program, James Bay Lowlands</p> <p>Preliminary Maps P. 2695 - Quaternary Geology of the Constance Lake Area P. 2696 - Quaternary Geology of the Hanlan Lake Area P. 2736 - Location of Gold Grains in Sonic Drill Samples from the Matheson Area</p> <p>Maps Map 2205 - (Reprint) Timmins-Kirkland Lake Sheet</p> <p>Miscellaneous Papers MP 117 - Report of Activities Regional Resident Geologists 1983 MP 119 - Summary of Field Work, 1984 MP 120 - Exploration Technology Development Program of the Board of Industrial Leadership and Development, Summary of Research 1983-84 MP 121 - Geoscience Research Grant Program, Summary of Research 1983-84</p>	<p>Geophysical/Geochemical Series MAP 80582 - Stock Township - Airborne Electromagnetic Survey, Total Intensity Magnetic Survey MAP 80592 - Bond Township - Airborne Electromagnetic Survey, Total Intensity Magnetic Survey MAP 80570 - Clergue Township - Airborne Electromagnetic Survey, Total Intensity Magnetic Survey MAP 80602 - Sheraton Township - Airborne Electromagnetic Survey, Total Intensity Magnetic Survey</p> <p>Aggregate Resources Publications ARIP 71 - Aggregate Resources Inventory of the Hearst Area ARIP 72 - Aggregate Resources Inventory of the Kapuskasing Area ARIP 93 - Aggregate Resources Inventory of the Smooth Rock Falls Area</p> <p>Additional Publications Lithostratigraphic Map of the Abitibi Subprovince</p>
--	--	--

Ross Division (underground): 235 000 tons

Schumacher Division (underground): 275 000 tons

Pamour Number 3 (underground): 58 000 tons

Timmins Property (underground): 83 000 tons

Timmins Property (surface): 200 000 tons.

Pamour custom milled 280 000 tonnes (308 000 tons) of gold ore from the Owl Creek Mine for Kidd Creek Mines Limited. Two hundred and seven tons were milled for Bridget Resources Limited

from Wawa. Concentrate was treated from Bridget Resources Limited, Consolidated Louanna Gold Mines Limited from Nakina, and Asarco Exploration Company of Canada Limited Aquarius Project.

In 1983 (1984 figures are not available at the time of writing) Pamour Porcupine Mines Limited completed 7744 feet (2360 m) of underground development (drifts and raises) and 126 994 feet (38 708 m) of diamond drilling at their 5 mines. Due to the falling gold price in 1984, Pamour was forced to reduce operations by closing the

Pamour Number 3 Mine (Aunor) in October and the Timmins Property Mine underground (Hollinger) in August. The Pamour Schumacher Division Mine (McIntyre) is still operating but on a day to day basis. The number of people employed at Pamour's operation decreased from 968 in 1983 to 746 by the end of 1984 (Pamour Porcupine Mines Limited, personal communications, 1984).

The Owl Creek Gold Deposit of Kidd Creek Mines Limited, located in Hoyle Township, has been mining gold by open pit methods

TABLE 2
GOLD PRODUCTION
PORCUPINE MINING DIVISION

Mine Name	Township	Year of Production	Tons Milled	oz. Produced	Grade
MINE NAME	TOWNSHIP	YEARS OF PRODUCTION	TONS MILLED	OZ. PRODUCED	GRADE
Ankerite	Deloro	1926-1953,-78	4,993,929	957,292	0.19
Ankerite/March	Deloro	1926-1935	317,769	61,039	0.19
Aunor	Deloro	1940-	8,423,174	2,496,017	0.30
Banner	Whitney	1927-28,-33,-35	315	670	2.13
Bonetal	Whitney	1941-1951	352,254	51,510	0.15
Bonwhit	Whitney	1951-54	200,555	67,940	0.34
Broulan	Whitney	1939-53	1,146,059	243,757	0.21
Cincinnati	Deloro	1922-1924	3,200	736	0.23
Concordia	Deloro	1935	230	16	0.07
Coniaurum/Carium	Tisdale	1913-18, 1928-1961	4,464,006	1,109,574	0.25
Crown	Tisdale	1913-1921	226,180	138,330	0.61
Davidson	Tisdale	1918-1920	9,341	2,438	0.26
De Santis	Ogden	1933,1939-42, 1961-1964	196,928	35,842	0.18
De Santis	Turnbull	1926		13	
Delnite	Deloro	1937-1964	3,847,364	920,404	0.20
Detour	Sunday Lake	1983- (NOV.-DEC.)	124,000	5,937	0.10
Dome	Tisdale	1920-	40,825,914	10,848,603	0.27
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
Halcrow-Swayze	Halcrow	1935	211	40	0.19
Hallnor (Pamour No. 2)	Whitney	1938-68,-81	4,226,419	1,645,892	0.39
Hiawatha	Lizar	1937,-39,-40	1,931	179	0.09
Hollinger-Schumacher	Tisdale	1915-18	112,124	27,182	0.24
Hollinger (Timmins)	Tisdale	1910-1968	65,778,234	19,327,691	0.29
Hoyle	Whitney	1976-	1,622,200	108,148	0.07
Hugh-Pam	Whitney	1941-44,46-49	725,494	71,843	0.10
Jerome	Oway	1926,1948-65	636,751	119,604	0.19
Joburke	Keith	1941-43,1956	335,060	56,893	0.17
Kingbridge/Gomak	Chester	1973-75,79-81	302,561	28,440	0.09
McIntyre (Schumacher)	Tisdale	1935-36	1,387	98	0.07
McLaren	Deloro	1912-	36,599,722	10,682,061	0.29
Moneta	Tisdale	1933-37	876	201	0.23
Naybob	Ogden	1938-1943	314,829	149,250	0.47
Pamour	Whitney	1932-1964	304,100	50,731	0.17
Paymaster	Tisdale	1936-68	26,755,031	2,918,901	0.11
Porcupine Lake	Whitney	1915-1966	5,607,402	1,192,206	0.21
Porcupine Peninsular	Cody	1937-40,1944	10,821	1,369	0.13
Preston	Tisdale	1924-27,-40,-47	99,688	27,354	0.123
Preston N Y	Tisdale	1938-1968	6,284,405	1,539,355	0.24
Preston/Porcupine Pet	Deloro	1933	2,800	153	0.05
Preston/Porphyry Hill	Deloro	1914-1915		314	
Reef Mine	Whitney	1913-1915	46	312	6.78
Shenango Prospect	Hawkins	1915-65	2,144,507	498,932	0.23
Tionaga/Smith-Thorne	Horwood	1936-37,-45	2,400	37	0.02
Tisdale Ankerite	Tisdale	1938-39	6,653	2299	0.35
Tommy Burns/Arcadia	Shaw	1952	14,655	2236	0.15
Vipond	Tisdale	1917	21	14	0.28-0.34
		1911-1941	1,565,218	414,367	0.26
TOTAL NO. OF MINES:	49				
TOTALS:			218,805,111	55,849,968	0.26

since November 1981. In 1983, 280 000 tonnes of ore were mined at an average grade of 4.0 g of gold per tonne (0.11 ounce gold per ton). Pamour Porcupine Mines Limited milled the total amount, except for 600 tonnes which was tested at Kidd Creek's metallurgical site. The lowest bench being mined is the fourth bench. Five and maybe even six more benches are planned to be mined to bring the bottom of the pit to 100 m below surface. The operation employs 25 people on a regular basis, which includes production, supervision, engineering, and mainten-

ance personnel (Kidd Creek Mines Limited, personal communication, 1984).

Asarco Exploration Company of Canada Limited began a test mining program in 1984 at its Aquarius Gold Deposit in MacKlem Township. Mining and milling began in mid-May, with mining ending in September and milling in November. Most of the underground production came from 3 stopes; 2 starting on the 166 m level and 1 on the 150 m level. All mining and milling was carried out by J.S. Redpath contractors with management and geology done by

Asarco. The gold mineralization occurs in quartz veinlets and stringers generally striking north-south in carbonatized ultramafic rocks. A total of 32 000 tons grading 0.225 ounce gold per ton were milled. Further underground development included extending the shaft from 160 m to 195 m and driving a decline from the 150 m level to 166 m to gain access to gold mineralization below the 150 m level. Surface diamond drilling on the 6 leased claims surrounding the deposit totaled 6974 m. Underground drilling totaled 14 386 m.

ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.

AEM -	Airborne electromagnetic survey	LC -	Linecutting
Ag -	Silver	Mag -	Magnetic survey
AMag -	Airborne magnetic survey	Man -	Manual labour
ARes -	Airborne resistivity survey	Mech -	Mechanical work
Au -	Gold	OVD -	Overburden drilling
AVLF -	Airborne VLF-EM survey	Pb -	Lead
BM -	Base Metals	PEM -	Pulse electromagnetic survey
Cu -	Copper	Ra. -	Radiometric survey
DD -	Diamond drilling	Res. -	Resistivity survey
EM -	Electromagnetic survey	Rtr -	Trenching
GC -	Geochemical survey	Scis. -	Seismic survey
GL -	Geological survey	Str. -	Stripping
Gph -	Geophysical survey	U/G -	Underground
HLEM -	Horizontal loop electromagnetic survey	UTEM -	University of Toronto electromagnetic survey
IP -	Induced polarization survey	VLF -	VLF-electromagnetic survey

TABLE 3

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Acres, Garden, Gentles, Habel, McCraig, Pickett, Rapley, Wright, Hambly, McBrian McCausland	42I,J	Onexco Minerals Ltd.	Lignite	OHEP	Summary of 1982 Exploration James Bay Lowlands, GC, GL, Gph, OVD-18-7235ft	1982	82-5C-28	T-2886
Adams, Deloro	42A/6SW	Comstate Resources	Au	Assess.	GL	1983	2.6603	T-2809
Adanac, Agate, Homuth, Hurdman Avon	42H/12 42H/13SE	Gowest Amalgamated Resources Lefebvre, L.	Au	Assess.	Mag, EM Str	1982 1983	2.5496 OM82-5C57	T-2582 T-2340
Atkinson Lake	32E/13SE	Getty Canadian Metals	Au, Ag, Cu, Zn	Assess. OHEP	DD-2-397.7m DD-3-425m	1983 1982	82-5C-76 63.4179	T-2443
Benneweis Blaney	41P/12SE 41O/10NE	Blanchard, Ed. Noranda Exploration	Au	Assess.	Rtr Mag, HLEM GL, DD-1-157m	1983 1983	2.6685 2.6924	T-2475 T-2564 T-2564
Bond	42A/10S 42A/10SW 42A/10S, 7N 42A/7N	Dome Exploration Labrador Mining Noranda Exploration Westmin Resources	Au	Assess. Assess. Assess. Assess. OHEP	Mag, Gph Assays AEM, Amag DD-2-411m DD/OVD(dup) Assays DD-2-305.5m	1983-84 1982 1984 1984 1982 1983	2.6560 2.6483 2.6974 63.4155 82-5C-52	T-2798 T-2409 T-2857 T-2440 T-2440
Brackin	42B/5SW	Canreos Minerals	Au	Assess.	Mag, VLF	1984	2.6845 2.6844	T-2847 T-2848
Brackin	42B/5SW	Jedburgh Resources	Au	Assess.	GC	1983-84	2.6425	T-2806
Brackin	42B/5SW	Shunock, M.	Au	Assess.	Mag, VLF	1984	2.6522	T-2792
Brackin, Lang	42B,C	Tundra Gold Mines	Au	Assess.	AMag, AEM, AVLF	1983	2.6613	T-2884

ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.

TABLE 3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Brackin, Leeson	42B/5SW	Canreos Minerals	Au	Assess.	VLF, Mag	1983-84	2.6608	T-2797
Breckenridge	42C/15SE	Tundra Gold Mines	Au	Assess.	AEM, AMag	1983	2.6074	T-2632
Breckenridge, Lizar	42C/15SE	Tay River Petrol.	Au	Assess.	AEM, AMag	1983	2.5982	T-2749
Bristol	42A/5NE	Allerston, R.E.	Au	Assess.	DD-4-413.6m	1984		T-1948
	42A/6NW	Kidd Creek Mines Ltd.	Au	Assess.	Str, Expenses	1981	2.5041	T-1941
	42A/5,6	Rio Algom Exploration	Au	Assess.	DD-7-956.6m	1984		T-2769
Bristol, Carscallen,	42A/5,6	Kidd Creek Mines	Au	Assess.	HEM, Mag	1983	2.5811	T-1941
Denton, Thorneloe								
Bristol, Godfrey,	42A/5NE	Chevron Canada	Au	Assess.	AEM, AMag, ARes	1984	2.7423	T-2904
Turnbull, Carscallen		Resources						
Carman, Cody	42A/6NE	Canamax, Noranda J.V.	Au	Assess.	DD-1-170.7m	1984		T-1978
Carman, Shaw	42A/6NE	Gowanda Resources (Gail Resources)	Au	OMEF	Assays, DD-15-1259.4	1982	63.4168 82-5C-56	T-227
				Assess.	VLF, Mag	1983-84	2.6961	T-2862
				Assess.	Mag, VLF	1984	2.6962	T-2862
Champagne,	41P/12SE	Hargor Resources	Au	Assess.	DD-6-624.8m	1983		T-2357
Benneweis		Inc.						
Carscallen	42A/5NE	Reginald Barnes Ltd.	Au	Assess.	Rtr, Str, Man, Mech	1984		T-2795
	42A/5NE	Cleyo Resources	Au	Assess.	DD-10-569.4m	1983		T-2628
	42A/5SE	Gowest Amalgamated	Au	Assess.	Rtr	1984		T-2815
				Assess.	GL	1984	2.7039	T-2815
Carscallen	42A/5NE	Kidd Creek Mines	Au	Assess.	HLEM, Mag	1984	2.7092	T-2865
				Assess.	AMag, AEM	1984	2.7009	T-2865
	42A/5E	Martin, G.	Au	Assess.	GL, Mag, VLF, GC	1983	2.6136	T-2810
Carscallen, Keefer,	42A/4NE	TBS Corporation	Au	Assess.	AMag, AEM	1982	2.4961	T-2611
Reynolds								
Chester	41P/12SW	Blue Falcon Mines Ltd.	Au	Assess.	Str, VLF, G1	1983-84	2.5944	T-2763
Chester	41P/12SW	Hanson Minerals	Au	OMEF	DD-3-61.4m	1982	82-5C-77	T-1934 T-1969
Chester	41P/12SW	Johnway Resources	Au	Assess.	Str, G1, VLF, Mag	1984	2.7007	T-2383
Chester	41P/12SW	Lytle, L.K.	Au	Assess.	DD-1-9.6m	1983		T-1934
Chester, Benneweis	41P/12SW	Murgold Resources	Au	Assess.	DD-1-57m VLF	1984 1981	2.4888	T-2433 T-2433
Clergue, Stock	42A/10SE	Surveymin Ltd	Au	Assess.	DD-1-253m	1983		T-2330
Cochrane	410/14SW	Noranda Exploration	Au	Assess.	GL	1983	2.6110	T-2826
Cody	42A/10SW, 11SE	Kidd Creek Mines	Au	Assess.	DD-3-628.6m OVD-12-344.4m	1982 1984	2.7075	T-1990 T-1990
Cody, Carman	42A/6NE	Canamax Resources/ Noranda J.V	Au	Assess.	DD-3-516m	1984		T-2730
Cody, German,	42A/10SW	Asarco Exploration	Au	Assess.	DD-6-1427.2m	1984		T-1959
Macklem								
Cody, Matheson	42A/11SE, 10SW	Placer Development	Au	Assess.	DD-1-215.2m	1984		T-2841

ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.

TABLE 3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Coral Rapids Project	42I/5,6	Selco Inc.	Diamonds	Assess.	Summary of Exploration	1983		T-2408
Cosens	410/13SW	Little M. Ltd.	Au	Assess.	DD-1-307.8m	1972-73		T-2603
Cunningham	410/10NE, 15SE	Ingamar Exploration	Au	Assess.	GL	1984	2.5431	T-2432
Cunningham	410/10NE	Kidd Creek Mines	Au	Assess.	HLEM, VLF, Mag	1983-84	2.6629	T-2512
				Assess.	HLEM, Mag, VLF	1983-84	2.6631	T-2512
				Assess.	DD-1-250.24m	1984		T-2512
					HLEM, VLF, Mag	1983	2.6630	T-2512
						1983-84	2.6628	T-2512
					DD-1-121.9m	1983		T-2512
Cunningham	410/10NE	M.W. Resources	Au	Assess.	GC, Analyses	1982-83	2.5444	T-2050
			Au	OMEP	Evaluation Report	1981	63.4004	T-2819
							81-5C-55	
Cunningham	410/10NE	Noranda Exploration	Au	Assess.	Mag, HLEM	1983	2.6764	T-2780
				Assess.	GL	1983	2.6430	T-2780
Cunningham, Swayze	410/15SE, 10NE	Ingamar Exploration	Au	Assess.	GL	1984	2.7205	T-2432
Dent L., Ridge L., S. Ridge L.	42J/6W	Selco (a division of BP)	Diamonds	Assess.	DD-18-2061.5m	1980-82		T-2735
Denton	42A/5SE	Golden Range Res.	Au, Ag, Cu, Zn	Assess.	GL, HLEM, Assays	1984	2.7298	T-2897
Denton	42A/5SE	Govest Amalgamated	Au	Assess.	Gph, Sampling	1983	2.5834	T-2738
				OMEP	GL, IP, DD-14-1767m	1981	63.4031	81-5C-109
					EM, Mag	1984	2.7085	T-2738
Denton	42A/5SE	Labrador Mining	Au	Assess.	DD-4-445m	1983		T-2412
					Mag, Gl		2.5810	
Denton	42A/5SE	Mid Canada Expl. Services Ltd. / 508610 Ont. Ltd.		Assess.	Mag, EM	1982	2.5114	T-2618
Deloro	42A/6NE	Canamax Resources	Au	Assess.	GL	1984	2.7254	T-1978
	42A/6NW	Canamax-Noranda J.V.	Au	Assess.	Mag, VLF	1984	2.6880	T-2846
	42A/6NW	Cometate Resources	Au	Assess.	GC, Analyses	1984	2.7036	T-2420
	42A/6NE	Diepdaume Mines	Au	Assess.	GL, Assays	1983	2.6477	T-2498
	42A/6NW	L'Etourneau, L.	Au	Assess.	Assays	1983	2.6283	T-2351
	42A/6NW	Labrador Mining	Au	Assess.	Mag, VLF	1984	2.7279	T-2888
	42A/6NW	Noranda Exploration	Au	Assess.	Mag, VLF	1983-84	2.6498	T-2791
	42A/6NW	Noranda Exploration	Au	Assess.	Mag, VLF	1984	2.6763	T-2880
	42A/6NE	Puissance Corp.	Au	Assess.	Mag, VLF	1984	2.6788	T-2839
	42A/6SE	Pyke, D.R.	Au	Assess.	Mag	1983	2.6407	T-2800
			Au	Assess.	AMag, AEM	1983	2.5739	T-2505
	42A/6NE	J.P. Sheridan	Au	Assess.	GL, VLF, Mag, Assays	1983-84	2.6665	T-2811
Deloro	42A/6NE	Vatco Exploration	Au	Assess.	GC	1981-83	2.5931	T-2733
				Assess.	GC, GL		2.6076	T-2733
							2.6755	
							2.5928	

ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.

TABLE 3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Deloro	42A/6NE	Vatco Exploration	Au	Assess.	GL	1981	2.6755	T-2530 T-2733
Deloro, Adams	42A/6	Comstate Resources	Au	Assess.	Mag, VLF	1983-84	2.6771	T-2809
Deloro, Ogden	42A/6SW	Canamax/Bruneau J.V.		OMEP	Mag, VLF, DD-6-1053m (1982 Prog Rep.)	1979-82	81-5C-135	T-2817
Denyes	410/15SW	Canico	Au	Assess.	GL	1983	2.6848	T-2446
Denyes, Greenlaw,	410/15SW	Collingwood Energy Ltd.	Au	Assess. Assess.	Str, Rtr Mag, Vlf	1983 1983	 2.5666	T-2607 T-2607
Denyes, Halcrow	410/15SW	Lenora Explorations	Au	Assess.	AMag, AEM, AVLF	1984	2.7116	T-2896
Denyes, Raney,	410/10,	Dejour Mines	Au	Assess.	GL, GC	1983	2.6595	T-2591
Cunningham, Garnet	15							
Derry, Ermine, Hawkins	42C, 42F	McKinnon, D.	Au	Assess.	AMag, AEM, VLF	1983	2.6655	T-2835
Dore	410/15SE	Swayze Resources	Au	Assess.	Assays	1984	2.7140	T-2784
				Assess.	GC	1983-84	2.6494	T-2784
Dore, Swayze	410/15SE	Dore Exploration	Au	Assess.	EM	1983	2.5865	T-2765
Dore, Swayze	410/15SE	Dore Exploration	Au	Assess.	GL	1984	2.7103	T-2765
Dublin	41P/4SE	Young, J.R.	Au	Assess.	Man., Mech,	1984		T-2464
Dyer	42I/11SW	Onakawana Development Ltd.	Lignite	Not Assess.	Downhole Gph, Geological Asses.	1980		T-2745
Esther	410/9NW	Burton, M.L.	Au	Assess.	GL, str, rtr	1982	63.4142	T-1920
							OH82-5I-26	
Esther, Benton	410/9NW	Canico	Au	Assess.	VLF, Mag, GL	1983	2.7004	T-2595
Evelyn	42A/11, E	Cominco Ltd.	Au	Assess.	Mag	1983	2.6076	T-2403
	10NW				OVD-26-631.9m	1983-84	2.7371	T-2885
Evelyn	42A/10NW	Korpela, D	Au	Assess.	Mag	1984	2.6860	T-2849
Evelyn, Gowen	42A/11NE	Cominco Ltd.	Au	Assess.	DD-1-392m	1983		T-2414
Evelyn, Hoyle	42A/11NE,	Cominco Ltd.	Au	Assess.	OVD-15-351.4m	1983-84	2.7034	T-2403
Matheson	SE							
Evelyn, Little	42A/11NE,	Cominco Ltd.	Au	Assess.	AMag, AEM	1983-84	2.6415	T-2885
	10NW							
Evelyn, Matheson	42A/11SE	St. Joe Canada Ltd.	Au	Assess.	HEM	1982	2.5406	T-2510
Fallon	42A/6SE	Meunier, D.	Au	Assess.	AEM, AVLF, ARes,	1983	2.6274	T-2596
	7SW, 3NE,				AMag			
	2NW			Assess.	GL	1983	2.6217	T-2596
Fallon, Pasken	42A/2NW	Cominco Ltd.	Au	Assess.	UTEM, Mag.	1982	2.6312	T-2574
Fallon, Langmuir	42A/6SE	Mercier Exploration	Au	Assess.	GL, Ra	1983	2.6376	T-2568
Foleyet	42B/1NW	Hudbay Mining	Au	Assess.	PEM, Mag	1983	2.7104	T-2430
Fripp	42A/3NW	Northgate Exploration	Au	Assess.	GC, VLF, GL	1982	2.6246	T-2525
Garnet	410/9NW	Lacana Mining	Au	Assess.	DD-2-318.5m	1983		T-2584
Garnet	410/10NE	Noranda Exploration	Au	Assess.	Mag, HLEM	1982	2.5869	T-2827
Genoa	410/16SE	Canamax Resources Inc.	Au	Assess.	Mag, HLEM	1983	2.5778	T-2621
German	42A/10SW	Asarco Exploration	Au	Assess.	GL	1983	2.5882	T-2824
German	42A/10SW	Canamax Resources	Au	Assess.	AMag, AEM	1983	2.7212	T-2902

ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.

TABLE 3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number	
German	42A/10SW	Cominco Ltd.	Au	Assess.	Mag, VLF	1984	2.6956	T-2757	
				Assess.	OVD-5-297.2m	1984		T-2742	
				Assess.	OVD-16-644.4m	1982		2.6055	T-2757
				Assess.	OVD-4-222.2m	1983		2.6258	T-2757
				Assess.	OVD-4-182.3m	1984			T-2757
German	42A/10SW	Comstate Resources	Au	Assess.	Mag	1984	2.7251	T-2466	
				Assess.	Mag, Vlf	1982		2.4852	T-2606
				Assess.	AMag, AEM	1983		2.6917	T-2864
				Assess.	OVD-27-1565.8m	1984		2.6957	T-2742
				Assess.	GL	1983		2.6599	T-2831
Glaister Lake	42I/9SE	Noranda Exploration	Au	Assess.	GL			T-2831	
Glaister Lake,	42I/9E	Noranda Exploration	Au	Assess.	GL, Mag, HEM	1983-84	2.6600	T-2832	
Glaister Lake N.							2.6707	T-2831	
							2.7030	T-2831	
Godfrey	42A/5NE	Kidd Creek Mines		Assess.	Str	1984		T-2613	
				Assess.	DD-1-179.6m	1984		T-2613	
				Assess.	VLF, AEM, Mag	1983-84		2.6337	T-2779
				Assess.	DD-1-350m	1983			T-2613
				Assess.	PEM	1981-83		2.6805	T-2613
				Assess.	GL, Analyses	1981-82		2.5874	T-2613
				Assess.	DD-1-479m	1984			T-2613
Godfrey	42A/5NE	Labrador Mining	Au	Assess.	Mag, VLF	1983	2.6354	T-2778	
				Assess.	Mag, EM	1983		2.5791	T-2620
				Assess.	GC	1982		2.6084	T-2461
Godfrey	42A/5NE	Samin Canada Ltd.	Cu, Pb, Zn	Assess.	GC	1981-83	2.6086	T-2777	
				Assess.	GC, Analyses	1982		2.6087	T-2461
				Assess.	Mag, VLF	1981		2.4469	T-2610
Godfrey	42A/5NE	VanSchie, J.		Assess.	Mag, VLF	1981	2.4469	T-2610	
Gouin	41P/13NE	Lambier, G.R.		Assess.	Manual Labour	1983		T-2770	
Gowan	42A/11NE	Cominco Ltd.	Au	Assess.	OVD-2-74.1m	1983	2.6057	T-2414	
				Assess.	OVD-10-305m	1983		2.6056	T-2414
				Assess.	OVD-2-71m	1983		2.5502	T-2414
				Assess.	DDH-2-293m	1983			T-2414
				Assess.	OVD-2-89.3m	1983		2.6058	T-2829
Greenlaw	410/10NW	Larche, J.	Au	Assess.	AMag, AVLF, AEM	1984	2.7179	T-2876	
Greenlaw	410/10NW	Noranda Exploration	Au	Assess.	GL	1983	2.6335	T-2782	
				Assess.	Mag, VLF	1984		2.7262	T-2823
				Assess.	DD-1-247.8m	1983			T-2823
				Assess.	HEM	1983		2.6275	T-2782
				Assess.	Mag, VLF	1983		2.6951	T-2854
		Noranda Exploration/ 492752 Ontario Ltd.	Au	Assess.	Mag, VLF	1983-84	2.6952	T-2853	
Greenlaw, Tooms,	410/15SW,	Collingwood Energy	Au	Assess.	GL	1983	2.6276	T-2785	
Halcrow, Denyes	10NW			Assess.	AMag, AVLF, AEM	1984	2.7178	T-2785	
Groves	41P/12E	Troutfly Resources	Au	Assess.	Mag, VLF	1984	2.6904	T-2868	
Groves, St. Louis	41P/12SE	Thor Resources Inc.	Au	Assess.	DD-6-610.1m,	1983	2.6247	T-2572	
					GL, GC, Analyses				

ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.

TABLE 3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Halcrow	410/15SW	Micham Exploration	Au	Assess.	AMag,AVLF,AEM	1984	2.7022	T-2870
		Topaz Exploration	Au	Assess.	AMag,AVLF,AEM	1984	2.7180	T-2879
Hassard	42A/4SE	Killeen,V.	Au	Assess.	Labour	1983		T-1937
Hawkins	42C/16NE	Falconbridge Ltd.	Au	Assess.	IP	1983-84	2.6500	T-2802
Hawkins	42C/16NE	Golden Range Res.	Au	Assess.	Mag,VLF	1983-84	2.6743	T-2804
					Mag,VLF	1983-84	2.6697	T-2804
Hawkins	42F/1SE	McKinnon,D.	Au	Assess.	AEM,AMag,AVLF	1983	2.6456	T-2835
Hawkins, Walls	42G/4SW, B/13NW, C/16NE	Falconbridge Ltd.	Au	Assess.	GC,Analyses	1983-84	2.6751	T-2764
					GC,Assays	1983	2.6524	T-2802
					DD-1-128.2m	1984		T-2630
Heenan	410/16SW	Blue Falcon Mines	Au	Assess.	Mag,VLF,GL	1984	2.7123	T-2903
Heenan	410/6SW	Kidd Creek Mines		Assess.	HLEM,Mag,VLF	1983	2.6001	T-2828
Heenan, Dore	410/16	Kerr Addison Mines	Au	Assess.	GL,VLF,Mag, GC, LC,Assay	1981-82	2.5154	T-2569
Heenan, Greenlaw	410/15SW, 16SW	Dejour Mines Ltd.	Au	Assess.	GC,Gph,GL	1983	2.5500	T-2762
Heenan, Marion, Genoa	410/16SW	Falconbridge Ltd.	Au	Assess.	GC,Analyses	1983-84	2.6582	T-2345
					DD-5-487.7m	1984		
					GC,Assays	1983	2.5993	T-2345
Hopper Lake	32E/13NW	Dome Exploration	Au	Assess.	DD-9-1558.4m	1984		T-2392
Hopper Lake	32E/13NW	Genesis Resources	Au	Assess.	DD-1-70.4m	1984		T-2601
					IP,HEM	1984	2.6709	T-2601
				Assess.	DD-3-589.2m	1984		T-2601
Hopper Lake, W of Sunday L.	32E/13NW 32L/4SW	M.J. Labelle	Au	Assess.	DD-2-152.4m	1984		T-2571
Horwood	410/6NW 41B/1SW	Darius Gold Mines	Au	Assess.	GL,GC	1982-84	2.6412	T-2756
					DD-1-124.1m		2.6980	T-2756
					GL		2.6982	T-2559
	42A/1SW	Grand Saguenay Mines	Au	Assess.	GL	1984	2.7101	T-2883
Horwood	410/16NW	Landers,J.	Au	Assess.	Mech. Equip.	1983		T-2424
Horwood	42B/1SW	Raise Contracting	Au	Assess.	GL	1983	2.5107	T-2737
Horwood	42B/1SW, 410/16NW	Ultrex Petroleum	Au	Assess.	GL	1984	2.7102	T-2891
Horwood	410/16NW	Widowczyk,R.	Au	Assess.	Man.,Mech,Str	1984		T-2424
					Assays	1982		T-2424
Horwood,Silk	42B/1SW 410/16NW	Orofino Mines Ltd.	Au	Assess.	DD-4-276m	1983		T-2126
					Rtr,Str	1984		T-2786
Hoyle	42A/11NE	Cominco Ltd.	Au	Assess.	OVD-1-34.4m	1983	2.5527	T-2403
Hoyle	42A/11SE	Guiho/Larche	Au	Assess.	Mag	1984	2.6865	T-2852
Hoyle	42A/11SE	Karpovitch/Rousseau	Au	Assess.	DD-2-304.8m	1984		T-2767
					Mag,VLF	1983	2.6310	T-2774
Hoyle	42A/11SE	Kerr Addison Mines	Au	Assess.	DD-2-443.8m	1984		T-2767
					DD-2-428.5m	1983		T-2767
			Au	Assess.	Mag	1984	2.6601	T-2767
Hoyle,Murphy	42A/11SE	Canamax/Dupont	Au	OMEPE	Report 1982	1982	62.4115	T-2787
							81-5-JV-137	
Huffman	410/9SE	Seaway Base Metals	Au	Assess.	Gph	1983	2.5877	T-2766

ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.

TABLE 3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Huffman	410/9SE	Tonapah Resources	Au	Assess.	HLEM, Mag	1984	2.6825	T-2838
Huffman, Potier	410/9SE	Hargor Resources	Au	Assess.	HLEM, Mag, AVL F	1984	2.7035	T-2873
Jamieson	42A/12SE	Kidd Creek Mines		Assess.	AMag, AEM	1981	2.6154	T-2543
					Mag, HEM, VLF	1984	2.7198	T-2543
Jamieson	42A/12SE	Kidd Creek Mines		Assess.	DD-1-457.2m	1983		T-2470
Jamieson	42A/12SE	Samim Canada Ltd.	Cu, Pb, Zn	Assess.	GC, Analyses	1981-83	2.6058	T-2833
Jamieson, Godfrey	42A/12SE	Kidd Creek Mines		Assess.	Str	1984		T-2543
Jamieson, Robb	42A/12SE	Glory Mining And Refining	Au	Assess.	OVD-78-506m, Assays	1982	2.5341	T-2608
Jessop	42A/11SW	Cominco Ltd.		Assess.	OVD-8-479.8m	1983	2.5785	T-2748
Jessop	42A/11SW	Kidd Creek Mines		Assess.	DD-1-231.9m	1983		T-2477
				Assess.	DD-1-152.7m	1983		T-2477
Jessop, Jamieson, Godfrey, Mountjoy	42A/11SW	Bonhomme, L.	Au	Assess.	DD-2-88.4m	1984		T-2887
Kattawagami River	32L/4NN	Noranda Exploration		Assess.	HEM	1983	2.6677	T-2855
Keith	42B/1NE	G. Sanford	Au	Assess.	Mech, Manual, Str	1984		T-2822
					Assays	1983	2.7171	T-2822
					Assays	1984	2.7406	T-2822
Keith, Ivanhoe	42B/1NW	Hudbay Mining	Au	Assess.	DD-4-752.9m	1983		T-2430
Kenogaming	42A/4NW	Bearcat Expln.	Au	Assess.	VLF, IP	1984	2.7342	T-2793
Kenogaming	42A/4NW	Carl Creek/Bearcat	Au	Assess.	Rtr, GL, Assays	1983	2.6285	T-2793
					Str, VLF	1983	2.5820	T-2793
					AMag, AVL F, AEM	1983	2.6379	T-2793
Kenogaming	42A/4NW	Golden Range Resources	Au	Assess.	Mag, HEM	1983	2.6176	T-2751
Kenogaming	42A/4NW	Ingamar Exploration	Au	Assess.	Assays	1984	2.6417	T-2845
Kenogaming	42A/4NW	Shack, L.	Au	Assess.	AMag, VLF, AEM	1983-84	2.7150	T-2877
		Sheppard, R. (Reba Res.)	Au	Assess.	AVLF, AMag, AEM	1983	2.6343	T-2830
Kenogaming	42A/4NW	Walker, M.G.	Cu, Ni, Co, Au, Ag	Assess.	AEM, AMag, AVL F	1983	2.6380	T-2894
Kenogaming, Sewell, Penhorwood, Reeves	42B/1E, 42A/4W	R.J. Sheppard	Au	Assess.	AMag, AVL F	1983	2.6579	T-2799
Kesagami River	42H/16NW	Dome Exploration	Au	Assess.	VLF, Mag, HLEM	1983-84	2.6703	T-2813
				Assess.	HLEM, VLF, Mag	1983-84	2.6704	T-2813
							2.6701	
Kidd	42A/11NW	Kidd Creek Mines		Assess.	Mag, HEM	1983	2.6177	T-2755
Langlois	410/6NE	Noranda Exploration		Assess.	GI	1984	2.7162	T-2881
Larkin	42F/2SE	Fournier, E.	Au	Assess.	DD-2-63m	1983		T-2593
Larkin, Lascelles	42F/2SE	Fournier, E.	Au	Assess.	DD-5-235.6m	1983		T-2593
Lennox	42H/3SW	Hudbay Mining		Assess.	AMag, AVL F	1983	2.6915	T-2398
Lennox	42H/3SW	Kidd Creek Mines		Assess.	Mag, HLEM	1983-84	2.6806	T-2836
Limestone Rapids	42F/16NE	Noranda Exploration		Assess.	Gph,	1984	2.5903	T-2507
				Assess.	DD-2-304.3m	1982,-84		T-2507
				Assess.	DD-1-306.6m	1982		T-2507
Little	42A/11NE	Larche, V.	Au	Assess.	Mag	1984	2.6864	T-2843
Little, McCart	42A/15SW	Samim Canada Ltd.	BM	Assess.	HEM	1982	2.5935	T-2418
Little, Tully	42A/11NE	Lacana Mining Corp.		Assess.	DD-1-188.7m	1983		T-1946

ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.

TABLE 3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Lizar	42C/15,16	Tanglewood Petroleum	Au	Assess.	AMag,AVLP,AEM	1983	2.5879	T-2863
		Tundra Gold Mines	Au	Assess.	AMag,AEM	1983	2.5970	T-2754
Lougheed	42B/10SE 7N	Noranda Exploration	Au	Assess.	G1,DD-3-360m	1983-84	2.7056	T-2860
							2.7057	
							2.7058	
							2.7059	
Loveland	42A/12NE	Kidd Creek Mines	Zn,Cu,Ag	Assess.	GL	1983	2.6035	T-2789
				Assess.	Mag, HLEM	1983-84	2.6527	T-2789
Lowakamistic River	32L/5NW	Noranda Exploration		Assess.	Mag,HEM	1984	2.6765	T-2861
Lowakamistic River N.	32L/12NW	Noranda Exploration		Assess.	Mag,HEM	1983	2.6708	T-2858
Lower Detour Lake	32E/13NE	Dome Exploration	Au	Assess.	DD-5-707.7m	1984		T-2447
		Duration Mines	Au	Assess.	Mag,GL,HLEM	1984	2.6561	T-2893
		Eastwest Resources Ltd.	Au	Assess.	Mag,VLP	1983	2.6545	T-2808
					Gph	1983	2.5772	T-2602
		Getty Canadian		Assess.	AMag,AVLP,Assays, Metals	1982	63.4179	T-2443
Lower Detour Lake	32E/13NE	Ingamar Exploration	Au	Assess.	IP	1984	2.6888	T-2602
					Mag,EM	1983	2.6063	T-2506
					Mag,VLP	1983	2.6175	T-2790
					GL	1983	2.5896	T-2790
					GL	1983	2.5896	T-2790
					VLP	1984	2.6539	T-2805
					DD-1-179m	1982-83		T-2331
					HEM	1982	2.6255	T-2331
					HEM	1984	2.6786	T-2331
					Mag,HLEM	1984	2.6992	T-2856
Mag,HLEM	1984	2.6992	T-2859					
Lower Detour Lake, Atkinson Lake	32E/13NE, SE	Getty Canadian Metals	Au Au Au	Assess. Assess. Assess.	DD-1-155.4m DD1-148.8m A Mag	1983 1983 1982	2.5774 63.4179	T-2443 T-2443 T-2443
				OMEP	AVLP	1982	63.4179	T-2443
							82-5C-76	
			Au	Assess.	DD-2-397.7m	1983		T-2443
Lower Detour Lake,	32E/13NE, SE	Petromet Resources	Au	Assess.	GC,HLEM,Analyses	1983	2.6514	T-2772
					DD-4-396.2m	1984		T-2772
Lower Detour Lake, Sunday Lake	32E/13NE, 42L/4SE	Pelangio-Larder Mines	Au	Assess.	GL	1983	2.5863	T-2500
Lower Detour, Hopper Lake, Sunday Lake	32L/4SE	Westmin Resources	Au	Assess.	DD-8-1049m	1983		T-2331
					DD-3-455m			
				Assess.	HLEM,Mag	1982-83	2.5962	T-2331
				Assess.	GL	1983	2.5963	T-2331
				OMEP	DD,Rept.-6-901.1m	1982-83	63.4153	T-2331
				Assess.	Mag		82-5C-43	
Lucas	42A/14SE	Abitibi Price Inc.	BM	Assess.	DD-3-301.1m	1984		T-2496
					AEM	1983	2.6744	T-2496
					DD-4-377.3m	1983		T-2442
					GC,OVD-4-11.7m	1983	2.6018	T-2442

ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.

TABLE 3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
MacDiarmid	42A/11NW	Kidd Creek Mines		Assess.	Mag, HLEM	1984	2.7336	T-2899
MacDiarmid	42A/12NE, 11NW	566307 Ont. Ltd.		Assess.	Mag, HLEM	1984	2.7347	T-2905
Macklem	42A/7NW, 10SW	Goldeidt Exploration	Au	Assess.	OVD, G1	1983	2.5553	T-2533
				OMEF	VLF, Mag, OVD-10-480m DD-3-473m	1982	63.4116 2.5459 81-5C-139	T-2533
	42A/7NW	Livingstone Energy Corp.		Assess.	Mag, VLF	1984	2.7276	T-2895
	42A/10SW	Pamour Porcupine	Au	Assess.	DD-1-132.9m	1984		T-2313
	42A/10SW	Pamour Porcupine Mines Ltd.	Au	Assess.	DD-1-129.8m OVD-10-270.4m	1983 1984	2.6804	T-2313
	42A/7NW	United Kingdom Energy Resources	Au	Assess.	VLF, Mag, HEM	1983 1984	2.6105 2.7077	T-2736
	42A/7NW	Vatri Expl. (Vatco)	Au	Assess.	GL, GC	1983	2.5929	T-2732
	42A/7NW	Vatri Expl. (Vatco)	Au	Assess.	HLEM	1983	2.5823	T-2732
Macklem, Bond	42A/10SW	Goldeidt Exploration	Au	Assess.	AMag, AEM	1983	2.5839	T-2533
Macklem, German	42A/10SW	Asarco Exploration	Au	Assess.	Mag, EM OVD-8-322.2m	1983 1983	2.5862 2.5957	T-1959
Macklem, Thomas	42A/	Dome Exploration	Au	Assess.	DD-10-1026.9m	1983		T-2402
Mallard	410/9NW	Adeline International	Au	Assess.	Rtr, Str, Assays DD-10-1524m	1983 1983		T-2318
Mallard	410/9NW	Granges Exploration AB	Au	Assess.	HEM	1982	2.5276	T-2481
Mallard	410/9NW	A.I.M.	Au	Assess.	Rtr, Str, Assays	1983-84	2.6395	T-2318
Marion	410/16SW	Falconbridge Ltd.	Au	Assess.	VLF	1982	2.6579	T-2803
Marion	410/16SW	Kerr Addison Mines	Au	Assess.	Mag, GL, GC	1982-83	2.5397	T-2569
Marion, Heenan	410/16SW	Falconbridge Ltd.	Au	Assess.	GL, Gph Assays, GC	1983 1982	2.5992 2.5994	T-2345
Marquis Lake	42H/16NE	Dome Exploration	Au	Assess.	HLEM, VLF, Mag	1983-84	2.6700	T-2812
Massey, Whitesides	42A/5NE	Burt, R.R.	Au	Assess.	DD-1-91.8m	1984		T-2901
Matheson	42A/11SE	Bonhomme, J.V.	Au	OMEF	DD-2-455.4m	1981	81-5-P9	T-261
Matheson	42A/10	Cominco Ltd.	Au	Assess.	Mag, UTEM	1983	2.5681	T-2403
	42A/11SW			Assess.	OVD-7-164m	1983	2.5643	T-2403
Matheson	42A/12SE	Kidd Creek Mines	Au	Assess.	OVD-3-78.6	1982	2.5949	T-2825
Matheson, Evelyn	42A/10	St. Joe Canada Inc.	Au	Assess.	OVD-41-1223.3m	1982-83	2.5979	T-2510
Matheson, German	42A/10SW	Eastern Mines		Assess.	GC	1983	2.6134	T-2606
Matheson, German	42A/10SW 11SE	McKinnon, D.	Au	Assess.	GC, Mag	1983 1984	2.5984 2.6976	T-2606
McPhail	4101/NE	Premier Exploration	Au	Assess.	Str, Manual, Mech Assays	1984 1984		T-2872
				Assess.	Assays	1984	2.7172	T-2872
Moen, Moggy, Neill, Schembri	410/5S	Noranda Exploration		Assess.	AMag	1984	2.6939	T-2837
Mountjoy	42A/11SW 16NW	Comstate Resources	Au	Assess.	AMag, AEM DD-2-245m	1983 1984	2.5738	T-2526

ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.

TABLE 3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Mountjoy	42A/11SW	Grand Saguenay Mines	Au	Not Assess.	Prospectus	1983		T-2882
Murphy	42A/11SW	Comstate Resources		Assess.	GL	1983	2.6267	T-2739
					GL	1984	2.7072	T-2482
				Assess.	Mag	1983	2.5991	T-2739
				Assess.	VLF	1983-84	2.7070	T-2482
Murphy, Hoyle	42A/11SE	Canamax Res. Inc.		Assess.	DD-3-606m	1984		T-2787
Murphy, Wark	42A/11E	Comstate Resources		Assess.	GC	1983	2.5948	T-2739
Neill	410/5SE	Labrador Mining	Au	Assess.	GL, Str	1984	2.7253	T-2807
				Assess.	GL	1983	2.6563	T-2807
Ogden	42A/6NW	Bonney, C.G.		Assess.	DD-2-61.9m	1984		T-2768
	42A/6NW	Canamax-Noranda J.V.	Au	Assess.	Mag, VLF	1983-84	2.6414	T-2801
	42A/6NW	Canamax/Noranda J.V.		Assess.	OVD-4-244m Mag, VLF	1984 1983-84	2.7386 2.6499	T-2801 T-2842
	42A/6NW	Hibbard/Karpovitch/ Rousseau	Au	Assess.	VLF	1984	2.6891	T-2851
	42A/6NW	Noranda Exploration		Assess.	Mag, VLF	1983	2.6409	T-2788
	42A/6NW	Rochon, R.		Assess.	Str	1983		T-2614
Osway	410/9NW	Benton Resources		Assess.	DD-2-304.8m	1984		T-2781
	410/9NW	Blue Falcon Mines		Assess.	VLF	1983	2.6162	T-2752
	410/9SW	Granges Exploration AB	Au	Assess.	Mag, EM	1982	2.5448	T-2821
	410/9	Hargor Resources		Assess.	DD-5-477m	1983		T-2517
Osway, Huffman	410/9SE	Blue Falcon Mines		Assess.	Mag, VLF	1983	2.6163	T-2752
Pearce	42G/9NW	Kapuskasing Resources		OHEP	Res. IP	1981	81-5C-39	T-2326
Penhorwood	42B/1NE	Quinterra Resources		Assess.	Mag	1983	2.6588	T-2814
Price, Fripp	42A/6SW	Argentex Resources	Au	OHEP	Mag, VLF, GL	1981	81-5C-44	T-2431
Price, Fripp	42A/6SW	Samim Canada Ltd.	Pb, Zn	Assess.	AEM, AMag, AVLF	1983	2.5718	T-2609
Prosser	42A/14SE	Abitibi-Price Inc.	BM	Assess.	AEM, AMag	1983	2.7196	T-2344
	42A/14SE	Abitibi-Price Inc.	BM	Assess.	AEM, AMag	1983	2.7196	T-2344
	42A/14SE	Kidd Creek Mines		Assess.	DD-1-170.7m	1984	-	T-1741
	42A/14SE	Kidd Creek Mines		Assess.	OVD-8-223.8m	1984	2.7040	T-1741
	42A/14SE	Kidd Creek Mines		Assess.	DD-1-170.7m	1984	-	T-1741
	42A/14SE	Kidd Creek Mines		Assess.	OVD-8-223.8m	1984	2.7040	T-1741
	42A/14SE	Kidd Creek Mines		Assess.	GL, GC	1983	2.5651	T-1741
Prosser, Wark	42A/11NE	Golden Range Res.		Assess.	DD-1-146.3m	1984		T-2758
Raney	410/15W	Dore Exploration		Assess.	GL	1983	2.6236	T-2631
	410/15SW	J-Dex Mining	Au	Assess.	DD-11-630.2m	1984		T-2180
Reeves, Sewell	42B/1NE	Comstate Resources	Au, Ag, Cu, Ni, Zn	Assess.	GC, Analyses GL	1983-84 1983-84	2.7164 2.7071	T-2898 T-2867
Reid, Mahaffy	42A/13SE	Kidd Creek Mines	BM	Assess.	HEM, Mag	1984	2.6881	T-2844
Ridge Lake S.	42J/6SW	Shell Canada		OHEP	Res, Seis, OVD-39-3037m	1981-82	63.4110 81-5C-114	T-2405
Robb, Jamieson	42A/12SE	Glory Mining & Refining		Assess.	Mag	1983	2.6349	T-2608

ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.

TABLE 3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Rollo	410/15NE	Carlson Mines Ltd.	Au	Assess.	Mag, EM, GL	1983	2.5864	T-1987
	410/15SE	Kenty Resources	Au	Assess.	GL	1983	2.6132	T-2731
				Assess.	DD-5-463.9m	1984		T-2731
				Assess.	IP	1983-84	2.6434	T-2731
				Assess.	GC	1983	2.6471	T-2731
Sewell	42A/4NW	Noranda Exploration	Au	Assess.	DD-2-257.2m	1983	-	T-2552
				Assess.	GP, VLF, GC	1983	2.6140	T-2552
							2.7055	
Shaw	42A/6NE	R.E. Allerston	Talc	Assess.	Mag	1984	2.6571	T-1200
				Assess.	GI	1983	2.5660	T-1200
Shaw	42A/6E	Gail Resources	Au	Assess.	Mag	1984	2.6920	T-2850
Shaw	42A/6NE	Petromet Resources	Magnesite	Assess.	GI	1983	2.5660	T-1200
Shaw, Deloro	42A/6NE	Canamax Resources	Au	Assess.	DD-1-151.5m	1984		T-1978
Shelley	41P/3NW	Rio Tinto		Assess.	DD-1-102m	1980		T-1927
Sherlock	42B/7NW	Noranda Exploration		Assess.	GL	1983	2.7188	T-2892
				Assess.	GL	1983	2.7187	T-2892
Sherlock, Lougheed	42B/7NW	Noranda Exploration		Assess.	GL	1984	2.7189	T-2892
Silk	42B/1SW	Mortimer, C.H.	Au	Assess.	Rtr, mech	1983		T-2604
Silk, Horwood	410/16NW	Northgate Expl.		Assess.	GL, CC, Mag, EM, Assays	1981	2.5286	T-2786
Slack	42C/1SW	Arsenault, J.	Au	Assess.	Rtr, Manual	1983-84		T-2363
Southbluff Creek E.,	41I/9W	Noranda Exploration	Au	Assess.	Mag	1983	2.6660	T-2856
Claister Lake W.				Assess.	GL	1983	2.6598	T-2856
St. Louis, Benneweis, Groves	41P/12SE	Jarvis Resources	Au	Assess.	DD-3-151.5m	1983		T-2599
Stock	42A/10SW,	Canamax Resources	Au	Assess.	AMag, AEM	1983	2.6838	T-2840
				Assess.	GL	1984	2.6893	T-2890
Stock	42A/10SE	Cominco Ltd.	Au	Assess.	OVD-2-58.8m	1983	2.6424	T-2783
				Assess.	Assays,	1983	2.6463	T-2742
				Assess.	OVD-5-90.2m			
				Assess.	OVD-5-186.5m	1983		T-2523
				Assess.	OVD-15-455.1m	1983	2.5645	T-2742
				Assess.	OVD-8-320m	1983	2.6111	T-2742
				Assess.	OVD-6-256.9m	1983	2.6462	T-2742
				Assess.	OVD-7-351.7m	1983	2.6461	T-2742
				Assess.	OVD-4-165.2m	1984	2.6822	T-2834
				Assess.	OVD-3-134.1m	1984	2.6823	T-2834
				Assess.	OVD-7-263.7m	1984	2.6913	T-2742
				Assess.	OVD-13-456.6m	1984	2.6955	T-2834
				Stock, Bond, Sheraton, 42A		Papont Resources		ONEP
Currie, Carr, Glackmeyer, Blount							81-6I-120	
Stock, German	42A/10SW	Cominco Ltd.		Assess.	OVD-11-409.7m	1983	2.5644	T-2742
Sunday Lake	32L/4SE	Canfic Resources	Au	Assess.	Mag, EM	1983	2.6051	T-2775
	32L/4SE	Carlson Mines Ltd.	Au	Assess.	Mag	1983	2.6131	T-2746
	32L/4SE	Corrie Copper	Au	Assess.	Mag, Vlf	1983	2.5618	T-2605
					IP, HEM	1984	2.6776	T-2605

ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.

TABLE 3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Sunday Lake	32L/4SE	Dome Exploration	Au	Assess.	GL,DD-8-1529m	1982	2.5790	T-2541
	32L/4SE	Ingamar Expln.	Au	Assess.	Mag,VLF	1983	2.6021	T-2900
	32L/4SE	Texas Commonwealth Resources	Au	Assess.	VLF	1983	2.6064	T-2816
Sunday Lake,	32L/4SE,	Westmin Resources	Au	Assess.	Mag,VLF	1983-84	2.6740	T-2331
Lower Detour Lake	32E/13NE			Assess.	GL	1983	2.6164	T-2331
				Assess.	HLEM	1984	2.6787	T-2331
Sunday Lake,	32L/4SE,	Dome Exploration		Assess.	DD-17-2257.3m	1984		T-2349
Sunday Lake,W.	SW							
Sunday Lake ,W.	32L/4SW	M.J. Labelle	Au	Assess.	GL,Gph		2.5796	T-2571
Sunday Lake,W.	32L/4SW	Northern Energy Corp.	Au	Assess.	DD-3-189m	1984		T-2485
			Au	Assess.	IP	1984	2.6887	T-2485
Sunday Lake,	32L/4SE	Westmin		Assess.	HLEM	1984	2.6790	T-2331
Lower Detour Lake	32E/13NE							
Swayze	410/15SE	Canico	Au	Assess.	GL	1983	2.6849	T-2446
Swayze	410/15SE	Troudor Resources	Au	assess.	GC	1984	2.7132	T-2545
Swayze,Denyes	410/15SE	Norminex	Au	Assess.	GL,Mag	1983	2.6594	T-2796
Swayze, Dore	410/15SE	Swayze Resources	Au	Assess.	GL,Rtr,Str	1983-84	2.6308	T-2784
Thomas	42A/7NW	LaFleche,G.	Au	Assess.	DD-1-361.5m	1983		T-2734
Thomas	42A/7NW	Noranda Exploration	Au	Assess.	Mag,A	1983	2.5439	T-1712
Thornloe	42A/5SE, .6SW	Comstate Resources	Au	Assess.	GL	1983-84	2.7250	T-2428
Thornloe	42A/5SE	Esso Minerals	Au	Assess.	GL	1984	2.7268	T-2890
				Assess.	Mag,HLEM	1984	2.7271	T-2890
Thornloe	42A/5SE, 6SW	Kerr Addison Mines Ltd.	Au	Assess.	Mag,VLF, DD-2-305.4m	1983	2.5592	T-2619
Timmins	42A/7SW	Guenther,P.	Au	Assess.	DD-1-53.3m	1983		T-2615
Tisdale	42A/6NE	Augdome Corp.	Au	OMEF	U/G DD-4-2861m	1982-83	63.4135 82-5P-8	T-2633
Tisdale	42A/11S	Labrador Mining	Au	Assess.	I.P.	1984	2.7358	T-2520
				Assess.	DD-1-122.8m	1984		T-2520
				Assess.	DD-1-198.7m	1984		T-2520
				Assess.	DD-1-49.7m	1982		T-2520
					GL	1981-84	2.7155	T-2520
Tisdale	42A/6NW	Meunier,D.	Au	Assess.	Str	1984		T-1861
Tisdale	42A/6NE	Newmont Exploration	Au	Assess.	GL	1984	2.6824	T-2741
				Assess.	DD-3-426.1m	1984		T-2740
				Assess.	Mag,VLF,HEM	1983-84	2.6374	T-2444
							2.7161	
				Assess.	Mag	1983	2.6054	T-2741
				Assess.	VLF	1983	2.6224	T-2747
				Assess.	GL	1983	2.5880	T-2740
Tisdale	42A/11SW	Pamour Porcupine Mines	Au	Assess.	Analyses,OVD-	1983	2.6696	T-2439
				Assess.	11-110.9m			
				Assess.	Str,Rtr	1984		T-2794
				Assess.	GL	1982	2.6481	T-2794
				Assess.	GC	1982	2.6482	T-1954

ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.

TABLE 3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Tisdale	42A/6NE	508825 Ontario Ltd.	Au, Ag	Assess.	Assays	1983	2.6960	T-1861
				Assess.	Str	1984		T-2556
Tooms	410/10NW	Quinterra/Highland Crow Resources	Au	Assess.	DD-3-457.2m	1983	2.5461	T-2493
				Assess.	Assays, GC	1982		T-2493
				Assess.	DD-1-228m	1983		T-2493
				Assess.	DD-1-109m	1983		T-2493
Tooms, Greenlaw Halcrow	410/15SW 10NW	Regal Petroleum	Au	Assess.	AMag, AVL, AEM	1984	2.7152	T-2878
				Assess.	Mag, VLF, HEM	1984		2.6702
Tomorrow Lake	42H/15NE	Dome Mines Ltd	Au	Assess.	Mag, VLF, HEM	1984	2.6702	T-2875
Traill	42I/4, H/13	Selco Inc.	Diamonds	Assess.	DD-1-114m	1982		T-2551
				Assess.	OVD-14-674.5m	1983		2.5503
Tully	42A/11NE	Cominco Ltd.		Assess.	OVD-11-287m	1984	2.6742	T-2750
				Assess.	OVD-11-287m	1984		2.6742
Tully	42I/11NE	Intex Mining		OMEF	Str, Rtr	1981	63.4099	T-1637
								81-5C-77
Tully	42A/11NE,	Kidd Creek Mines	BM	Assess.	AMag.	1984	2.7112	T-2448
Tully	42A/11NE	Whitestar Copper		Assess.	Assays	1983	2.6251	T-2386
Tully, Evelyn, Little	42A/11NE	Lacana Mining Corp.	Au	OMEF	Summary Rept.,	1983	82-5JV-70	T-1946
				Assess.	DDH-3-479.5m			
Turnbull	42A/5NE	Galore Gold Resources	Au	Assess.	DD-6-650m	1984		T-2874
				Assess.	Str, Assays	1983		2.6109
Turnbull	42A/12SE	555768 Ontario Ltd	Au	Assess.	Mag.	1984	2.7006	T-2871
Turnbull, Carscallen	42A/5NE	Rousseau, R.		Assess.	Man, Mech equip	1983		T-2616
				Assess.	DD-2-270.5	1982		
Valentine	41I/5SE	Selco (a division of BP)	Diamonds	Assess.	DD-2-270.5	1982		T-2408
Walls	42B/13NW, C/16NE	Falconbridge Ltd.		Assess.	DD-1-230m	1984	2.6737	T-2764
				Assess.	Mag	1983-84		T-2764
Wark	42A/11NE	Cominco Ltd.		Assess.	OVD-8-249.6m	1983	2.5786	T-2753
Wark, Murphy	42A/11E, 11W	Comstate Resources	Au	Assess.	GC, GI	1983-84	2.6314	T-2482
								2.7037
Whitesides, Carscallen	42A/5NE	Roy, J.	Au	Assess.	Assays	1983-84	2.6959	T-2889
Whitney	42A/11SE	Kidd Creek Mines	Au	Assess.	DD-2-593.3m	1983	NA	T-2312
	42A/11SE	Meunier, D.		Assess.	Assays	1981,-83	2.6117	T-2486
	42A/11SE	Omenica Resources	Au	OMEF	Summary Report	1981-82	63.4169	T-2869
	42A/11SE	Pamour Porcupine Mines	Au	Assess.	Mag., VLF	1983	2.5997	T-2818
	42A/11SE	Placer Development	Au	Assess.	GI, HEM, Mag, VLF	1983	2.5705	T-2491
	42A/11SE	Smith, R.	Au	Assess.	AMag, AEM, VLF	1983	2.6613	T-2884
Whitney, Tisdale	42A/6NE	Augdome Corp.	Au	OMEF	DD-22-4303.5m	1981	81-5-P87	T-2633
Yeo	41P/12SW	Johnway Resources	Au	Assess.	GL, Mech.	1984	2.7377	T-2383
		Kidd Creek Mines	Au	Assess.	DD-1-174.7m	1983		T-2771

Since production ceased in September, the mine has been on a care and maintenance basis. Production, development, and exploration work is expected to resume in the Spring of 1985 (Asarco Exploration Company of Canada Limited, personal communications, 1984).

In 1983, H.G.Q. Incorporated and Gail Resources Incorporated, private United States companies, optioned the former Carshaw Gold Property in Shaw Township from Gowganda Resources Incorporated. The company stockpiled approximately 120 000 tons of gold bearing material from an open pit and constructed a mill on site. Gold occurs within quartz stringers and sulphides within an oxide facies iron formation. The mill began to process stockpiled material in July 1984. The company acquired the neighbouring M M Porcupine Property and began a surface diamond drill program to evaluate the iron formation on that property. Most of the activity on both properties was curtailed in late 1984 (The Northern Miner, May 31, 1984; personal observations, 1984).

INDUSTRIAL MINERALS

Steetley Talc Limited is continuing a \$3.76 million expansion program started in 1982 at its Timmins operations. A grant of \$940 000 was obtained by the company from the Government of Ontario through the Board of Industrial Leadership and Development (BILD). The expansion, to be completed in 1985, consists of a series of small projects to bring the total talc production up to 36 000 tons per year. Due to excellent performance in production which was beyond expectations in 1984 and better market conditions, Steetley Talc will be expanding to 60 000 tons during 1985 and 1986. Operations in 1984 included open pit mining and stockpiling of 120 000 tons of ore during February, March, and April, an increase over the 1983 figure of 67 401 tons. In 1984, 30 000 tons of beneficiated talc was produced compared to 23 100 tons

in 1983. The ore is mined and the talc concentrated at the mine site in Penhorwood Township. The concentrate is trucked to the company's fine-grind plant in Timmins. The product is sold to the pulp and paper, paint, cosmetic, plastics, and rubber industries. Steetley Talc Limited presently employs 50 people at its Timmins operations. This is the same number as in 1983 (Steetley Talc Limited, personal communications, 1984).

PROPERTY EVALUATION AND DEVELOPMENT

Kidd Creek Mines Limited began an underground development project in the Summer of 1983 on the Hoyle Pond Gold Deposit. Discovered in 1980, this deposit is located just east of the Owl Creek Deposit in Hoyle Township. Development was started by driving a decline from surface to the 105 m level. In 1984, 1365 m of lateral development was completed, of this, 483 m was done driving the decline and the remainder consisted of driving cross-cuts and drifting on gold mineralization. A 159 m bored vent raise was driven to surface. A total of 6485 m of underground diamond drilling was completed at the project in 1984. In mid-November Kidd Creek began sending development material obtained from drifting on gold mineralization to Asarco Exploration Company of Canada Limited gold mill in Macklem Township. Fifteen thousand tons are planned to be processed in a little over 3 months. Recovered gold grades thus far are reported to be better than expected. By the end of 1984 the decline is expected to reach 145 m where another level will be started (Kidd Creek Mines Limited, personal communications, 1984).

St. Andrew Goldfields Limited, a subsidiary of Quebec Sturgeon River Mines Limited, continued the underground development program started in 1983 after a \$14 million equity financing. The deposit was discovered in 1973 with some underground exploration and development done in

1981. In 1984 the shaft was deepened from 665 to 884 feet (203 to 269 m). Lateral development was carried out on 4 levels. This includes 706 feet (215 m) on a sublevel between the first (200-foot) and second (325-foot) levels; 1862 feet (567.5 m) on the second level; 2340 feet (713 m) on the third (450-foot) level; and 2587 feet (788.5 m) on the fourth (575-foot) level. Underground diamond drilling, done on all levels, totaled 57 000 feet (17 374 m); 12 909 feet (3935 m) of surface diamond drilling was also done. At the time of this writing (December 1984) drifting is being done on the second level, cross-cutting on the fourth level, sublevel development between the first and second levels, and raising between the fourth and the third level. Surface and underground diamond drill programs are also in progress.

Gold mineralization at St. Andrew's property occurs in narrow quartz veins, veinlets, and stringers within an altered (sericitic and carbonatized) tholeiitic basalt. The tholeiitic basalt is surrounded by both carbonatized and talcose komatiites (St. Andrew Goldfields Limited, personal communications, 1984; personal observations, 1984).

Canamax Resources Incorporated has prepared for shaft sinking at its Bell Creek gold project in Hoyle Township. In 1984 the contracting company, Patrick Harrison Limited, completed the surface installation which included the headframe and service building. At the time of this writing (December 1984) the hoist is being certified. The shaft collar has also been completed. Development is to be done primarily on the A horizon of the North Zone. There are 4 gold zones on the property: the Bell Creek Zone, the Marlhill Zone, and the A and B horizons of the North Zone. Published reserves are only given for the A horizons of the North Zone. This figure is 526 000 tons at a grade of 0.21 ounce gold per ton. The shaft is to be sunk to a depth of 280 m with 4 stations being cut. Two levels are to be driven 750 feet (230 m) north from the shaft to the North

Zone passing by the Bell Creek Zone. Other work on the property in 1984 included the drilling of 5 diamond drill holes on the Marlhill Zone (Canamax Resources Incorporated, personal communication, 1984).

Getty Mines Limited and Davidson Tisdale Mines Limited made an agreement in early 1984 to evaluate the latter company's gold deposit in Tisdale Township. Getty can earn a 50% interest in the property by spending \$6 million, of which \$2 million must have been spent in 1984. Getty's 1984 program was well over that mark. This included over 40 000 feet (12 192 m) of diamond drilling. Vertical holes were drilled on a grid basis to outline shallow dipping quartz vein structures surrounded by carbonate alteration within a tholeiitic basalt. Drill indicated reserves to a depth of 650 feet (198 m) are 823 850 tons grading 0.36 ounce gold per ton. Potential exists for an additional 1.2 million tons of similar grade between 650 and 1675 feet (198 and 510.5 m). Another small deposit occurs on the property with reserves of 170 800 tons grading 0.33 ounce gold per ton. A decision will be made in early 1985 whether to evaluate the deposit by underground methods (Getty Mines Limited, personal communications, 1985; The Northern Miner, December 20, 1984).

Orofino Resources Limited did a minor amount of surface work on their gold deposit in Silk and Horwood Townships in 1984. The company published drill indicated reserve figures of 1.6 million tons grading 0.14 ounce gold per ton using a cut-off grade of 0.05 ounce gold per ton or 0.8 million tons at 0.21 ounce gold per ton using a cut-off grade of 0.11 ounce gold per ton. Orofino conducted a 10-hole, 3600-foot (1097 m) diamond drill program on the Tionaga Property in Horwood Township in 1984. A few narrow gold/silver intersections were obtained (Orofino Resources Limited, personal communications, 1984; The Northern Miner, June 21, 1984).

Diepdaume Mines Limited is keeping the underground workings of the old Preston East Dome Mine pumped out to the 600-foot level. Equipment has been installed to dewater the mine to a deeper level. The company has partially completed the mill with the crusher, ball mills, and fine ore bins being installed. Surface exploration including diamond drilling was done on a claim group south of the mine property in Deloro Township. Four holes were drilled to evaluate the property from underground at the Dome Mine (Diepdaume Mines Limited, personal communications, 1984).

Jerome Gold Mines Limited (formerly Osway Explorations Limited) has an agreement to purchase the old Jerome Gold Mine in Osway Township from Eddy Forest Products Limited for \$2 million. Jerome has made an agreement with Muscocho Explorations Limited to explore the property allowing the latter company to earn an interest. Drilling has started on the property with 2 machines. Ten thousand feet (3048 m) of drilling are scheduled to be completed before the end of 1984 (The Northern Miner, various articles, 1984).

Murgold Resources Incorporated drilled 19 holes (4560 feet (1390 m)) on its property in Chester Township in the Summer of 1984. Drilling was done on the extension of the old Strathmore vein and the extension of Kidd Creek Mines Limited's Chester Number Two Zone. A few gold intersections were obtained (Murgold Resources Incorporated, personal communications, 1984; The Northern Miner, August 2 and 23, 1984).

Heron Resources Limited drilled a total of 15 holes (5000 feet (1524 m)) on the old Kenty Property in Swayze Township. Drilling was mostly confined to testing known veins. A few geophysical and geochemical anomalies were also drilled. This latter drilling did not prove successful in locating new veins. Most of the drilling was between the old Number One and Number Two Shafts. A few narrow gold intersections

were obtained with the best value being 0.717 ounce gold per ton over 4 feet (1.2 m). The underground workings were dewatered and a sampling and mapping program was conducted. Results have not been published. A stripping and sampling program was carried out on a narrow (4 feet (1.2 m) wide) vein for 900 feet (274 m) east of Number Two Shaft. A few high grade gold assays were reported. Exposed veins are confined to narrow fractures. There is no evidence of extensive shearing. The wall rock is generally undeformed pillowed basalt with buff carbonate alteration immediately adjacent to the veins (personal observations, 1984; The Northern Miner, various articles, 1984).

Kidd Creek Mines Limited made an agreement with Pamour Porcupine Mines Limited to mine and mill the former company's Chester Number Two Zone gold deposit in Chester Township. Percussion drilling for sampling has taken place in late 1984, however, the project has been postponed until the Spring of 1985 (Pamour Porcupine Mines Limited, personal communications, 1984; The Northern Miner, October 18, 1984).

Canreos Minerals (1980) Limited optioned the Braminco Gold Property in Leeson and Brackin Townships. Canreos surface mined a 2943 pound (1338 kg) bulk sample grading 0.27 ounce gold per ton in early 1984 and shipped this to Noranda Incorporated's smelter in Quebec for flux testing. The company also sent 250 tons of material to Kidd Creek Mines Limited's copper smelter in Timmins. This sample assayed 0.32 ounce gold per ton. Canreos also conducted a diamond drill program to further explore the deposit. Seven holes totaling 3800 feet (1158 m) were drilled. The gold bearing quartz vein mined occurs in a granodiorite intrusive. Therefore, the material mined may have some potential of being good smelter flux with the gold being recovered in the refining process. Canreos also completed 6 short holes (1200 feet (366 m)) on the adjoining Nudulama Property

(personal observations 1984; The Northern Miner, various articles, 1984; Canreos Minerals Limited, personal communications, 1984).

EXPLORATION ACTIVITY

Exploration activity in the Timmins Resident Geologist area remained high in 1984 despite the low base metal prices and the falling price of gold. Emphasis was still placed on exploration for gold deposits with a few of the larger companies exploring for base metal deposits. Most of the activity centred in the Abitibi "Greenstone" Belt close to Timmins. The Swayze area still had a large amount of activity. Exploration in the Detour Lake area declined noticeably. Some of the projects carried out in the Timmins Resident Geologist's area during 1984 are briefly described here.

Kidd Creek Mines Limited, once again, had the most aggressive exploration program in the Timmins area in 1984 with programs in 32 townships. The interesting base metal intersections obtained on the Chance ground in Kidd Township in 1983 were followed up in 1984, but the results were disappointing.

Kidd Creek's base metal exploration drilling on properties within easy transportation distance of the company's metallurgical site was down 60% from 1983. In 1984, drilling included 5 holes (2953 m) in Kidd Township, 5 holes (1086 m) in Prosser Township, 3 holes (780 m) in Carnegie Township, and 1 hole each in Godfrey (479 m) and MacDiarmid (263 m) Townships. Overburden drilling in Kidd Township totaled 78 holes. Base metal exploration drilling for their regional program included 3 holes (440 m) in Cunningham Township and 2 holes (634 m) in Yeo Township. Nothing of significance was intersected. The regional program also included drilling 2 holes (237 m) for gold in Tooms Township and the evaluation of a felsic tuff unit in Churchill Township by drilling 2 holes (289 m).

Kidd Creek carried out an extensive gold exploration program locally with 4 diamond-drill holes (700 m) drilled in Tully Township, 3 diamond-drill holes (750 m) drilled in Ogden Township, 5 diamond-drill holes (1145 m) in Whitney Township, and 6 diamond-drill holes (2300 m) in Hoyle Township. The latter program was to explore for the westerly faulted extension of the Owl Creek ore zone. Overburden drilling was done in Lucas Township (92 holes), Prosser Township (8 holes), Matheson Township (57 holes), and Cody Township (28 holes) (Kidd Creek Mines Limited, personal communications, 1984).

Noranda Incorporated carried out an extensive program in both base metal and gold exploration in the Porcupine Mining Division in 1984. Base metal programs included: drilling of 8 diamond-drill holes in Loughed and Ossin Townships; reconnaissance work in Eisenhower Township; and drilling of 2 diamond-drill holes in Cochrane Township. Gold exploration programs included: an overburden drill program in Bond Township in a joint venture with Gowest Amalgamated Resources Limited; a large stripping, mapping, and sampling program which included 8 diamond-drill holes in the Hotstone Lake Property in Greenlaw Township with International Rhodes Resources Limited; 3 diamond-drill holes and a surface exploration program on the Holmer Gold Property in Bristol Township; and stripping on the Croxall option in Bristol Township. Noranda is also conducting a long term gold exploration program in Ogden and Deloro Townships on ground optioned from Canamax Resources Incorporated and the Desantis Mine property recently optioned from L. Bonhomme. Eleven diamond-drill holes were completed on this project in 1984 (Noranda Incorporated, personal communications, 1984).

Newmont Mines Limited continued on from their 1983 gold exploration program on their large group of optioned properties be-

tween the old Coniaurium Mine in Tisdale Township and the Pamour Number One Mine in Whitney Township. In 1984 the company completed 39 diamond-drill holes for a total of 26 962 feet (8218 m). Also, 767 basal till samples were taken by drilling 20 663 feet (6298 m) with a Wacker drill. Newmont plans to conduct more follow-up drilling in this area in 1985. At the beginning of 1984, Newmont also drilled 3 holes totaling 3000 feet (914.5 m) in Tully Township. The company is continually conducting a regional assessment of the Timmins area to develop more exploration projects (Newmont Mines Limited, personal communication, 1984).

Dome Exploration (Canada) Limited had an active gold exploration program in the Porcupine Mining Division during 1984. The company did over 20 000 feet (6096 m) of diamond drilling on their 4 properties in the Detour Lake area. Dome began narrowing down their program in Newton, Coppell, and Dale Townships by concentrating on stripping and doing an extensive induced polarization survey in Newton Township. These 3 privately held townships in the Swayze area are under option by Dome from Algoma-Talisman Minerals Limited. Dome conducted a 5000-foot (1524 m) diamond-drill program on the Wettlaufer-Herrick option in Hoyle Township just west of Canamax Resources Incorporated's Bell Creek Gold Deposit. No significant intersections were obtained. A total of 56 overburden holes were drilled by Dome in Bond Township. A geophysical program was completed in Bristol Township with drilling planned in 1985 (Dome Exploration (Canada) Limited, personal communications, 1984).

In late 1984, Canamax Resources Incorporated and affiliate company Bruneau Mining Corporation discovered a new gold zone in the northeastern corner of German Township on the optioned Clavos Porcupine Mines Property. Drilling intersected gold mineralization in 4 holes. This latest drill-

ing is located 1000 feet (305 m) west of the original Clavos Gold Zone in Stock Township. During the current program 2 holes were drilled to the east of the known zone with negligible results, and 3 holes were drilled into the Clavos Zone to test previous results. In other exploration Canamax drilled 2 holes (429 m) in another property in German Township and 3 holes (585 m), also in another property in Stock Township (Canamax Resources Incorporated, personal communications, 1984; The Northern Miner, December 13, 1984).

Chevron Canada Resources Limited, after establishing an office in Timmins in 1983, carried out ambitious program in both gold and base metal exploration. On ground optioned from Abitibi-Price Incorporated, Chevron's 1984 diamond drilling included: 4 holes (968 m) in Lennox Township, 1 hole (249 m) in Kingsmill Township for gold; and 6 holes (567 m) in Lucas Township, 2 holes (401 m) in Carnegie Township, 1 hole (130 m) in Crawford Township, and 1 hole (212 m) in Nesbitt Township for base metals. The company also drilled 2 holes (231 m) on its own ground in Foley Township. Twenty-eight overburden drill holes were drilled in Kingsmill Township and 12 in Mabee Township (Chevron Canada Resources Limited, personal communications, 1984).

Labmin Resources Limited (formerly Labrador Mining and Exploration Company Limited) drilled 2 holes on the Brown McDade Gold Property in Denton Township in 1984 to follow-up a gold intersection obtained in late 1983. Nothing of significance was intersected and the option was dropped. Two holes were drilled into a conductor in the northeastern corner of Tisdale Township intersecting graphitic argillites. Stripping, trenching, and sampling for gold were done in Neill Township, and Labmin conducted a small grass roots exploration program in Denton Township (Labmin Resources Limited, personal communications, 1984).

Canadian Nickel Company Limited (Canico), a wholly owned subsidiary of Inco Limited drilled a total of 17 short diamond-drill holes totaling 1536 feet (468 m) on the Burton Gold Property in Esther Township. Exploration on the property which started in 1983 will continue in 1985. The company also conducted a mapping and geophysical program in Swayze, Dore, and Denyes Townships. Four diamond-drill holes were drilled in Swayze, and 2 in Dore Townships, totaling 1985 feet (605 m) (Canico, personal communications, 1984).

Sulpetro Minerals Limited conducted a mapping, geophysical, and diamond drilling program on the south Rundle Gold Property in Swayze Township during 1984. The property is held under option from Labmin Resources Limited. Drilling consisted of 11 holes (1797 m) to test geophysical targets away from the Rundle Gold Deposit (Sulpetro Minerals Limited, personal communications, 1984).

Cominco Limited, as in 1983, spent \$800 000 in exploration in the Timmins area in 1984. The company carried out an induced polarization survey in German Township and drilled 250 overburden holes in Stock, German, Tully, Evelyn, and Matheson Townships. One diamond-drill hole (1106 feet (337 m)) was drilled in Evelyn Township. This hole was a follow-up to 3 holes drilled in 1983 to test bands of barren sulphide mineralization consisting primarily of pyrite located along the township's western boundary 4 miles (6.5 km) down from the north boundary (Cominco Limited, personal communications, 1984).

Westmin Resources Limited conducted geophysical surveys on their properties in the Detour Lake area. Two holes (475 m) were drilled in late 1984 on the company's property just east and along strike of the Detour Lake Mine to test 2 induced polarization anomalies. Two previously drilled holes were rebotomed by Westmin in Bond Township. Drilling there totaled 402 m (Westmin Resources

Limited, personal communications, 1984).

Pamour Porcupine Mines Limited conducted an overburden drill program and a diamond drill program which consisted of 11 holes on Night Hawk Lake in Macklem and Cody Townships in early 1984. The company also explored 2 properties in Tisdale Township (Pamour Porcupine Mines Limited, personal communications, 1984).

Placer Development Limited drilled 2 holes totaling approximately 600 m on ground optioned from Comstate Resources Limited in Deloro Township just west of the Delnite Mine. Exploration was also done by Placer on Comstate's properties in Tisdale and Whitney Townships (Comstate Resources Limited, personal communications, 1984).

Pominex Limited conducted 2 major diamond drill programs on the old Weststock Property in the northeastern corner of Macklem Township. Gold mineralization in a felsic horizon between mafic to intermediate rocks to the south and carbonatized ultramafic rocks to the north was evaluated. Various intersections of differing widths and gold grades were obtained. The gold mineralization occurs in very narrow fractures within the felsic rock and the attitude of the zone of fracturing was difficult to interpret (Pominex Limited, personal communications, 1984; The Northern Miner, various articles, 1984).

Falconbridge Limited conducted an extensive gold exploration program in Hawkins and Walls Townships which included a diamond drill program in early 1984, stripping during the summer and another diamond drill program which began in late 1984. The company also drilled 12 holes (5000 feet (1524 m)) in Heenan and Marion Townships to evaluate the gold potential of the Woman River Iron Range. Falconbridge began a 5000-foot (1524 m) drilling program in late 1984 in Whitney Township, just east of their old Hoyle Mine property (Falcon-

bridge Limited, personal communications, 1984).

Kerr Addison Mines Limited completed a 4 hole, 2500-foot (762 m) diamond drill program on the Karpovich option in Hoyle Township. An interface between a magnetic high and a magnetic low was the horizon being tested. Argillaceous sedimentary rocks and wackes were intersected, but no economic mineralization was found (Kerr Addison Mines Limited, personal communications, 1984).

Riocanex Incorporated conducted a 10-hole diamond drill program in Bristol Township in early 1984 (Riocanex Incorporated, personal communications, 1984).

Tanglewood Consolidated Resources Incorporated conducted a 5000-foot (1524 m) diamond drill program on the old Hiawatha Property in Lizar Township (personal observations, 1984).

Quinterra Resources Incorporated explored their properties in Tooms and Greenlaw Townships, Swayze and Cunningham Townships, and in Penhorwood Township (The Northern Miner, various articles, 1984).

Storiman Exploration Limited conducted a drilling program on the old Mining Corporation Property in Sewell Township which was optioned from Noranda Incorporated (Storiman Exploration Limited, personal communications, 1984).

Puissance Corporation conducted a large stripping program on the old Powell Property in Deloro Township. A diamond drill program was started in late 1984 and gold values were intersected in the first hole (personal observations, 1984; The Northern Miner, November 8, 1984).

Aside from those previously mentioned, companies conducting exploration programs in the Abitibi "Greenstone" Belt in the Timmins area are: Bigstone Minerals Limited (drilling a 5000-foot (1524 m) hole in Whitney Township); Comstate Resources Limited (Cody and

Macklem Townships); Diepdaume Mines Limited (Macklem Township); Esso Minerals Canada (Tisdale Township); Falcon Resources Incorporated (Ogden Township); Galore Gold Resources Incorporated (drilling in Turnbull Township); Getty Mines Limited (Carscallen Township); Golden Range Resources Incorporated (drilling in Wark and Prosser Townships); Gowganda Resources Incorporated (Matheson Township); Lac Minerals (Langmuir Township); Melrose Resources Limited (Cleaver Township); Selco Incorporated (Mann, McCart, Reaume, Newmarker, Duff, and Little Townships); and Utah Mines Limited (MacDiarmid and Bristol Townships).

Other companies not previously mentioned as working in the Swayze area include: Adeline International Mines (5000-foot (1524 m) drill program in Mallard Township); Collingwood Energy Incorporated (drilling in Greenlaw Township); Jarvis Resources Limited (drilling in Chester Township); J-Dex Mining and Exploration Limited (Denves Township); Kenty Resources Limited (drilling in Rollo and Swayze Townships); Micham Exploration Incorporated (Halcrow Township); Regal Petroleum Limited (Halcrow, Tooms, Greenlaw Townships); and Swayze Resources Limited (Swayze and Dore Townships).

A number of junior resource companies are reported to be exploring in the Detour Lake area. Among those which reported drilling on their properties are: Genesis Resources Corporation, Northern Energy Corporation, and Petromet Resources Limited. The other companies exploring include: Canfic Resources Limited, Duration Mines Limited, Global Energy Corporation, and Kenar Resources Limited.

Companies not already mentioned exploring the western extension of the Wawa "Greenstone" Belt which extends into the Porcupine Mining Division include: The Coniagas Mines Limited (drilling in Leeson Township on the Anglo Dominion Property); Aurelian De-

velopers Limited (Brackin Township); and Jedburgh Resources Limited (Brackin Township) (personal communications, 1984; assessment files; various articles in The Northern Miner and the George Cross News Letter, 1984).

ONTARIO GEOLOGICAL SURVEY ACTIVITIES

In 1984, there were no Precambrian Geology Section programs undertaken in the Timmins Resident Geologist area. However, several of the other sections of the Ontario Geological Survey were active in the area.

ENGINEERING AND TERRAIN GEOLOGY SECTION

As part of the Hydrocarbon Energy Resources Program (HERP), Watts, Griffis and McOuat Limited, under contract to the Ontario Geological Survey, continued as assessment of the lignite resource potential of the James Bay Lowlands. The 1984 Winter drilling program consisted of the drilling of 11 holes followed by sedimentological, palynological, and geochemical studies. Lignite was discovered in only 1 drillhole in the northwestern corner of McBrien Township. Results and details of the procedures of the program were released as Open File Report 5511.

P.G. Telford and D.J. Russell began an assessment of the oil shale potential of the Long Rapids Formation, Moose River Basin, and the James Bay Lowlands. Field work in late 1984 involved the mapping and measurement of stratigraphic sections near William's Island (Hydrocarbon Energy Resources Program).

Also as part of the Hydrocarbon Energy Program, the Peatland Inventory Project was developed under the supervision of J.L. Riley, Engineering Terrain Geology Section. In 1984, Peatland Inventory III, which included study sites in the Cochrane, Kapuskasing, and Timmins areas, was initiated. Details of procedures and results of the program are to be released as an Open File Report in 1985.

As part of the Black River-Matheson Program (BRIM), J.M. Richard completed Quaternary mapping of the Porquis Junction and Watabeag River areas. Maps of these areas will be published in late 1985.

In cooperation with the Geophysics/Geochemistry Section, and as part of the Black River-Matheson Project, J.A.C. Fortescue and C. Baker conducted a basal till geochemistry project. Sampling involved the use of both backhoe and sonic drilling methods. Geochemical results and logs of the drillholes will be released in an Open File Report in 1985. Map P.2736 (Location of Gold Grains in Sonic Drill Samples from the Matheson Area) was released in December 1984, indicating some of the results of the program.

GEOPHYSICS/GEOCHEMISTRY SECTION

In addition to the above program and also as part of the Black River-Matheson Project (BRIM), a Mark VI INPUT system survey was released in May 1984. The survey covered the entire BRIM study area including 4 townships in the Timmins Resident Geologist area (Clergue, Stock, Bond, and Sheraton Townships). During 1984, studies on the Night Hawk Geophysical Test Range were continued.

MINERAL DEPOSITS SECTION

As part of the BRIM program, an examination of gold, metallic minerals, and industrial minerals was initiated. Clergue, Stock, Bond, and Sheraton Townships are included in the study area.

S. Marmont continued to work on applications of age dating to gold mineralization, and also began detailed mapping in the De-tour Lake area.

One M.Sc. and one Ph.D. program were ongoing in the Timmins area during 1984 with partial support from the Ontario Geological Survey.

P.C. Wood continued investigation into the controls of gold and tungsten (scheelite) mineralization in the Hollinger-McIntyre Vein System.

D.R. Burrows began a mapping and sampling program of the Pearl Lake porphyry and late albite dikes at the Pamour Porcupine Mines Schumacher Division (McIntyre).

ONTARIO GEOSCIENCE RESEARCH GRANTS PROGRAM

During 1984 and 1985, grant recipients with a project directly related to the Porcupine Mining Division were:

W.S. Fyfe, University of Western Ontario:

Grant 134, Stratigraphy and Geochemistry of Northern Ontario Carbonaceous Deposits: Onakawana Lignite and James Bay Peats.

D.W. Strangway, University of Toronto:

Grant 118, Surface Electromagnetic Mapping in Selected Positions in Northern Ontario.

ONTARIO MINERAL EXPLORATION PROGRAM (OMEP)

The Ontario Mineral Exploration Program was created in 1980 to provide incentives to encourage mineral exploration in Ontario. These incentives are in the form of tax grants and credits to cover part of the risk capital. In 1984, 50 programs in the Porcupine Mining Division were designated for OMEP assistance. Total budgeting expenditures amounted to \$16 709 805. Of this total, \$12 898 542 are expenditures eligible for the OMEP program. OMEP tax/grant credit assistance for the Porcupine Mining Division for the 1984 time period will be \$3 224 639.

Kirkland Lake Resident Geologist Area, Northern Region

Howard Lovell¹, Gary Grabowski², and David Guindon³

¹Resident Geologist, ²Resource Geologist, ³Core Library Geologist, Ontario Ministry of Natural Resources, Kirkland Lake

INTRODUCTION

The Kirkland Lake Resident Geologist Area coincides with the Larder Lake Mining Division. "Days" of assessment work credit assigned from January 1 to November 30, 1984, number 402 820, the most in the history of the Larder Lake Mining Division (see Table 1). Active claims (Figure 1) were 21 169, the second highest in history, superceded only in 1964, the peak year resulting from Texas Gulf Sulphur Company's Kidd Creek Zn, Cu, Ag, Pb discovery. According to Gartley (1984), for the townships that comprise the Kirkland Lake Resident Geologist Area, the most recently available expenditures (1983) for "outside and general exploration" were \$4 784 656; "mine and on-property exploration" were \$3 019 142; and "mine and on-property development" were \$15 980 033, about 14% of the Ontario total. The 1982 (the most recent available) total value of production (including iron pellets, gold, silver, barite, and serpentine filler) was \$144 137 656 (Weatherson 1984). Thus mineral

resources revenues in the Kirkland Lake Resident Geologist Area for a single 12-month period are estimated to total upwards of \$170 million.

The Bear Island Indian Caution in 1978 prevented the recording of mining claims consequently stopping most exploration work and any possible ensuing production in an area comprising 1/4 of the Larder Lake Mining Division.

RESIDENT GEOLOGIST STAFF ACTIVITIES

Permanent staff totals 3: Howard Lovell, Resident Geologist; Gary Grabowski, Resource Geologist; and F.M. Boucher, Secretary. Geological Assistant T. Beckett worked a 9-month contract. Various periods of assistance were provided (through the Canada Works Program) by P. Mills, P. Prieur, and T. Morgan. Clerical assistance was provided for various periods of time by P. Savarie, L. Brousseau, and C. Francoeur.

The Black River-Matheson Project (BRIM), for the latter half

of 1984, engaged Economic Geologist Alex Bath, Geological Assistant N. Cox, and Data Folio Geologist K. Kalicharran.

Activities of the Resident Geologist Office included:

1. responding to a record 2700 inquiries from exploration, mining, and government personnel, and the general public
2. preparing 22 reports on mineral property examinations, diamond drill core (logs), field trips, and technical papers
3. guiding 8 geological field trips to the Kirkland Lake-Larder Lake area gold occurrences for the Geological Association of Canada-Mineralogical Association of Canada (GAC/MAC), groups of mineral explorationists, government, university, and foreign geologists, and 3 Ontario Ministry of Natural Resources Junior Ranger camps
4. responding to Road Proposals and Forest Management Agreements, Mining Rights Withdrawals, Mining Hazards, Lands, and Reviews, etc.

SUMMARY OF CLAIMS RECORDED AND ASSESSMENT WORK CREDIT

TABLE 1

Year	Claims Recorded	Claims Cancelled	Claims Active	Diamond Drilling (Man Days)	Geophysical Surveys (Man Days)	Geological Surveys (Man Days)	Total Man Days
1984*	7,699	4,476	21,169	85,423	224,051	30,433	402,064
1983	8,354	3,866	17,946	121,213	98,366	15,233	304,770
1982	3,253	5,218	13,458	99,526	133,511	17,926	313,690
1981	5,498	2,697	15,423	69,906	125,459	19,536	247,087
1980	6,299	1,834	12,622	64,454	115,031	10,981	209,35
1979	4,261	1,452	8,157	29,714	25,352	4,990	68,763
1978	1,710	2,065	5,248	32,602	38,100	8,887	87,144
1977	1,826	2,334	5,703	37,101	45,436	1,820	98,992
1976	2,350	2,979	6,712	47,724	42,338	6,220	102,936
1975	2,916	5,010	7,341	45,880	38,047	6,738	98,624
1974	4,757	2,296	9,435	40,678	55,716	4,441	110,165
1973	3,260	3,214	6,974	34,113	35,811	8,150	92,616
1972	3,253	4,740	6,781	39,371	52,351	3,358	106,026
1971	4,065	3,846	8,268	29,433	48,785	4,764	96,047
1970	4,315	3,704	8,049	25,683	28,683	4,133	73,157
1969	3,404	5,273	7,438	50,892	45,713	15,829	130,185
1968	4,171	7,909	9,307	74,649	82,637	5,799	180,437
1967	5,450	7,341	13,045	79,172	29,073	4,032	143,600
1966	7,606	11,101	14,936	117,544	30,971	8,050	182,352
1965	9,331	6,906	18,431	123,129	88,259	6,530	257,029
1964	12,842	3,884	22,912	77,807	32,644	11,705	149,198
1963	4,710	3,895	13,954	95,696	16,241	4,226	138,627
1962	4,675	4,028	13,139	63,003	5,494	5,099	97,219
1961	3,749	4,451	12,492	47,862	5,494	1,118	79,219
1960	5,024	6,747	13,194	75,123	7,296	4,751	104,632
1959	6,419	5,594	14,917	22,947	3,792	1,404	80,322
1958	8,582	7,108	14,902	37,381	7,481	1,941	66,783
1957	4,664	8,212	12,618	95,934	12,593	3,948	138,891
1956	9,673	3,594	16,166	77,879	20,982	6,693	130,894
1955	4,182	3,999	10,087	75,561	3,389	3,529	105,925

* to Nov. 30

Note: 1955 to 1967 includes Larder Lake, Montreal River and Timiskaming Mining Divisions

5. filing for ready retrieval the assessment work representing an all-time record 402 064 "man-days"

6. preparing a complete up-to-date roads map of the Larder Lake Mining Division (scale 1:253 440 or 1 inch to 4 miles), which the public can whiteprint at the Mineral Resources Office, 4 Government Road East, Kirkland Lake

7. attending 10 Canadian Institute of Mining and Metallurgy symposia, local executive and local branch meetings at Kirkland Lake, Cobalt, Val d'Or, Chibougamau, Timmins, and Sudbury.

DRILL CORE STORAGE LIBRARY

The Drill Core Storage Library (Lithotheque) for the Larder Lake Mining Division was officially opened on June 18, 1984. Drill core collected previously has now been moved into the library and catalogued. At present, 87 216 m of core are stored, representing 129 811 m of drilling.

In 1984, approximately 42 000 m of drill core were collected, catalogued, and stored. Figure 2 shows the location of the drillholes from which the core has been stored in the library. Table 5 lists a summary of core stored for each township, by company.

All drillholes have been plotted on mylar township maps, at the same scale as township mining claims maps. Drillhole data has been entered and stored on an Apple IIe microcomputer, using dBase-II. At present, data searches may be done using the following parameters: township, company, alternate name, and NTS. Other types of searches can be done on request, i.e. UTM or multiparameter.

Core logs for the majority of drillholes stored are available at the Core Library. A complete set of the corresponding assessment files is not stored at the Core Library, but is available at the Resident Geologist Office. By early 1985, it is hoped that all drill logs filed at the Resident Geologist Office will be referenced to the ap-

propriate core stored at the Core Library.

Assistance at the Core Library was provided by F. Kiernicki, Geological Assistant; S. Price, Labourer; J. McCammon, A. Charbonneau, A. Akulick, P. Altenbec, D. Bruce, G. Fitzgerald, M. Shortt, and D. Barbeau, Mining Sector Works Program; and G. Santia, P. Alexander, and B. Levesque, Canada Student Works Program.

The Core Library is located west of Kirkland Lake, on the southern side of Highway 66, at the Ontario Ministry of Natural Resources District Office. Persons wishing to examine or donate core should telephone (705) 642-3222, Ext 42, or write to:

Drill Core Library
Ontario Ministry of Natural Resources
P.O. Box 129
Swastika, Ontario
POK 1T0

OPERATION BLACK RIVER – MATHESON (BRIM)

Alexander Bath

Economic Geologist, Ontario Ministry of Natural Resources, Kirkland Lake.

INTRODUCTION

Operation Black River Matheson (BRIM) is an integrated, multi-disciplinary program focused on a 40-township block extending from Night Hawk Lake eastward to the Ontario-Quebec interprovincial boundary (Figure 3). Funded equally by the Ontario Ministry of Northern Affairs and the Ontario Ministry of Natural Resources, the program has been designed to stimulate the economy of Northern Ontario in the long term, via mineral exploration incentives provided through the development of a comprehensive exploration database, which ideally will contribute to the discovery of mines in the area. The goals of the 5-year program (in its second year) will be realized through contributions from the Geophysics/Geochemistry, Precambrian, Mineral Deposits, and Engineering and Terrain Geology

Sections of the Ontario Geological Survey and the Kirkland Lake and Timmins Resident Geologist Offices.

GENERAL GEOLOGY

The Black River-Matheson area is located in the Superior Province of the Canadian Shield and is underlain by Early Precambrian (Archean) metamorphosed supra-crustal and plutonic rocks of the Abitibi "Greenstone Belt". Middle Precambrian (Huronian) sedimentary rocks unconformably overlie the Early Precambrian rocks in 1 part of the area. Overburden, consisting primarily of Pleistocene tills, esker deltaic sands, and varved clays, is present over large portions of the bedrock surface.

The local geology is dominated by low metamorphic rank (subgreenschist to greenschist facies) volcanic and sedimentary rocks, which have been intruded by ultramafic to felsic sills, stocks, and batholiths and volumetrically minor diabase dikes. Two major faults traverse the area in an easterly regional trend, the Porcupine-Destor "break" and the Pipestone Fault. The Porcupine-Destor "Break" is a complex fault zone which constitutes a major structural and lithologic discontinuity over much of its extent within the area.

Recent mapping in this portion of the Abitibi Belt (Jensen and Langford 1983; Jensen 1978) indicate that the volcanic stratigraphy of the belt may be subdivided into a series of volcanic cycles, each of which is characterized by lower, middle, and upper portions of dominantly komatiitic, dominantly tholeiitic, and dominantly calcalkalic affinity, respectively. In a regional sense, local lithologies corresponding to the upper portion of volcanic cycle II (the Hunter Mine Group) and the lower (Stoughton-Roquemaure Group), middle (Kinojevis Group), and upper (Blake River Group and the Destor-Porcupine Complex) portions of volcanic cycle III are present in the area.

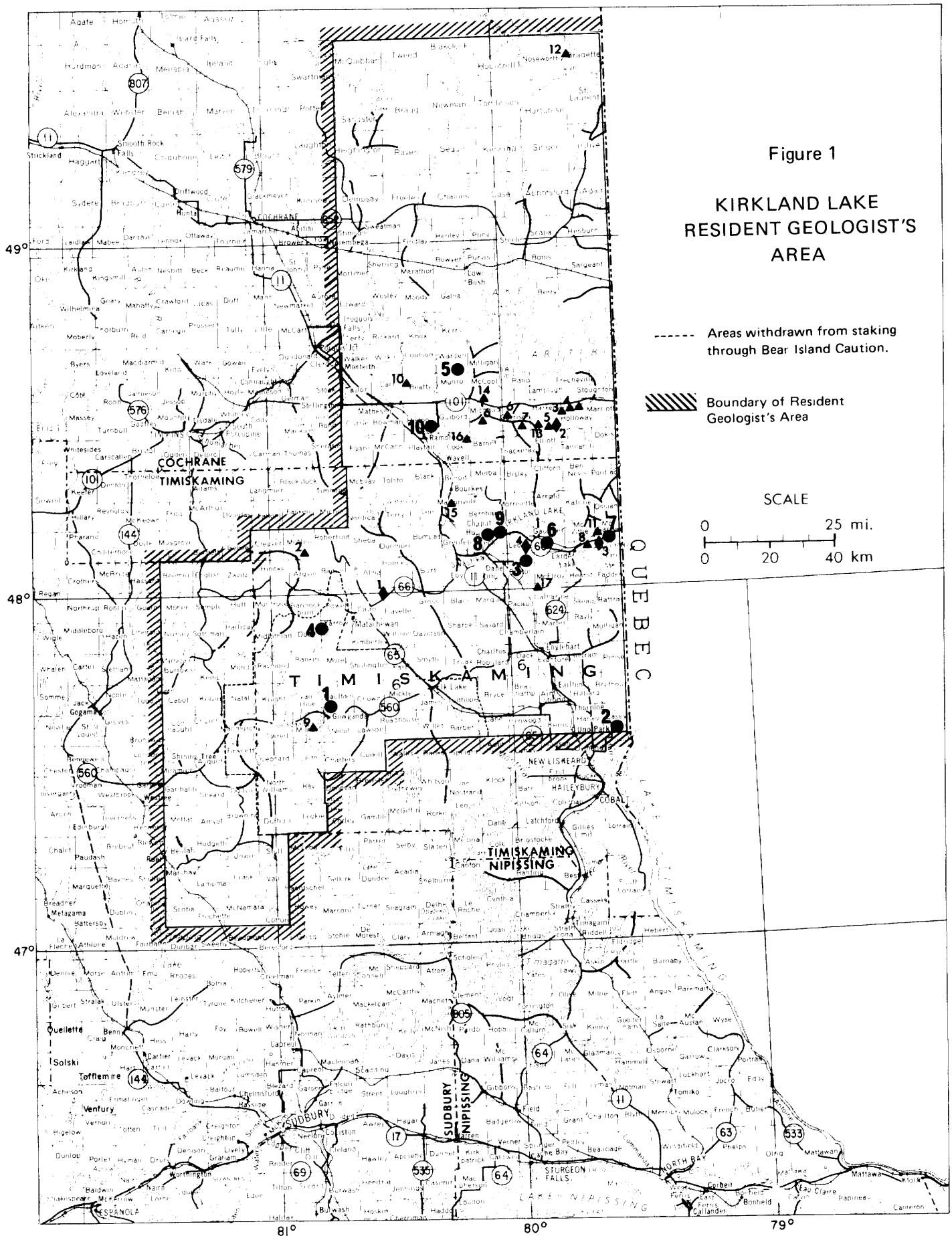


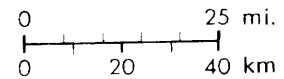
Figure 1

**KIRKLAND LAKE
RESIDENT GEOLOGIST'S
AREA**

----- Areas withdrawn from staking through Bear Island Caution.

▨ Boundary of Resident Geologist's Area

SCALE



● Producing Mines

1. Agnico-Eagle Mines Limited
Castle-Tretheway Mine Ag, Co
2. Agnico-Eagle Mines Limited
Langis Mine Ag, Co
3. Dominion Foundaries and Steel Company Limited
Cliffs of Canada Limited
Adams Mine Fe
4. Extender Minerals of Canada Limited Barite
5. Hedman Resources Limited Serpentine Filler
6. Inco Limited - Queenstone Gold Mines Limited
McBean Mine Au, Ag
7. Kerr Addison Mines Limited Au, Ag
8. Lac Minerals Limited
Macassa Mine Au, Ag
9. Lake Shore Mines Limited Au, Ag
10. Pamour Porcupine Mines Limited
Ross Mine Au, Ag, Cu

▲ Properties Under Major Evaluation

1. Argentex Resource Exploration Corporation Au
2. Argyle Ventures Incorporated Au
3. Barrick Resources Corporation Au
4. Canamax Resources Incorporated Au
5. Discovery Mines Limited - Lenora Explorations Limited
Golden Harker Property Au
6. Falconbridge Limited Au
7. Kerr Addison Mines Limited Au
8. Larder Resources Incorporated - Eldor Resources Ltd. . . Au
9. Manridge Explorations Limited Ag
10. Maude Lake Gold Mines Limited Au
11. McGarry Resources Limited Au
12. Newmont Exploration of Canada Limited Au, BM
13. Perrex Resources Incorporated Au
14. Placer Development Limited Au
15. Pryme Energy Resources Limited Au, Zn
16. St. Joe Canada Incorporated Au
17. Shenandoah Resources Limited Au

◆ Property Visits

1. CMB Holdings Gold Occurrence
2. Golden Harker Explorations Limited Gold Prospect
3. Sheldon-Larder Mines Limited Gold Prospect
4. T. & W. Sullivan and W. Cooper Gold Occurrence

TABLE 2. MAPS AND REPORTS PERTAINING TO THE KIRKLAND LAKE RESIDENT GEOLOGIST AREA PUBLISHED DURING 1984 BY THE ONTARIO GEOLOGICAL SURVEY, MINISTRY OF NATURAL RESOURCES

Ontario Geological Survey Reports Report 231	80587 80588 80589 80590	Miscellaneous Reports MP 120 MP 121 MP 117 MP 77 MP 119	OFR 5503 OFR 5504 OFR 5505 OFR 5506 OFR 5508 OFR 5510 OFR 5520 OFR 5523 OFR 5524 OFR 5526
Preliminary Maps - Geological Series P.2700 P.2736	80591 80593 80594 80595 80596 80597	General Index Volume 8 General Index Volume 9 Video Census Number 3	
Maps - Geophysical/Geochemical Series	80598 80599 80600 80601 80603 80604 80605 80606 80607 80608 80609 80610 80611 80714	Open File Reports OFR 5404 OFR 5470 OFR 5480 OFR 5481 OFR 5485 OFR 5586 OFR 5500 OFR 5501 OFR 5502	Mineral Resources Branch Publications MPBP 17 IMBP 5
80573 80574 80575 80576 80577 80578 80579 80580 80581 80582 80583 80584 80585 80586			Coloured Maps MAP 2470 MAP 2484

ONGOING ACTIVITIES

On May 17, 1984, the Ontario Ministry of Natural Resources released the results of an airborne electromagnetic (modified "high power" Mark VI Input System) and magnetic (total intensity) survey of the BRIM area. A total of 18 747 line km of data were collected at a terrain clearance of 122 m, using a flight line separation of 200 m. The results of the survey are available as a set of 80 maps (2 for each township in the BRIM area, 1 each at a scale of 1:20 000 and 1:31 680 (OGS 1984); as 2 colour contour maps (scale 1:80 000) of the airborne magnetic data, and as digitized data on magnetic tape). Survey flight records on microfilm are available for viewing at the Resident Geologist Offices in Kirkland Lake and Timmins, at the Larder Lake Mining Division Core Storage Library in Swastika, and through D.H. Pitcher, Geophysics/Geochemistry Section, Ontario Geological Survey, Toronto.

Geophysicists at the Ontario Geological Survey (OGS) have developed a ground method of geophysical overburden sounding based on recent activities in the Matheson area (Krentz and Barlow 1984). Related work using data derived from the 1984 BRIM airborne electromagnetic survey has allowed qualitative estimates of the nature and areal extent of overburden conductivities to be made on a regional scale (Pitcher *et al.* 1984). Such estimates may be of use in conjunction with other information (e.g. surficial geology data) in establishing bedrock topographic trends (Pitcher *et al.* 1984; Baker and Steele 1984).

The Geophysics/Geochemistry Section of the OGS have been conducting a regional gravity survey in northern Ontario which will include the southern half of the BRIM area. Average station spacing is expected to be 2 to 3 km, and the final map is anticipated to be published at the scale 1:100 000, with a release date possibly as early as late 1985.

The Engineering and Terrain Geology Section (OGS) have been mapping the surficial geology of the BRIM area (Vagners 1983; Baker *et al.* 1982; Baker *et al.* 1980; Baker 1980). Expected to be available in 1985 are 1:50 000 scale maps of the surficial geology of both the Matheson and the Lightning River areas. Results of Quaternary geology mapping in the Watabeag River and Porquis Junction areas are expected to be available by late 1985. With the publishing of these maps, the entire surficial geology of the BRIM area shall have been mapped at the scale of 1:50 000.

The Precambrian Geology Section (OGS) Survey have been mapping the bedrock geology of the BRIM area during the past several seasons (Jensen and Langford 1983; Jensen 1982a, 1982b; Trowell and Johnstone 1983; Trowell 1982).

Maps of the Precambrian geology of the Ramore area at scales of both 1:20 000 and 1:63 360 and of

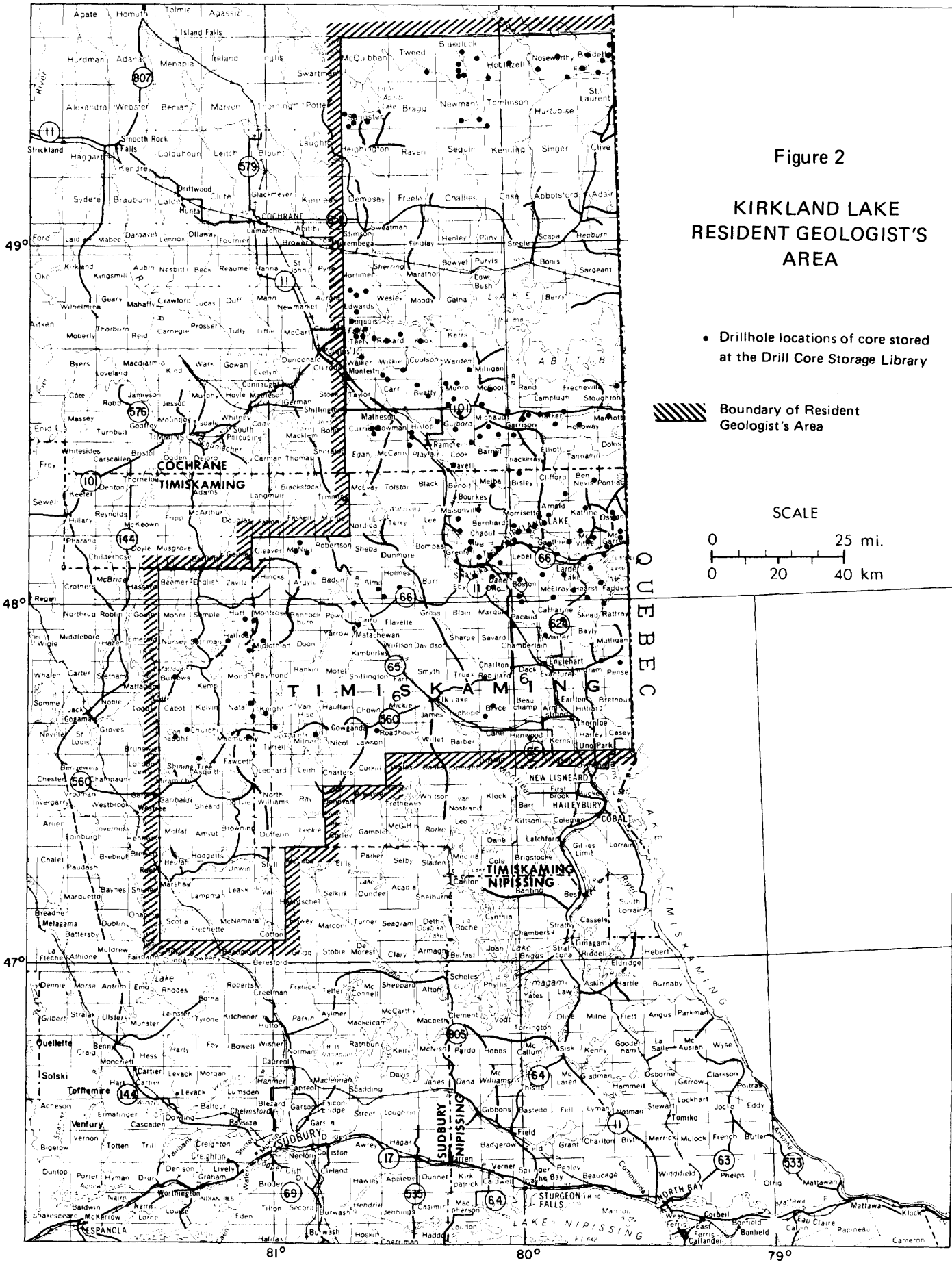


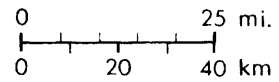
Figure 2

KIRKLAND LAKE
RESIDENT GEOLOGIST'S
AREA

• Drillhole locations of core stored
at the Drill Core Storage Library

▨ Boundary of Resident
Geologist's Area

SCALE



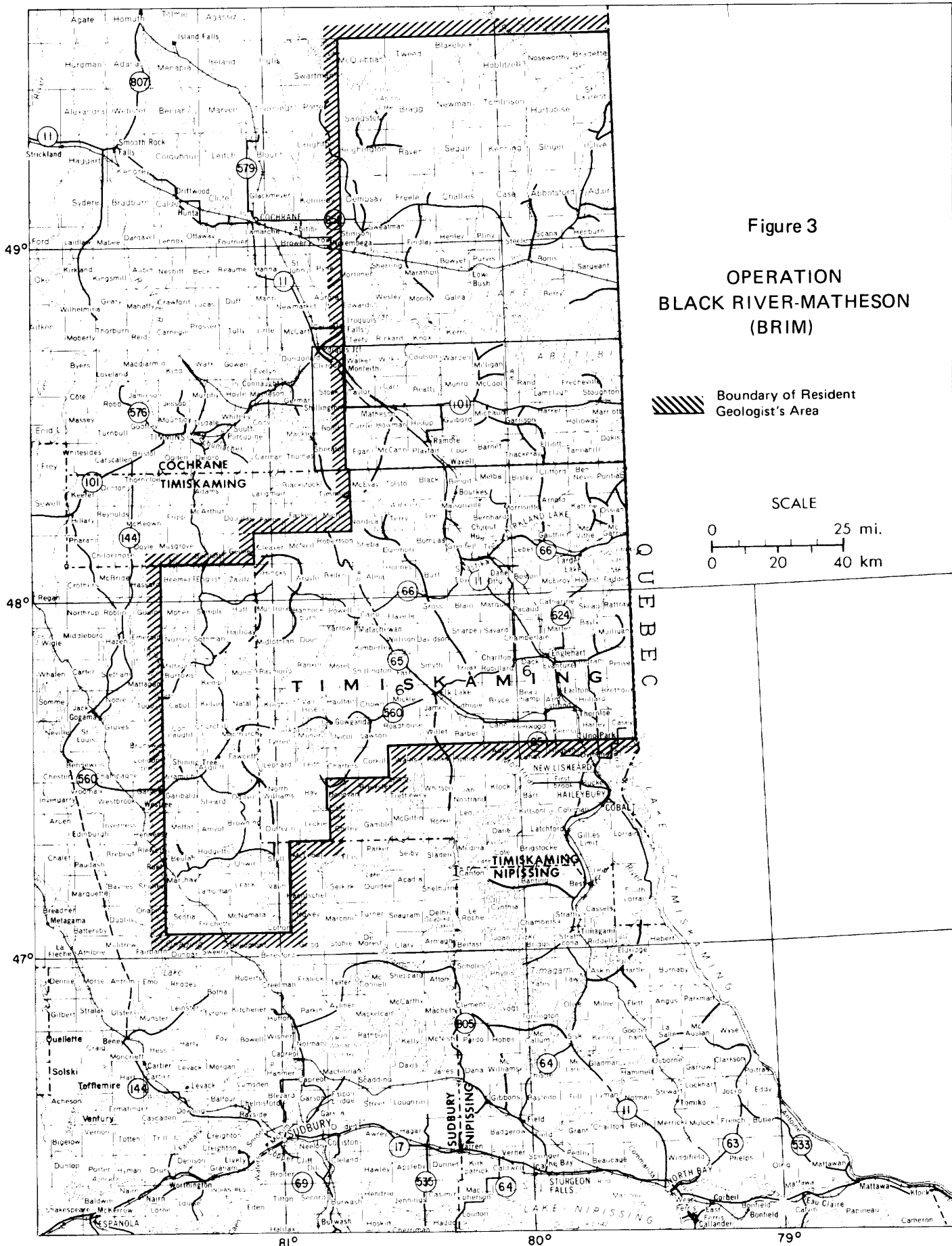

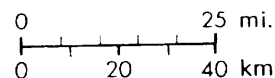


Figure 3

OPERATION
BLACK RIVER-MATHESON
(BRIM)

 Boundary of Resident Geologist's Area

SCALE



both Beatty and Munro Townships at a scale of 1:63 360 are expected to be available in 1985. Field mapping of Stock, Carr, and Taylor Townships has been completed; bedrock geology maps of these areas should be available in the near future.

During the Fall of 1984 the Ontario Geological Survey completed a trenching and sonic overburden drilling program in the westernmost block of 16 townships in the BRIM area. The presence of extensive, and in places complex, overburden thicknesses over much of the area presents a major obstacle to exploration, therefore a concerted effort was begun to characterize the nature of this overburden. With data provided by OGS field staff, optimal drillhole locations were established and 42 drillholes were sonic overburden drilled. An attempt was made at each location to penetrate about 1.6 m into bedrock to obtain information on bedrock geology. Each core is to be analyzed in terms of Quaternary stratigraphy, industrial mineral potential, geochemical and heavy mineral analysis (including gold grain distributions) of till and glaciofluvial samples, and bedrock geology. Data pertaining to gold grain distributions in drill core samples were released in December, 1984 (Baker *et al.* 1984); selected portions of the core are expected to be available for public examination in 1985 at both the Larder Lake Mining Division and the Porcupine Mining Division Core Storage Libraries, in Swastika and Timmins respectively.

The Mineral Deposits Section (OGS) initiated a series of deposit studies in the BRIM area during the 1984 field season designed to fit the precious metal, base metal, and industrial mineral potential of the area into a regional metallogenetic framework. Emphasis to date has been on gold mineralization (Whittaker 1984; Whittaker and Malczak 1984). Plans for future work tentatively include detailed field mapping in the Holloway, Barker and Munro Township areas as well as statistical ana-

lysis of mineralization characteristics observed in the area.

Compilation of Geological Data Inventory Folios (GDIFs) for selected townships in the BRIM area was initiated in 1984 by K. Kalicharran with assistance from N. Cox. GDIFs for Beatty, Bowman, Carr, Currie, Frecheville, Harker, Holloway, Lamplugh, Marriott, Munro, Stoughton, and Taylor Townships are expected to be published in 1985.

As of November 30, 1984, 21 632 m of diamond drill core from 240 holes representing 34 423 m of drilling in the BRIM area have been catalogued and stored and are available for examination in the Larder Lake and Porcupine Mining Division Core Storage Libraries. This core represents a valuable resource with direct application to both exploration and research. Excellent examination facilities exist at both libraries; the core samples are available for analysis and/or assay as well as visual examinations.

As part of Operation Black River-Matheson, an economic geologist has been based in Kirkland Lake to encourage exploration activity in the BRIM area at the local level by being available to all members of the exploration community as a source of exploration-related information and advice. Efforts of the economic geologist are directed primarily toward the mining and exploration industries and the prospecting community in order to promote activity in the BRIM area, to catalyze the property-optioning process, to interface between the public and private sectors, and in general to provide services that facilitate exploration in the area. Specifically, the economic geologist is available to 1) assist local prospectors with property visits, advice, and assessment file searches; 2) document new mineral occurrences in the BRIM area; 3) compile all available data relevant to exploration in the area; and 4) help "orient" new workers or potential new workers to the area. A long term goal of the program is the compilation of a comprehensive, locally accessible

database for the BRIM area. Direct benefits include increased availability of exploration data and an improved data retrieval system resulting in reduced cost to the exploration community.

The latter half of 1984 was spent becoming familiar with the geology and mineral deposits of the BRIM area by means of field work, research compilation, and developing a contact network. In addition:

- A list of approximately 70 names and addresses of prospectors and mining and exploration companies active in the area has been compiled.
- Compilation maps at the scale 1:100 000 indicating road access, preliminary geological map, geological map, and out-of-print map coverage and mineralization have been generated. These maps are suitable for presentations, and whiteprint copies will be available to the public.
- The creation of reference files on each township containing relevant maps, reports, property evaluations, claim status, etc. is well underway.
- Remote sensing imagery of the BRIM and Kirkland Lake areas has been obtained to complement existing coverage available at the office of the Kirkland Lake Resident Geologist.
- As of November 30, 1984, more than 500 key-word cross-referenced literature articles pertinent to the mineral potential of the BRIM area have been stored on floppy disks accessible via the Apple IIe computer; software is available in the Larder Lake and Porcupine Mining Division Core Storage Libraries.
- Development work has commenced on a computer-based exploration database system with support software. This package will be developed using existing computer capabilities at the Larder Lake Mining Division Core Storage Library. When complete, the system will allow the user to perform a wide variety of multiple parameter searches on any geo-

graphic subdivision of the BRIM region to access information currently available at the offices of the Resident Geologist in Kirkland Lake and Timmins, the 2 Mining Division Drill Core Storage Libraries, and in Ontario Geological Survey Databases in Toronto. The system will feature user-friendly, menu-driven software, and ultimately will be capable of being run on computer facilities available at the Kirkland Lake Resident Geologist Office.

ECONOMIC POTENTIAL

The Black River-Matheson area's potential to host economic gold mineralization is excellent. Historically, substantial exploration for gold has been concentrated along both the Porcupine-Destor and Pipestone Fault zones, where auriferous quartz-carbonate veins and stringers typically are hosted by various carbonate, sericite, chlorite, talc, and serpentine-bearing schists. The gold occurs both in its native state and associated with pyrite. Associated ore minerals may include arsenopyrite, chalcopyrite, and galena (Resident Geologist Files, Ontario Ministry of Natural Resources, Kirkland Lake). Similarly, much activity has been directed toward locating auriferous quartz-carbonate veins associated with intrusive felsic stocks. Such mineralization may occur either internally or externally to the associated felsic intrusive body and it may be accompanied by silicification, pyritization, carbonatization, and/or hematitization (Cherry 1982).

Recent encouraging results on the Barrick Resources Corporation (formerly Camflo Mines Limited) property in western Holloway Township (Tinter 1983) have resulted in increased efforts directed toward locating similar auriferous, pyritic, carbonate-bearing siliceous interflow sedimentary horizons, which appear to be associated with low magnetic responses.

The Hunter Mine Group and Blake River Group volcanic rocks (both being calcalkalic affinity) are potentially host to Pb - Zn - Cu -

Au - Ag sulphide mineralization. An inferred positive relief during Blake River Group deposition has led Jensen (1980) to postulate that such mineralization, if present in the Blake River Group section, is likely to be located proximal to volcanic vent locations and could be of a "stacked" form.

The Stoughton-Roquemaure Group volcanic rocks (of komatiitic affinity) are potentially host to nickel sulphide and to industrial minerals including asbestos, serpentine, magnesite, and talc. The Hedman Mine in Warden Township is a serpentine deposit currently in production (Whittaker and Malczak 1984).

The Kinojevis Group volcanic rocks of tholeiitic affinity and intercalated interflow sedimentary horizons are potentially host to exhalative base and precious metal sulphide mineralization.

Destor-Porcupine Complex alkalic rocks, which are chemically similar to alkalic rocks in the Kirkland Lake area, may occur in an analagous structural setting and could potentially host Kirkland Lake-type gold mineralization.

The presence of kimberlite dikes in Michaud Township (Jensen 1975) and of kimberlite boulders in glacial overburden in the Kirkland Lake-Larder Lake area (Baker 1982; G. Grabowski, Resource Geologist, Ontario Ministry of Natural Resources, Kirkland Lake, personal communication, 1984) suggest that the BRIM area may host diamonds both in bedrock and in placers associated with eskers in the Quaternary section. The potential for placer gold associated with eskers in the BRIM area has not yet been adequately investigated.

MINING ACTIVITY

During 1984, 12 mines operated in the Kirkland Lake Resident Geologist area, 5 producing gold and by-product silver; 2 producing, and 1 developing, silver and by-product cobalt; 1 producing iron pellets; 1 producing barite; 1 producing ser-

pentine filler; and 1 producing peat.

The total gold production in the Larder Lake Mining Division to the end of 1983 is shown in Table 3.

The deepest single-lift vertical shaft planned in the western hemisphere (ultimate depth 7275 feet (2217 m)), at the Macassa Gold-Silver Mine of Lac Minerals Limited, reached almost 5000 feet (1524 m).

Lake Shore Mines Limited continued mining its crown pillar via a scoop tram decline ramp, and at No. 5 shaft raised a 90-foot (27.5 m) headframe and installed a 12-foot (3.7 m) diameter hoist, in preparation to develop gold-silver ore remaining from past mining operations to the 4000-foot (1219 m) level.

The McBean Gold-Silver Mine, owned by Inco Limited and Queenston Gold Mines Limited and operated by Inco, began open pit production in May, using the renovated Upper Canada Mill.

Argentex Resource Exploration Corporation overburden-drilled with follow-up diamond drilling on their 50-claim property in Holloway Township. Gold values in till ranged from 1095 to 84 000 parts per billion (The Northern Miner, November 1, 1984).

Argyle Ventures Incorporated completed geological and geophysical surveys, and extensive stripping and trenching on a 42-claim group in McNeil Township. A grab sample assayed 0.82 ounce gold per ton (George Cross News Letter, October 10, 1984).

Barrick Resources Corporation, with which Camflo Mines Limited was merged, diamond drilled several thousand metres delineating the Camflo gold discoveries in Holloway Township and exploring nearby claims in Harker Township (up to 6 diamond drills operated simultaneously).

Canamax Resources Incorporated diamond drilled several thousand metres; several of the drill-holes were drilled at its Holloway Township gold discoveries.

TABLE 3. GOLD PRODUCTION FROM ALL MINES IN ONTARIO'S LARDER LAKE MINING DIVISION TO END OF 1983 (COMPILED BY KIRKLAND LAKE RESIDENT GEOLOGIST OFFICE)

MINE	TOWNSHIP	TONS MILLED	PRODUCTION	
			(oz.Au)	(oz.Ag)
Aljo	Beatty	2 333	42	5
American Eagle	Munro	60	40	nil
Argyll	Beatty	25	30	nil
Ashley	Bannockburn	157 076	50 123	7 644
Baldwin	Eby	81	43	81
Barry Hollinger	Pacaud	267 741	77 000	8 502
Bidgood	Lebel	586 367	160 184	72 468
Blue Quartz	Beatty	500	81	33
Bourkes	Benoit	1 298	277	50
Canadian Arrow	Hislop	279 593	17 045	nil
Cathroy Larder	McElroy	22 250	3 227	993
Chesterville	McGarry	3 260 439	358 880	19 371
Croesus	Munro	5 333	14 859	1 423
Ethel Copper	James	8 500	69	2 484
Gateford (Swastika)	Teck	103 684	30 068	nil
Golden Summit	Maisonville	737	57	nil
Gold Hill	Catharine	4 616	660	nil
Gold Pyramid	Guibord	175	36	nil
Hudson-Rand	Teck	6 496	483	143
*Kerr Addison	McGarry	36 825 384	10 093 599	562 200
Kerr Addison (Murphy)	Garrison	70 000	9 000	nil
Kirkland Lake	Teck	3 140 283	1 172 955	130 579
Kirkland Townsite	Teck	4 230	1 921	168
Laguerre	McVittie	40 514	7 568	1 383
*Lake Shore	Teck	16 945 083	8 505 657	1 955 132
*Macassa	Teck	5 783 835	2 524 685	399 115
Matachewan Consolidated	Powell	3 525 200	378 101	133 210
Miller Independence	Pacaud	31	59	70
Moffat-Hall	Lebel	16 388	4 780	1 149
Morris Kirkland	Lebel	127 253	16 999	29 754
New Telluride	Skead	104	62	50
Omega	McVittie	1 615 081	214 098	29 290
Queenston	Gauthier	1 054	177	nil
Ronda	Macmurchy	24 592	2 727	4 830
*Ross	Hislop	5 589 000	895 341	1 471 735
Ryan Lake	Powell	184 790	1 352	36 141
Stairs	Midlothian	15 835	3 573	1 767
Sylvanite	Teck	5 049 536	1 674 808	337 956
Teck Hughes	Teck	9 565 302	3 709 007	501 657
Toburn	Teck	1 186 316	570 659	135 238
Tyrannite	Tyrrell	223 810	31 352	4 860
Upper Beaver	Gauthier	531 067	140 709	3 512
Upper Canada	Gauthier	4 648 984	1 398 291	589 696
Wright Hargreaves	Teck	9 934 327	4 821 296	853 643
Young-Davidson	Powell	6 213 272	585 690	131 939
Total		115 968 539	37 447 602	7 391 508

*Producer in 1983

TABLE 4

ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.

ABBREVIATIONS								
APM	-	Airborne Electromagnetic Survey	Fe	-	Iron	SA	-	Sampling, Assays
Ag	-	Silver	Gc	-	Geochemical Survey	SP	-	Self Potential Survey
AMag	-	Airborne Magnetic Survey	GL	-	Geological Survey	STr	-	Soil Trenching
Assess	-	Assessment Work	HLEM	-	Horizontal Loop Electromagnetic Survey	rTr	-	Rock Trenching
Au	-	Gold	IP	-	Induced Polarization Survey	UTEM	-	University of Toronto Electromagnetic Survey
BM	-	Base Metals	Mag	-	Magnetic Survey	VEM	-	Vertical Loop Electromagnetic Survey
co	-	Cobalt	OMEP	-	Ontario Mineral Exploration Program	VLF-EM	-	Very Low Frequency Electromagnetic Survey
CS	-	Core Samples	OVD	-	Overburden Drilling			
D	-	Donation	Rad	-	Radiometric Survey			
DD	-	Diamond Drilling	Res	-	Resistivity Survey			

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Alma	42A/02	Sunfire Exploration Inc.	Au	Assess	SA STr	1983		
Amyot	41P/06	Energex Development Inc.	Au	Assess	Mag VLF-EM	1984	2,6656	
Argyle	42A/02	Fox, P.	Au	Assess	rTr	1983		
Argyle Hincks	42A/02	Johns-Manville Canada Inc. "McGill Group"	Au	Assess	DD (3) 326'	1983		
Argyle	42A/02	Larche, J.P.	Au	Assess	rTr	1983		
Argyle	42A/02	Petromet Resources Ltd.. "Ashley Mine Property"	Au	Assess	VLF-EM	1983	2,5925	
Arnold Morrisette	32D/04	Gleeson-Rampton Expl. "Alfie Group"	Au	Assess	GL Gc	1983	2,5806	
Arnold	32D/04	Merrick, A.; Link, T.	Au	Assess	DD (4) 2294'	1984		
Arnold Morrisette	32D/04	Monoprocs Ltd..	Au	Assess	AMag AEM	1982	2,5921	
Arnold, Lebel Gauthier	32D/04	Tower Gold Resources Ltd. "Commodore Group"	Au	OMEP Assess	GL SA GL VLF-EM	1981 1984 1984	63,3991 2,6317 2,6331	
Asquith	41P/11	Forbes, C.P.	Au	Assess	SA	1983	2,5759	
Asquith	41P/11	Gunter, C.	Au	Assess	STr	1984		
Asquith Churchill	41P/11	Onitap Resources Inc. "Gosselin Group"	Au	Assess	STr Gc VLF-EM	1984 1984		2,7018
Asquith	41P/11	Onitap Resources Inc. "Seager Lake Property"	Au	Assess	Gc	1984		2,7105
Asquith	41P/11	Shiningtree Gold Res. Inc.	Au	Assess	STr	1983		
Asquith	41P/11	Southgate Resources Ltd.	Au	Assess	DD (5) 592'	1983		
Asquith	41P/11	Timmins Gold Res. Ltd. "Gibson Property"	Au	Assess	Mag VLF-EM GL	1983 1983 1983	2,5367 2,5720 2,5719	
Asquith	41P/11	Timmins Gold Res. Ltd. "Jesse James Property"	Au	Assess	DD (1) 250'	1983		
Asquith Churchill	41P/11	Timmins Gold Res. Ltd. "Jonson Lake Group"	Au	Assess	Mag VLF-EM Mag VLF-EM	1984 1984	2,6796 2,6478	
Asquith	41P/11	Timmins Gold Res. Ltd. "Stewart Lake Property"	Au	Assess	DD (2) 502' Mag VLF-EM Mag VLF-EM	1983 1984 1984		2,6479 2,6672
Asquith	41P/11	Yoder, A.	Au	Assess	rTr	1983		
Baden Powell	41P/15 42A/02	Hanson Mineral Exploration Ltd.	Au	Assess	VLF-EM Mag SA	1984	2,6738	
Baden	42A/02	Shiningtree Gold Res. Inc. "Arbade Group"	Au	Assess	Mag VLF-EM	1983	2,6227	
Bannockburn	41P/15	Johns-Manville Canada Inc. "Galer Group"	Au	Assess	STr rTr	1984		
Bannockburn	41P/15	Landry, R.	Au	Assess	rTr	1983		
Bannockburn	41P/15	Letellier, R.	Au	Assess	rTr	1983		
Bannockburn	41P/15	Quevillon, G.	Au	Assess	rTr	1983		
Barnet Thackeray	32D/05 42A/08	Brinco Mining Ltd. "Tillicum Project"	Au	Assess	VLF-EM Mag	1983	2,5372	
Barnet, Cook Melba, Guibord	42A/08	St. Joe Canada Inc.	Au	Assess	OVD (96) 9266' DD (8) 1797' OVD (56) 4949'	1983 1983 1984	2,5922	

TABLE 4 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Beatty, Carr Hislop, Taylor Walker, Wilkie	42A/09 42A/10	Canamax Resources Inc. "Pipestone Project"	Au	Assess	AEM AMag	1984	2.7212	
Beatty	42A/09	Lalonde, D.	Au	Assess	Mag VLF-EM rTr STR	1984 1983	2.6553	
Beatty	42A/09	Lynco Resources Ltd.	Au	OMEP	DD (1) 233' Rad GL DD (1) 318'	1980 1983 1983 1984	2.5844 2.5843	
Beatty	42A/09	Maude Lake Gold Mines Ltd. "Main Group"	Au	OMEP Assess	DD (25) 9773' Rad VLF-EM rTr	1981 1984 1984 1984	2.6934 2.7067	
Beatty	42A/09	Maude Lake Gold Mines Ltd. "Salve Lake Group"	Au	Assess	Rad Rad GL VLF-EM Mag	1984 1984	2.7213 2.7107	
Beatty	42A/09	Parsons, G.E.	Au	Assess	GL Mag VLF-EM STR	1983 1983	2.6250	
Beemer	42A/03	Lynco Resources Inc.	Au	Assess	VLF-EM Mag GL Rad	1983	2.5519	
Ben Nevis Clifford	32D/05	Croxall, J.E. & Allsopp, A.	Au	Assess	SA STR STR	1981 1983 1984	2.4405	
Ben Nevis	32D/05	Harper, H.G. "Goldmac Expl. Inc."	Au	Assess	GL	1984	2.6926	
Benoit Cook	42A/08	Golden Cradle Resources Ltd. "Black River Group"	Au	Assess	VLF-EM Mag	1983	2.6400	
Benoit	42A/08	Golden Cradle Resources Ltd. "Highway 11 Group"	Au	Assess	VLF-EM Mag	1984	2.6401	
Benoit Black	42A/08	Goliath Mines Ltd.	Au	Assess	GL Gc HLEM DD (3) 1647'	1983 1983 1982	2.5418 2.5793 2.5269	
Benoit	42A/08	Leschishin, O.	Au	Assess	STR	1983		
Benoit	42A/08	Minefinders Corporation Ltd.	Au	Assess	Mag GL GL	1982 1983 1983	2.5314 2.6107 2.6218	
Benoit	42A/08	Noranda Exploration Co. Ltd. "Ward Claims"	Au	Assess	VLF-EM	1984	2.6918	
Benoit	42A/08	Portelance, R.	Au	OMEP	VLF-EM GL	1981		
Benoit	42A/08	Rodholm, C.	Au	Assess	rTr	1984		
Bernhardt Teck	42A/01	O'Connor, F.	Au	Assess	STR Mag VLF-EM GL	1984 1984	2.7126	
Beulah	41P/06	Harlin Resources Ltd.	Au	Assess	Mag VLF-EM	1984	2.6935	
Bisley	32D/05	Monoprocs Ltd.	Au	Assess	Mag VLF-EM	1984	2.6586	
Bisley	32D/05	St. Joe Canada Inc.	Au	Assess	GL SA OVD (8) 542'	1984 1984	2.6288 2.6927	
Black	42A/08	Goliath Mines Ltd.	SEE	UNDER	BENOIT TOWNSHIP			
Black	42A/08	Gray, M.	Au	Assess	DD (1) 136'	1983		
Bampas	42A/01	St. Joe Canada Inc.	Au	Assess	Gc	1983	2.5729	
Boston	32D/04	Argentex Resource Exploration Corporation	Au	Assess	DD (1) 125'	1984		
Boston	32D/04	Forbes, C.	Au	Assess	STR SA	1983	2.7051	
Boston	32D/04	Marshall Boston Iron Mines Ltd. "North Group"	Au Fe	OMEP	HLEM DD (12) 2959'	1982 1983	63.4026	
Boston	32D/04	Marshall Boston Iron Mines Ltd. "South Group"	Au Fe	OMEP	SA DD (16) 5317'	1972 1981	63.3938 63.4026	
Boston	32D/04	Marshall Minerals Corp.	Au	Assess	Mag	1983	2.6170	
Boston	32D/04	Perron, A.H. "Barry Hollinger Prop."	Au	Assess	Mag VLF-EM	1984	2.7065	
Boston, McElroy Catharine	32D/04 31M/13	Perron, A.H. "Catharine Six Group"	Au	Assess	STR Mag VLF-EM STR STR	1984 1984 1983 1984	2.6666	
Boston	32D/04	Planet Gold Mines Ltd.	Au	OMEP	SA Gc	1982		

TABLE 4 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Boston	32D/04	Shiningtree Gold Resources Inc.	Au	Assess	STr	1983		
Boston	32D/04	Shiningtree Gold Res. Inc. "East Group"	Au	Assess	VLF-EM Mag Mag	1983 1982	2.5774 2.5050	
Boston Pacaud	32D/04 31M/13	Shiningtree Gold Res. Ltd. "West Group"	Au	Assess	VLF-EM Mag	1984	2.5774	
Bowman	42A/08	Asarco Exploration Co. of Canada Ltd. "Cook Project"	Au BM	Assess	DD (1) 700'	1984		
Bowyer Marathon	42A/16	Noranda Exploration Co. Ltd. "Bowyer 1-82, Marathon 1-82"	Au BM	Assess	Mag HLEM Mag HLEM Mag HLEM OVD (4) 668'	1984 1984 1984 1984	2.6619 2.6684 2.6695 2.6705	
Bowyer Purvis	42A/16	Noranda Exploration Co. Ltd. "Bowyer 2-82"	Au BM	Assess	Mag HLEM Mag HLEM	1984 1984	2.6859 2.7054	
Bowyer	42A/16	Noranda Exploration Co. Ltd. "Low Bush Townsite"	Au BM	Assess	Mag HLEM	1984	2.6706	
Bradette	32E/12	Canadian Nickel Company Ltd.	Au BM	Assess	GL	1984	2.6558	
Bradette Noseworthy	32E/12 32E/05	Newmont Exploration of Canada Ltd.	Au BM	Assess	IP OVD (15) 2899' GL Mag HLEM	1983 1983 1984 1983	2.5965 2.5840 2.6783 2.5405	
Bradette	32E/12	Noranda Exploration Co. Ltd. "1-80"	Au BM	Assess	DD (1) 787'	1984		
Bradette	32E/12	Noranda Exploration Co. Ltd. "2-80"	Au BM	Assess	DD (2) 648' Mag HLEM	1982 1984	2.6338	
Bradette	32E/05	Noranda Exploration Co. Ltd. "Bradette 1-82"	Au BM	Assess	DD (2) 886'	1984		
Browning	41P/06	Thomson, M.	Au	Assess	STr	1984		
Bryce	41P/09	Bush, C.B.	Au	Assess	DD (3) 763' SA	1984		
Bryce	31M/09	Yvanex Dev. Ltd. & Wind-jammer Power & Gas Ltd. "Briscoe-Bryce Property"	Au	OMEF	DD (11) 4489'	1982		
Burrows Kemp	41P/14	Newmont Exploration of Canada Ltd.	Au BM	Assess	HLEM VLF-EM SA	1982 1982 1983	2.5150 2.5146	
Cabot	41P/11	Dea, A.	Au	Assess	STr	1983		
Cairo	41P/15	Comstate Resources Ltd. "Cairo Property"	Au	Assess	GL STr Mag VLF-EM	1983 1984 1983	2.5704 2.5740	
Cairo	41P/15	Comstate Resources Ltd. "Moyneur Lake Property"	Au	Assess	GL STr	1983 1984	2.6269	
Cairo	41P/15	Landry, L.	Au	Assess	rTr STr	1984		
Cairo	41P/15	Pamour Porcupine Mines Ltd. "Northeast Group"	Au	Assess	Mag	1983	2.5581	
Cairo	41P/15	Pamour Porcupine Mines Ltd. "Webb Lake Group"	Au	Assess	OVD (7) 21'	1983	2.6846	
Cairo	41P/15	Twin Buttes Expl. Ltd.	Au	D	GL Gc	1984		
Carr	42A/09	Asarco Exploration Co. of Canada Ltd.	Au	Assess	Mag VLF-EM	1983	2.5945	
Carr	42A/09 42A/10	Canamax Resources Inc. "Pipestone Project"	SEE	UNDER	BEATTY TOWNSHIP			
Carr	42A/09	Cominco Ltd.	Au	Assess	DD (3) 1300'	1984		
Carr	42A/10	Hobbs, L.G.	Au	Assess	Mag	1984	2.7001	
Carr Wilkie	42A/09	Pyke, D.R.	Au	Assess	VLF-EM Gc GL Mag	1982 1983 1983 1984	2.5357 2.5741 2.5887 2.6268	
Catharine McElroy	32D/04	Amax Minerals Expl. "Mirado Property"	Au	OMEF	GL Mag SA STr DD (55) 30240'	1981 1981		
Catharine	31M/13	Cook, B.G.	Au	Assess	Gc	1984	2.6106	
Catharine	31M/13	Gilson, R.R.	Au	Assess	DD (2) 326' SA STr	1983		

TABLE 4 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Catharine	31M/13	Kidston, J.	Au	Assess	STr	1984		
Catharine	31M/13	Link Drilling Ltd.	Au Ag	Assess	DD (3) 1089'	1983		
Catharine	31M/13	Marlin Mines Ltd.	Au	Assess	DD (2) 1004'	1984		
Catharine	32D/04	Perron, A.H. "Catharine Six Group"	SEE	UNDER	BOSTON TOWNSHIP			
Catharine	31M/13	Perron, A.H. "Catharine Ten Group"	Au	Assess	Mag	1984	2.6749	
Catharine	31M/13	Perron, A.H. "Misema Eight Grid"	Au	Assess	Mag VLF-EM	1984	2.6624	
Chesney Bay Galna, Moody Wesley	42A/16	Noranda Exploration Co. Ltd. "Galna 1-81, Moody 1-81"	Au	Assess	VEM Mag HLEM Mag HLEM Mag HLEM Mag HLEM Mag HLEM Mag DD (2) 1508' HLEM Mag	1983 1983 1983 1983 1983 1984 1984	2.5761 2.5870 2.5762 2.5827 2.5828 2.6322 2.7029	
Churchill	41P/11	Cashaback, A.	Au	Assess	STr rTr	1984		
Churchill Kelvin	41P/11	Gail Resources Ltd.	Au	Assess	GL Mag	1983 1984	2.6128 2.6802	
Churchill	41P/11	Kidd Creek Mines Ltd.	Au	Assess	GL GL Mag VLF-EM HLEM VLF-EM DD (2) 947'	1982 1982 1983 1983 1984	2.5524 2.5525 2.5732 2.6127	
Churchill Kelvin	41P/11	Marshall Minerals Corp.	Au	Assess	Mag	1984	2.6821	
Churchill	41P/11	Onitap Resources Inc. "Gosselin Property"	SEE	UNDER	ASQUITH TOWNSHIP			
Churchill	41P/11	Sauve, J.	Au	OMEP	STr rTr SA	1980		
Churchill	41P/11	Shiningtree Gold Res. Inc. "Gunter Option Group"	Au	OMEP Assess	GL Mag VLF-EM rTr STr	1982 1983 1983	2.5961	
Churchill	41P/11	Timmins Gold Res. Ltd. "Johnson Lake Group"	SEE	UNDER	ASQUITH TOWNSHIP			
Clifford	32D/05	Croxall, J.; Allsopp, A.	SEE	UNDER	BEN NEVIS TOWNSHIP			
Clifford	32D/05	Link, T.A.	Au	Assess	DD (1) 1037'	1984		
Clifford	32D/05	St. Joe Canada Inc.	Au	Assess	OVD (6) 427' GL SA OVD (14) 1531' OVD (13) 583'	1983 1984 1984 1984	2.5745 2.6289 2.6686 2.6979	
Connaught Miramichi	41P/11	Narex Ore Search Consolidated Inc.	Au	Assess	AEM AMag	1984	2.6912	
Connaught	41P/11	Onitap Res. Inc. "Elephanthead Lake Prop."	Au Ag	Assess	GL	1983	2.5953	
Connaught	41P/11	Patino Mines Ltd.	Au Ag	Assess	Mag VLF-EM	1981	2.3991	
Connaught	41P/11	Timmins Gold Res. Ltd. "Elephanthead Lake Prop."	Au Ag	Assess	Mag VLF-EM	1983	2.5954	
Cook	42A/08	Golden Cradle Res. Ltd. "Black River Group"	SEE	UNDER	BENOIT TOWNSHIP			
Cook	42A/08	St. Joe Canada Inc.	SEE	UNDER	BARNET TOWNSHIP			
Coulson	42A/09	Campeall, L.	Au	Assess	rTr	1984		
Coulson	42A/09	Canamax Resources Inc.	Au	Assess	DD (1) 388'	1983		
Coulson	42A/09	Hollinger Argus Ltd.	Au	Assess	VLF-EM DD (2) 1066'	1983 1984	2.6187	
Currie	42A/07	Dore Explorations Ltd.	Au	Assess	Mag	1983	2.6292	
Currie	42A/07	Papont Resources Inc.	Au	OMEP	Mag VLF-EM	1981		
Eby Grenfell	42A/01	Gren-Teck Kirkland Resources Ltd. "Kenogami Lake Property"	Au	Assess	Mag VLF-EM	1983	2.5972	
Eby	42A/01	Harrington, P.	Au	Assess	STr	1980		
Eby	42A/01	Hemlo Reef Res. Ltd.	Au	Assess	Mag VLF-EM	1984	2.7131	

TABLE 4 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Eby	42A/01	Mylamaque Mines Ltd.	Au	D	GL	1947		
Eby Otto	42A/01	Reed, J.D.	Au	Assess	STr STr GL GL	1982 1983 1983 1983	2.6419 2.6408	
Edwards	42H/15	Canamax Resources Inc.	Au	Assess	DD (1) 571'	1983		
Elliott	32D/05	Golden Harker Expl. Ltd.	Au	Assess	DD (2) 886'	1984		
Elliott Harker	32D/05	Perron, A.H. "Elliott-Harker Group 1"	Au	Assess	GL Mag Gc rTr STr	1983 1983 1983 1984	2.5755 2.6067	
Elliott	32D/05	Phelps Dodge Corporation of Canada Ltd.	Au	Assess	GL	1983		2.5753
Elliott	32D/05	Union Mining Corp.	Au	Assess	DD (3) 1297'	1983		
English Semple	41P/14 42A/03	Chevron Canada Res. Ltd.	Au	Assess	Mag	1984		2.7098
Flavelle Gross	41P/16	Leahy, M. "Gross Group"	Au	Assess	Mag VLF-EM	1984		2.6723
Frechette	41P/03	Jedburgh Resources Ltd.	Au	Assess	STr VLF-EM	1983 1984		2.7011
Frecheville Holloway	32D/12	Bruneau Mining Corp.	Au	Assess	GL	1983		2.5904
Galna	42A/16	Noranda Expl. Co. Ltd. "Galna 1-81, Moody 1-81"	SEE	UNDER	CHESNEY BAY			
Galna	42A/16	Utah Mines Ltd. "Jim's Lake Property"	Au	Assess	DD (2) 1162'	1984		
Garrison	32D/05	Falconbridge Nickel Mines Ltd. "Canyon Claims"	Au	Assess	Gc GL Rad DD (1) 1037'	1983 1984		2.5516
Garrison Harker	32D/05	Lynx-Canada Expl. Ltd.	Au	Assess	Mag VLF-EM	1984		2.6966
Garrison Michaud	32D/05	Moses, J.R.	Au	Assess	DD (3) 1972'	1983		
Garrison Michaud	42A/08 32D/05	Nahanni Mines Ltd. "Sept. & October Grid"	Au	OMEP	Mag VLF-EM HLEM Mag VLF-EM HLEM GL Mag VLF-EM HLEM DD (1) 501'	1982 1983 1983 1983 1983	63.4011 2.5976 2.5955 2.5941	
Garrison	32D/05	Noranda Expl. Co. Ltd. "Windjammer Option"	Au	Assess	DD (2) 1008' GL	1983 1984		2.7050
Garrison	32D/04 32D/12	The Consolidated Mining and Smelting Co. of Canada Ltd.	Au	D	GL Mag	1946		
Gauthier	32D/04	Bodick, J.	Au	Assess	STr	1983		
Gauthier	32D/04	Hill, R. "Hoose Crossing Prop."	Au	Assess	DD (1) 152' STr	1983		
Gauthier	32D/04	Hoffman Exploration and Minerals Ltd.	Au	Assess	Mag VLF-EM rTr VLF-EM VLF-EM SA	1983 1983 1984 1984 1984	2.5641 2.6457 2.6620 2.6547	
Gauthier	32D/04	Leahy, M.	Au	Assess	DD (1) 101'	1983		
Gauthier	32D/04	MacGregor, R.A.	Au	Assess	VLF-EM Rad Mag VLF-EM Mag VLF-EM STr DD (3) 359'	1982 1983 1983 1983 1984	2.4761 2.5832 2.5701	
Gauthier	32D/04	Southwind Resource Explorations Ltd.	Au	Assess	Mag VLF-EM	1983		2.5936
Gauthier	32D/04	Tower Gold Res. Ltd. "Commodore Group"	SEE	UNDER	ARNOLD TOWNSHIP			
Grenfell Teck	42A/01	Gren-Teck Kirkland Res. Ltd. "Cook Lake Group"	Au	Assess	VLF-EM	1983		2.6244
Grenfell	42A/01	Gren-Teck Kirkland Res. Ltd. "Kencami Lake Prop"	SEE	UNDER	EBY TOWNSHIP			
Grenfell	42A/01	Hurd, D.	Au	Assess	DD (1) 150'	1983		

TABLE 4 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Grenfell	42A/01	Perron, A.H.	Au	Assess	Mag VLF-EM	1983	2.5545	
Grenfell	42A/01	Sirola, D.G.	Au	OMEP Assess	STr GL OVD (17) 234' DD (1) 365'	1982 1983 1983 1984	63.4156 2.5939 2.5995	
Gross	41P/16	Leahy, M.	SEE	UNDER	FLAVELLE TOWNSHIP			
Guibord	42A/08	Armco Mineral Expl. Ltd. "Main Property Group"	Au	Assess	OVD (35) 2356' VLF-EM VLF-EM OVD (16) 1240' OVD (20) 1427'	1984 1984 1984 1984 1984	2.6396 2.6515 2.6516 2.6876 2.7302	
Guibord	42A/08	Asarco Exploration Co. of Canada Ltd. "Holtvre East"	Au	Assess	Mag VLF-EM OVD (12) 1540' OVD (24) 2812'	1983 1984	2.5942 2.6870 2.7301	
Guibord	42A/08	Mangan, J.J.	Au	Assess	STr	1984		
Guibord	42A/08	Johns-Manville Canada Inc. "Joseph Group"	Au	Assess	SA STr rTr Rad	1984 1984 1984	2.6440 2.6832	
Guibord	42A/08	Parsons, G.E.	Au	Assess	STr	1983		
Guibord	42A/08	St. Joe Canada Inc.	SEE	UNDER	BARNET TOWNSHIP			
Halliday	41P/14	Chevron Standard Ltd. "Talisman"	Au	Assess	DD (1) 327'	1983		
Harker	32D/12	Amax Minerals Expl. "Harker 4"	Au	Assess	DD (3) 1104'	1982		
Harker	32D/05	Argentex Resource Exploration Corp.	Au	Assess	Mag VLF-EM GL	1984	2.6958	
Harker	32D/05	Barrick Resources Corp.	Au	Assess	DD (1) 425'	1984		
Harker Holloway	32D/12	Camflo Mines Ltd. "East Block"	Au	OMEP Assess	DD (17) 7771' rTr IP Gc Mag VLF-EM Mag Mag VLF-EM	1982 1981 1984 1984	2.6368 2.6827	
Harker	32D/12	Camflo Mines Ltd. "Lenora Property"	Au	Assess	DD (3) 1103'	1984		
Harker	32D/05	Camflo Mines Ltd. "West Block Property"	Au	Assess	Mag VLF-EM	1984	2.6827	
Harker	32D/12	Canamax Resources Inc. "Union Mining Option"	Au	Assess	HLEM DD (9) 4549'	1983 1983	2.5599	
Harker	32D/05	Golden Harker Expl. Ltd.	Au	Assess	STr DD (1) 341'	1984 1984		
Harker	32D/05	Harley, N.	Au	Assess	DD (4) 1461'	1984		
Harker	32D/05	Hobbs, L.G.	Au	Assess	DD (3) 1273'	1984		
Harker	32D/05	Hurd, D.F.	Au	Assess	Rad STr	1983 1984	2.5783	
Harker	32D/05	Independant Mining Corp.	Au	Assess	Mag VLF-EM	1981	2.4470	
Harker	32D/12	Lenora Explorations Ltd.	Au	Assess	DD (1) 577'	1983		
Harker Holloway	32D/05 32D/12	Lightval Mines Ltd.	Au	OMEP	HLEM Mag GL DD (18) 4391'	1980 1981	63.3940	
Harker	32D/05	Lynx-Canada Expl. Ltd.	SEE	UNDER	GARRISON TOWNSHIP			
Harker	32D/05	Perron, A.H. "Elliott-Harker Group 1"	SEE	UNDER	ELLIOTT TOWNSHIP			
Harker	32D/05 32D/12	Perron, A.H. "Harker Group 2"	Au	Assess	GL STr	1983 1984	2.6316	
Harker Holloway	32D/05	Phelps Dodge Corp. of Canada Ltd. "Grid A"	Au	OMEP	SA	1981	63.4014	
Harker Holloway	32D/05	Phelps Dodge Corp. of Canada Ltd. "Grid B"	Au	OMEP	DD (7) 2804' GL VLF-EM	1982 1982	63.4014	
Harker Holloway	32D/12	Teddy Bear Valley Mines Ltd.	Au	OMEP	GL Mag	1945 1947	63.3940 63.3940	
Haultain Nicol	41P/10	Peerless Silver & Cobalt Explorations Ltd.	Ag Co	OMEP	GL UG DD (43) 22392'	1981 1979 1981	63.3931	

TABLE 4 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Hearst Skoad	31M/13	Canadian Nickel Company Ltd.	Au	Assess	SA	1983	2.5374	
Hearst	32D/04	Combined Larder Mines Ltd.	Au	Assess	Gc	1984	2.6448	
Hearst	32D/04	Hummingbird Res. Ltd.	Au	Assess	GL	1983	2.5161	
Hearst	32D/04	Lacasse, L.	Au	Assess	Mag VLF-EM	1984	2.6659	
Hearst	32D/04	Lac Minerals Ltd.	Au	Assess	DD (1) 667'	1983		
Hearst	32D/04	MacGregor, R.A. "Benson Creek North"	Au	Assess	VLF-EM	1983	2.5492	
Hearst McFadden	32D/04	MacGregor, R.A. "Grace Lake Baseline"	Au	Assess	Gc Rad VLF-EM	1982 1982 1983	2.5220 2.5332 2.5589	
Hearst Skoad	32D/04 31M/13	MacGregor, R.A. "Manor Grid"	Au	Assess	SA VLF-EM VLF-EM	1982 1983 1982	2.5331 2.5493	
Hearst McFadden	32D/04	MacGregor, R.A. "Martin Bird South"	Au	ONEP Assess	Mag VLF-EM GL	1981 1984	2.6277	
Hearst	32D/04	Rivard, F.	Au	Assess	STr	1983		
Hearst Skoad	31M/13 32D/04	Utah Mines Ltd. "Manor Property" "MacGregor Option"	Au	Assess	Rad HLEM	1982	2.9954	
Hepburn Scapa	32D/13	Asarco Exploration Co. of Canada Ltd.	Au BM	Assess	Mag VLF-EM	1983	2.5861	
Hepburn Sargeant	32D/13	Cominco Ltd.	Au BM	Assess	OVD (8) 280' OVD (3) 91'	1983 1984	2.5897 2.6350	
Hincks	42A/02	Johns-Manville Canada Inc. "McGill Group"	SEE	UNDER	ARGYLE TP.			
Hislop	42A/08 42A/09	Amco Mineral Exploration Ltd. "Parsons Hislop Prop."	Au	ONEP ONEP Assess Assess Assess	DD (18) 2901' GL VLF-EM Mag VLF-EM Mag GL VLF-EM	1981 1982 1983 1984 1984	63.3970 2.6221 2.6517 2.6518	
Hislop	42A/09	Canamax Resources Inc. "Pipestone Project"	SEE	UNDER	BEATTY TOWNSHIP			
Hislop	42A/08	Pamour Porcupine Mines Ltd. "Vimy Group"	Au	Assess	OVD (14) 531' OVD (14) 175' SA Mag DD (2) 360'	1982 1983 1984	2.5400 2.6273	
Hislop	42A/08	Pancontinental Mining (Canada) Ltd.	Au	ONEP	GL Mag VLF-EM Gc SA DD (14) 5626'	1981 1980	63.3930	
Hislop	42A/08	Parsons, G.E.	Au	Assess	DD (1) 201'	1983		
Hodgetts	41P/03	Goldmac Explorations Inc.	Au	Assess	GL Rad Mag VLF-EM	1983	2.6213	
Holloway	32D/05	Amx Minerals Expl.	Au	Assess	DD (5) 2091'	1983		
Holloway	32D/12	Bruneau Mining Corp.	SEE	UNDER	PRECHEVILLE TP.			
Holloway	32D/12	Camflo Mines Ltd. "East Block"	SEE	UNDER	HARKER TOWNSHIP			
Holloway	32D/12	Camflo Mines Ltd. "McDermott Property"	Au	Assess	Mag VLF-EM	1982	2.4808	
Holloway	32D/12	Johns-Manville Canada Inc.	Au	Assess	DD (8) 4390'	1984		
Holloway	32D/05 32D/12	Lightval Mines Ltd.	SEE	UNDER	HARKER TOWNSHIP			
Holloway	32D/05	Phelps Dodge Corp. of Canada "Grid A"	SEE	UNDER	HARKER TOWNSHIP			
Holloway	32D/05	Phelps Dodge Corp. of Canada "Grid B"	SEE	UNDER	HARKER TOWNSHIP			
Holloway	32D/12	Teddy Bear Valley Mines Ltd.	SEE	UNDER	HARKER TP.			
Ingram	31M/13	Agnico-Eagle Mines Ltd.	Ag	Assess	GL SA	1983	2.6225	
Katrine	32D/05	Kiazky, B.	Au	Assess	DD (2) 204' STr STr	1983 1984		
Katrine	32D/04	Rock Ore Exploration & Development Ltd.	Au	Assess	STr	1983		
Katrine	32D/04	Swansea Gold Mines Ltd.	Au	ONEP	Mag	1982		

TABLE 4 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Kelvin	41P/11	Gail Resources Ltd.	SEE	UNDER	CHURCHILL TP.			
Kelvin	41P/11	Marshall Minerals Corp.	SEE	UNDER	CHURCHILL TP.			
Kemp	41P/14	Newmont Exploration of Canada Ltd.	SEE	UNDER	BURROWS TP.			
Kerrs	42A/16	Dome Exploration (Canada) Ltd.	Au	Assess	DD (6) 4059'	1983		
Kerrs	42A/09	Noranda Exploration Co. Ltd. "Kerrs 1-77"	Au	Assess	DD (4) 2614' DD (3) 2976' HLEM Mag	1982 1983 1983	2.6260	
Kerrs	42A/16	Utah Mines Ltd. "Jim's Lake Property"	Au	Assess	HLEM Mag SA DD (1) 667'	1983 1983 1984	2.5706 2.6313	
Leask	41P/03	Elliott, A.	Au	Assess	Mag SP	1984	2.7106	
Lebel	32D/04	Egg, H.	Au	Assess Assess	STr rTr rTr	1983 1984		
Lebel	32D/04	Federal Kirkland Mines Ltd.	Au	Assess	DD (1) 670'	1983		
Lebel	32D/04	Forbes, C. & Leahy, M.	Au	Assess	Mag	1982	2.5011	
Lebel	32D/04	Gamble, S.G.	Au	Assess	STr STr	1983 1984		
Lebel	32D/04	Labine, M.	Au	Assess	VLF-EM STr	1983 1984	2.5773	
Lebel	32D/04	Lacana Mining Corp.	Au	OMEP	HLEM VLF-EM SA	1981		
Lebel	32D/04	Lampe Resource Co. Ltd.	Au	Assess	STr	1984		
Lebel	32D/04	Marshall, W.J. "Will Char Option"	Au	Assess	DD (3) 854'	1983		
Lebel	32D/04	North Kirkland Mines Ltd.	Au	Assess	UG	1983		
Lebel	32D/04	Tower Gold Resources Ltd. "Commodore Group"	SEE	UNDER	ARNOLD TOWNSHIP			
Lee Maisonville	42A/01	Cooper, W.	Au	Assess	STr DD (1) 105' rTr	1983 1984 1984		
Macmurchy	41P/11	Decker, A.	Au	Assess	DD (1) 101' STr	1984		
Maisonville	42A/01	Barry, H.	Au	Assess	rTr STr	1983		
Maisonville	42A/01	Cooper, W.	SEE	UNDER	LEE TOWNSHIP			
Maisonville	42A/01	Eso Res. Canada Ltd.	Au	Assess	Mag VLF-EM	1984	2.6266	
Maisonville	42A/01	Forbes, C.P. "Bennett Claims"	Au	Assess	Mag	1984	2.6418	
Maisonville	42A/01	Hahn, J.	Au	Assess	STr	1984		
Maisonville	42A/01	Kruzynski, A.	Au	Assess	DD (1) 103'	1983		
Maisonville	42A/01	Noranda Exploration Co. Ltd. "Maisonville 1-82"	Au	Assess	Mag HLEM	1984	2.6646	
Maisonville	42A/01	Roberts, L.	Au	Assess	DD (1) 375'	1984		
Maisonville	42A/01	Salo, L.	Au	Assess	DD (2) 674'	1984		
Marathon	42A/16	Noranda Exploration Co. Ltd. "Bowyer 1-82, Marathon 1-82"	SEE	UNDER	BOWYER TOWNSHIP			
Marathon	42A/16	Noranda Exploration Co. Ltd. "Marathon 2-82"	Au	Assess	HLEM Mag	1984	2.6857	
Marriott	32D/12	Canamax Resources Inc. "Dalhousie Option"	Au	Assess	DD (6) 2431'	1983		
Marriott	32D/12	Canamax Resources Inc. "Marriott-2"	Au	Assess	DD (3) 1925'	1983		
Marter	31M/13	Shortt, L.	Au	Assess	STr	1984		
McCann	42A/07	Stevens, N.D.	Au	Assess	SA	1982	2.5534	
McCool	42A/09	Fournier, E.	Au	Assess	DD (1) 139'	1984		
McCool	42A/09	Placer Development Ltd. "Belore Option"	Au	Assess	Mag VLF-EM DD (1) 439'	1982 1984	2.5647	

TABLE 4 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
McCool Munro	42A/09	Richmond, G.	Au	Assess	STr STr	1983 1984		
McCool Milligan	42A/09	Yellow Sands Prospecting Syndicate	Au	Assess	Mag	1984	2.6834	
McElroy	32D/04	Amex Minerals Exploration "Mirado Property"	SEE	UNDER	CATHARINE TOWNSHIP			
McElroy	32D/04	Bastarche, G.	Au	Assess	DD (1) 125'	1984		
McElroy	32D/04	Falconbridge Copper Corp. "Moly Hill Grid"	Au BM	Assess	Gc GL	1983	2.5795	
McElroy	32D/04	Falconbridge Copper Corp. "Superior Northwest Opt."	Au BM	Assess	SA GL VLF-EM STr	1983 1981	2.5795	
McElroy	32D/04	MacGregor, R.A. "Moly Hill Property"	Au BM	Assess	VLF-EM DD (1) 105'	1984 1984	2.7142	
McElroy	32D/04	MacGregor, R.A. "South East Grid"	Au BM	Assess	Mag VLF-EM	1984	2.6281	
McElroy	32D/04 31M/13	Perron, A.H. "Catharine Six Group"	SEE	UNDER	BOSTON TOWNSHIP			
McElroy	32D/04	St. Joe Canada Inc. "East Property"	Au	Assess	OVD (13) 1892'	1984	2.6967	
McElroy	32D/04	St. Joe Canada Inc. "West Property"	Au	Assess	OVD (8) 1107'	1984	2.7237	
McElroy	32D/04	Tagliamonte, F.	Au	Assess	Gc	1983	2.5386	
McElroy	32D/04	Yost, C.H.	Au	Assess	DD (1) 103' rTr rTr	1983 1983 1984		
McFadden	32D/04	MacGregor, R.A. "Grace Lake Baseline"	SEE	UNDER	HEARST TOWNSHIP			
McFadden	32D/04	MacGregor, R.A. "Larder River Baseline"	Au	Assess	Mag VLF-EM	1983	2.5345	
McFadden	32D/04	MacGregor, R.A.	Au	Assess	Mag VLF-EM	1983	2.5652	
McFadden McGarry, McVittie	32D/04	MacGregor, R.A. "Larder Lake Area"	Au	Assess	Mag VLF-EM	1983	2.5652	
McFadden	32D/04	MacGregor, R.A. "Martin Bird South"	SEE	UNDER	HEARST TOWNSHIP			
McGarry	32D/04	Aurelian Developers Ltd. "Sheldon Larder Property"	Au	D	Annual Report	1984		
McGarry McVittie	32D/04	Edomar Resources Inc.	Au	Assess	GL DD (4) 499' STr	1984 1984 1984	2.6861	
McGarry	32D/04	Kennco Explorations Ltd. "Pelangio-Larder Option"	Au	Assess	GL	1983	2.6223	
McGarry	32D/04	Kerr Addison Mines Ltd.	Au	Assess	SA Gc	1982	2.5298	
McGarry	32D/04	Leahy, M. "Border Group"	Au	Assess	VLF-EM	1984	2.6306	
McGarry	32D/04	Lee Geo-Indicators Ltd.	Au	Assess	DD (7) 3139' DD (2) 604'	1983 1984		
McGarry	32D/04	MacGregor, R.A. "Larder Lake Area"	SEE	UNDER	McFADDEN TOWNSHIP			
McGarry	32D/04	MacGregor, R.A.	Au	Assess	Mag VLF-EM	1983	2.5653	
McGarry	32D/04	Noranda Exploration Co. Ltd.	Au	Assess	DD (13) 2593'	1983		
McGarry	32D/04	Walker, J.	Au	OMEP	STr	1981		
McNeil	42A/02	Argyle Ventures Inc.	Au	Assess	Mag VLF-EM	1984	2.6604	
McNeil	42A/02	Cominco Ltd.	Au	Assess	Mag UTEM	1983	2.6347	
McNeil	42A/02	Manville Canada Inc. "Bobjo Group"	Au	Assess	DD (5) 817' SA rTr	1983 1983		
McNeil	42A/02	King, M. & Weckley, L.	Au	Assess	DD (5) 1616'	1984		
McNeil	42A/02	Konovsky, P.R.	Au	Assess	DD (3) 863'	1983		
McVittie	32D/04	Edomar Resources Inc.	SEE	UNDER	McGARRY TOWNSHIP			

TABLE 4 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
McVittie	32D/04	Lefebvre, A.	Au	Assess	rTr	1983		
McVittie	32D/04	Lenora Explorations Ltd.	Au	ONEP	VLF-EM SA DD (5) 2167'	1981 1981		
McVittie	32D/04	MacGregor, R.A. "Larder Lake Area"	SEE	UNDER	McFADDEN TOWNSHIP			
McVittie	32D/04	MacGregor, R.A.	Au	Assess	DD (4) 3657'	1984		
McVittie	32D/04	Sudbury Contact Mines Ltd.	Au	Assess	DD (3) 932'	1980		
Melba	42A/08	Hurd, D.F.	Au	Assess	rTr rTr	1983 1984		
Melba	32D/08	Leahy, M. "Group 1 & 2"	Au	Assess	Mag Mag VLF-EM	1984 1984	2.6792 2.6793	
Melba	42A/08	St. Joe Canada Inc.	SEE	UNDER	BARNET TOWNSHIP			
Michaud	42A/08	Asarco Exploration Co. of Canada Ltd.	Au	Assess	GL Mag HLEM	1984	2.7208	
Michaud	42A/09	Golden Range Res. Inc.	Au	Assess	HLEM Mag VLF-EM	1984	2.7031	
Michaud	32D/05	Moses, J.R.	SEE	UNDER	GARRISON TOWNSHIP			
Michaud	42A/08	Nahanni Mines Ltd.	Au	Assess	OVD (15) 1828' GL	1983 1982	2.6092 2.5312	
Michaud	42A/08 32D/05	Nahanni Mines Ltd. "Sept. & October Grid"	SEE	UNDER	GARRISON TOWNSHIP			
Michaud	42A/08	Norbaska Mines Ltd.	Au	Assess	Mag VLF-EM	1983	2.5664	
Michaud	42A/08	Redstone Resources Inc.	Au	Assess	DD (2) 1578'	1983		
Michaud	42A/08	Selco Inc. "Renzly Option"	Au	Assess	Mag IP	1982	2.5358	
Midlothian	41P/14	Regal Goldfields Ltd.	Au	Assess	DD (9) 5003'	1983		
Milligan	42A/09	Ryan, W.J.	Au	Assess	STr	1984		
Milligan	42A/09	Yellow Sands Prospecting Syndicate	SEE	UNDER	McCOOL TOWNSHIP			
Miramichi	41P/11	Narex Ore Search Consultants Inc.	SEE	UNDER	CONNAUGHT TOWNSHIP			
Miramichi	41P/11	T.G.R. Resources Ltd.	Au	Assess	Mag VLF-EM	1984	2.6576	
Montrose	42A/02	Canamax Resources Inc.	Au	Assess	GL Mag VLF-EM	1983	2.5990	
Montrose	41P/14	Hagan, J.D.	Au	Assess	STr	1984		
Moody	42A/16	Noranda Expl. Co. Ltd. "Galna 1-81, Moody 1-81"	SEE	UNDER	CHESNEY BAY			
Moody	42A/16	Utah Mines Ltd. "Jim's Lake Project"	Au	Assess	SA DD (5) 3763' OVD (8) 1610' OVD (7) 1279'	1982 1984 1984 1984	2.5794 2.6760 2.6842	
Morrisette	32D/04	Gleeson-Rampton Expl. "Alfie Group"	SEE	UNDER	ARNOLD TOWNSHIP			
Morrisette	32D/04	Gleeson-Rampton Expl. "Lahaie Lake Group"	Au	Assess	GL Gc	1983	2.5807	
Morrisette	32D/04	Gleeson-Rampton Expl. "Morrisette Creek Group"	Au	Assess	Gc GL SA	1983	2.5808	
Morrisette	32D/04	Monopros Ltd.	SEE	UNDER	ARNOLD TOWNSHIP			
Morrisette	32D/04	Ward, J.T.	Au	Assess	DD (3) 327' GL VLF-EM	1983 1983 1983	2.6062 2.6141	
Mortimer	42A/15	St. Denis, R.	Au	Assess	rTr	1983		
Munro	42A/09	Mangan, J.J.	Au	Assess	STr	1984		
Munro	42A/09	Miller, J.M.	Au	Assess	DD (1) 205'	1984		
Munro	42A/09	Richmond, G.	SEE	UNDER	McCOOL TOWNSHIP			
Nicol	41P/10	Peerless Silver and Cobalt Exploration Ltd.	SEE	UNDER	HAULTAIN TOWNSHIP			
Noseworthy	32E/05 32E/12	Newmont Exploration of Canada Ltd.	SEE	UNDER	BRADETTE TOWNSHIP			

TABLE 4 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Ogilvie	41P/06	Amoco Canada Petroleum Company Ltd.	Au	Assess	SA	1983	2.6355	
Otto	42A/01	Argentex Resource Expl. Corporation	Au	OMEP Assess	GL DD (4) 1352' STr	1981 1984 1984		
Otto	42A/01	Birnie, B.	Au	Assess	rTr STr	1983 1984		
Otto	42A/01	Joni Minerals & Exped. Ltd. "Dymet-Kidston Group D"	Au	Assess	STr	1983		
Otto	42A/01	Reed, J.D.	SEE	UNDER	EBY TOWNSHIP			
Otto	42A/01	Vesich, Z.	Au	Assess	DD (2) 214'	1983		
Pacaud	31M/13	Gilson, R.R.	Au	Assess	SA STr rTr SA	1983 1983 1984	2.5611	2.6381
Pacaud	31M/13	Hurd, D.	Au	Assess	rTr rTr	1983 1984		
Pacaud	31M/13	Laskowski, H.	Au	Assess	STr rTr	1984		
Pacaud	32D/04 31M/13	Shiningtree Gold Res. Inc. "West Group"	SEE	UNDER	BOSTON TOWNSHIP			
Playfair	42A/08	Bodick, J.	Au	Assess	STr STr rTr	1983 1984		
Playfair	42A/08	Playfair Resources Inc.	Au	Assess	DD (1) 701'	1983		
Playfair	42A/08	Standen, L.	Au	Assess	SA	1983		
Pliny Steele	32E/04 42H/01	Randa, T.	Au	Assess	Gc SA	1981	2.4835	
Powell	41P/15 42A/02	Hanson Mineral Exploration Ltd.	SEE	UNDER	BADEN TOWNSHIP			
Powell	41P/15	Sylva Exploration Ltd. "Bloom Lake Group"	Au	Assess	VLP-EM HLEM	1979	2.3212	
Purvis	42A/16	Noranda Exploration Co. Ltd. "Bowyer 2-82"	SEE	UNDER	BOWYER TOWNSHIP			
Rattray Skead	31M/13	MacGregor, R.A. "Four Corners Baseline"	Au	Assess	VLP-EM	1983	2.5473	
Rattray Skead	32D/04	Noranda Exploration Co. Ltd. "MacGregor Option"	Au	Assess	HLEM VEM SA SA	1982 1983 1984	2.4873 2.5374 2.6766	
Robillard	41P/16	Maidment, E.E. "Mearow Occurrence"	Au	Assess	DD (1) 309'	1983		
Sargeant	32D/13	Cominco Ltd.	SEE	UNDER	HEPBURN TOWNSHIP			
Scapa	32D/13	Asarco Exploration Co. of Canada Ltd.	SEE	UNDER	HEPBURN TOWNSHIP			
Simple	41P/14 42A/03	Chevron Canada Resources Ltd.	SEE	UNDER	ENGLISH TOWNSHIP			
Sherring	42A/15	Noranda Exploration Co. Ltd. "Sherring 1-82"	Au	Assess	Mag HLEM	1983	2.5940	
Sherring	42A/16	Noranda Exploration Co. Ltd. "Sherring 2-82"	Au	Assess	HLEM Mag DD (1) 626'	1984 1984	2.6882	
Skead	31M/13	Canadian Nickel Co. Ltd.	SEE	UNDER	HEARST TOWNSHIP			
Skead	31M/13	Kapuskasing Resources Ltd.	Au	Assess	VLP-EM Mag Rad GL	1983	2.6091	
Skead	32D/04 31M/13	MacGregor, R.A. "Benson-Creek Project"	Au	Assess	VLP-EM VLP-EM	1982 1983	2.4875 2.5494	
Skead	32D/04 31M/13	MacGregor, R.A. "Castello Lake Grid"	Au	Assess	Mag VLP-EM	1983	2.5495	
Skead	31M/13	MacGregor, R.A. "Four Corners Baseline"	SEE	UNDER	RATTRAY TOWNSHIP			
Skead	31M/13	MacGregor, R.A. "Group B1"	Au	Assess	DD (5) 834' STr	1984		
Skead	31M/13	MacGregor, R.A. "Lincoln-Nipissing Project"	Au	Assess	VLP-EM	1983	2.5702	
Skead	32D/04 31M/13	MacGregor, R.A. "Manor Grid"	SEE	UNDER	HEARST TOWNSHIP			

TABLE 4 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Skead	32D/04	Noranda Exploration Co. Ltd. "MacGregor Option"	SEE	UNDER	RATTRAY TOWNSHIP			
Skead	31M/13	Perron, A.	Au	Assess	rTr STR	1983		
Skead	31M/13	Utah Mines Ltd. "Manor Property" "MacGregor Option"	SEE	UNDER	HEARST TOWNSHIP			
Sothman	41P/14	Manville Canada Inc.	Au	Assess	rTr DD (5) 538' CS SA	1983 1983 1983	2.6438	
Steele	32E/04 42M/01	Randa, T.	SEE	UNDER	PLINY TOWNSHIP			
Stoughton	32D/12	Noranda Exploration Co. Ltd. "Stoughton 1-79"	Au	Assess	DD (2) 329' VLF-EM	1982 1984	2.6661	
Stull	41P/02	Brady, J.	Au	Assess	STR	1984		
Tannahill	32D/05	Mathias, A.	Au	Assess	STR	1983		
Taylor	42A/09 42A/10	Canamax Resources Inc. "Pipestone Project"	SEE	UNDER	BEATTY TOWNSHIP			
Taylor	42A/10	Canamax Resources Inc. "Stock 3"	Au	Assess	AMag AEM	1984	2.6839	
Taylor	42A/10	Hollinger Argus Ltd.	Au	Assess	DD (1) 154'	1984		
Teck	42A/01	Argentex Resources Expl. Corporation	Au	Assess	GL STR	1984 1984	2.7032	
Teck	42A/01	Dans, R.E.	Au	Assess	STR	1983		
Teck	42A/01	Gren-Teck Kirkland Res. Ltd. "Cook Lake Group"	SEE	UNDER	GREENFELL TOWNSHIP			
Teck	42A/01	Harvey, L.	Au	D	VLF-EM	1984		
Teck	42A/01	Joni Minerals & Exped. Ltd. "Dyment Kidston Group A & B"	Au	Assess	STR	1983		
Teck	42A/01	Labrador Expl. (Ont.) Ltd. "Dyment-Kidston A & B Project"	Au	Assess	STR Gc	1983 1983	2.5700	
Teck	42A/01	Lac Minerals Ltd. "Condie Claim"	Au	Assess	DD (2) 231'	1983		
Teck	42A/01	Leahy, M.	Au	Assess	DD (1) 183'	1983		
Teck	42A/01	O'Connor, F.T.	SEE	UNDER	BERNHARDT TOWNSHIP			
Teck	42A/01	Perron, A.H. "Group 1 & 2"	Au	Assess	STR rTr VLF-EM Mag GL STR	1983 1984 1984 1984	2.6954 2.7248	
Teck	42A/01	Perron, A.H. "Wedge Claims"	Au	Assess	Mag VLF-EM GL	1984 1984	2.6734 2.6988	
Teck	42A/01	St.Jean, B.; Williams, D.E.	Au	Assess	DD (5) 1093'	1983		
Teeffy	42A/15 42A/10	Canamax Resources Inc.	Au	Assess	DD (7) 3880'	1983		
Thackeray	32D/05 42A/08	Brinco Mining Ltd. "Tillicum Project"	SEE	UNDER	BARNET TOWNSHIP			
Truax	41P/16	Attwater, D.	Au	Assess	STR	1983		
Tyrrrell	41P/10 41P/11	Stubbs, D.	Au	Assess	Gc	1981	2.4381	
Unwin	41P/03	Elliott, A. "Chicault Gold-Cobalt Prospect"	Au Co	Assess	VLF-EM Mag SP Mag	1982 1983	2.5428 2.6102	
Unwin	41P/06	Onitap Resources Inc.	Au	Assess	DD (2) 901'	1984		
Walker	42A/09 42A/10	Canamax Resources Inc. "Pipestone Project"	SEE	UNDER	BEATTY TOWNSHIP			
Walker	42A/10	Golden Grail Mineral Exploration Corporation	Au	Assess	IP	1983	2.5750	
Wesley	42A/16	Noranda Exploration Co. Ltd. "Moody 1-81"	SEE	UNDER	CHESNEY RAY			

TABLE 4 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Wesley	42A/15	Noranda Exploration Co. Ltd. "Wesley 1-83, 3-83"	Au	Assess	HLEM Mag	1984	2.7184	
	42A/16					HLEM Mag	1984	2.7186
Wilkie	42A/09 42A/10	Canamax Resources Inc. "Pipestone Project"	SEE	UNDER	BEATTY TOWNSHIP			
Wilkie	42A/10	Kidd Creek Mines Ltd.	Au	Assess	DD (1) 600' STr	1983 1984		
Wilkie	42A/09	McChristie, N.	Au	Assess	DD (3) 389'	1983		
Wilkie	42A/10	Nahanni Mines Ltd.	Au	OMEF Assess	GL DD (1) 1112'	1981 1983		
Wilkie	42A/09	Pyke, D.R.	SEE	UNDER	CARR TOWNSHIP			

Discovery Mines Limited and Lenora Explorations Limited diamond drilled several thousand metres in a gold-bearing stratigraphic zone in Elliot, Harker, and Holloway Townships that strikes through the claims held by Golden Harker Explorations Limited.

Falconbridge Limited diamond drilled about 10 000 m in Michaud and Garrison Townships gold prospects (respectively Marchaud and Garrison Creek Properties).

Kerr Addison Mines Limited staked a number of claims around the Murphy Property in Garrison Township and did extensive follow-up work, including overburden and diamond drilling.

The Larder Resources Incorporated "Cheminis Mine" gold-bearing zones underwent considerable diamond drilling by Eldor Resources and Kerr Addison Mines Limited, including one hole about 1500 m long, wedged through the projected ore horizon at several depths.

Manridge Exploration Limited drove a scoop tram decline ramp to, and drifted along, its silver-bearing zone near Gowganda, and trucked about 1000 tons to the Canadaka Mill of Sulpetro Minerals Limited near Cobalt.

Maude Lake Gold Mines Limited diamond drilled an additional 24 000 feet (7315 m) at its Beatty Township "Argyll" Gold Deposit.

McGarry Deep Mines Limited diamond drilled about 10 000 m at its McGarry Township gold prospect.

Newmont Exploration of Canada Limited staked more than 300 claims in Bradette and Noseworthy Townships on the Ontario extension of the Casa-Berardi gold-bearing stratigraphic zone. Overburden drilling, geophysics, and more than 10 000 feet (3048 m) of diamond drilling were done.

Perrex Resource Exploration completed overburden drilling with follow-up diamond drilling on its 50-claim property in Holloway Township. Gold values in till ranged up to 0.04 ounce gold per ton (The Northern Miner, November 1, 1984).

Placer Development Limited drilled more than 25 holes totaling more than 17 000 feet (5187 m) on the Belore Property in McCool Township. The best result reported was 0.28 ounce gold per ton across 13.1 feet (4 m) (The Northern Miner, August 9, 1984).

Pryme Energy Resources Limited did extensive work on ground optioned from Don McKinnon. Drilling indicated 0.413 ounce gold per ton across 4 feet (1.2 m) (George Cross News Letter, January, 1984) and significant amounts of zinc.

St. Joe Canada Incorporated overburden drilled more than 14 000 feet (4267 m) with further follow-up diamond drilling in the Cook and Barnet Townships area.

This exploration was, in part, an attempt to track down anomalous gold values found in overburden drilling in Benoit and Melba Townships by the Ontario Geological Survey as part of the Kirkland Lake Initiatives Program (KLIP).

Shenandoah Resources diamond drilled and trenched on the Kennedy-Boston Property in Catharine Township. Three thousand feet (914 m) of drilling on 100-foot (30.5 m) centres tested a mineralized zone along strike 1100 feet (335 m) to a depth of 230 feet (70 m). Drill-indicated reserves were estimated at 500 000 tons grading 0.32 ounce gold per ton (The Northern Miner, November 15, 1984).

PROPERTY VISITS

C.M.B. HOLDINGS "BEAVER DAM" GOLD OCCURRENCE, FAVELLE TOWNSHIP

A new occurrence of gold was discovered by assaying float placed on a dam by beavers (L. Cunningham, geologist, Kirkland Lake, personal communication, 1984). The southern end of the dam is built on a 6 m thick, ropy lava flow of komatiitic basalt, striking 100°, dipping steeply, and containing malachite stain in a carbonate stringer. Stratigraphically below (north of) the flow is a 3 m thick interflow sedimentary rock, its top more siliceous, its base more carbonate-rich, containing disseminated fine- and medium-grained pyrite. Above (south of)

TABLE 5. CORE STORED AT DRILL CORE LIBRARY, KIRKLAND LAKE

Township	Company	Drillhole Length (m)	Core Stored (m)
Alma	Minorex Limited	326.5	295.0
Alma	Northclaim Resources	93.6	1.6
Argyle	Mid North Engineer Ser. Ltd.	640.5	7.1
Arnold	Merrick-Link	1699.5	1581.0
Asquith	Annett, R.	73.2	61.0
Asquith	Patino Mines Limited	75.9	75.3
Asquith	Southgate Resources	180.6	2.5
Asquith	Timmins Gold Resources	979.7	854.9
Bannockburn	Hanna Mining Company	93.4	74.1
Bannockburn	Quevillon, G.	180.3	4.2
Barnet	Noranda Exploration Co. Ltd.	135.3	132.9
Beatty	Amax Minerals Exploration	145.9	141.8
Beatty	Gulf Minerals Canada Limited	1039.6	930.8
Beatty	Noranda Exploration Co. Ltd.	399.2	191.7
Ben Nevis	Beaudry, R.	408.4	261.5
Bernhardt	Beaumont Consolidated	871.7	129.7
Blakelock	Noranda Exploration Co. Ltd.	401.5	293.7
Blakelock	Utah Mines Limited	269.7	157.2
Boston	Dominion Foundaries	97.5	95.1
Boston	Kerr Addison Mines Limited	167.6	1.6
Bowman	Asarco Exploration Company	318.5	226.2
Bradette	Newmont Exploration Canada Ltd.	2448.5	36.5
Bradette	Noranda Exploration Co. Ltd.	533.9	320.2
Bryce	Anaconda Canada Exploration	913.8	877.0
Bryce	Bush, C.	232.5	229.8
Burrows	Hanna Mining Company	138.4	92.0
Burrows	Newmont Exploration Canada Ltd.	1614.9	1545.4
Cabot	Hanna Mining Company	212.4	131.1
Cairo	Minorex Limited	598.0	553.9
Catharine	Amax Minerals Exploration	8228.4	7714.8
Catharine	Link, W.O.	302.7	263.7
Churchill	Patino Mines Limited	117.0	116.1
Churchill	Timmins Gold Resources	100.3	75.9
Cleaver	Teck Exploration Limited	323.4	4.0
Clifford	Merrick-Link	316.1	292.2
Clifford	Noranda Exploration Co. Ltd.	227.9	1.8
Connaught	Patino Mines Limited	515.4	488.4
Cook	New Kelore Mines Limited	92.7	2.9
Cook	Noranda Exploration Co. Ltd.	146.0	104.5
Currie	Asarco Exploration Company	3971.2	2898.2
Currie	Turney, W.J.	39.0	0.2
Eby	Harrington, P.	67.1	0.6
Eby	Reid, J.	328.9	318.0
Edwards	Amax Minerals Exploration	321.3	231.3
Edwards	Canamax Resources Incorporated	510.0	243.1
Flavelle	Minorex Limited	91.4	75.3
Garrison	Amax Minerals Exploration	790.0	624.7
Gauthier	Haas-Warner Mining Limited	239.3	236.2
Gauthier	Leahy, M., Forbes, C.	31.7	0.4
Grenfell	Minorex Limited	983.3	895.3
Grenfell	Orcana Resources	110.9	104.2
Guibord	Amax Minerals Exploration	75.0	71.3
Guibord	Cominco Limited	589.5	2.3
Guibord	Johns-Manville Canada Inc.	62.2	1.0

TABLE 5. CONTINUED

Township	Company	Drillhole Length (m)	Core Stored (m)
Halliday	Canadian Arrow Mining Ltd.	927.4	10.5
Halliday	Chevron Standard Limited	2089.8	1659.0
Halliday	Noranda Exploration Co. Ltd.	106.7	48.5
Halliday	Northgate Exploration Limited	539.1	7.9
Harker	Amax Minerals Exploration	6116.2	5031.1
Harker	Canamax Resources Incorporated	815.0	684.9
Harker	Golden Harker	1889.0	1708.9
Hearst	Amax Exploration Incorporated	111.3	68.6
Hearst	Amax Minerals Exploration	618.7	556.2
Hearst	MacGregor, R.A.	841.6	9.8
Hearst	Pelangio Larder Mine	366.8	316.0
Hearst	San Rafael Resources	312.1	3.5
Hearst	Sudbury Contact Limited	1980.6	20.5
Hearst	Utah Mines Limited	240.2	2.5
Henwood	Stone-Eplett	2335.4	1923.9
Hinks	Newmont Exploration Canada Ltd.	782.1	742.3
Hislop	Ginn, A.P.	615.2	7.6
Hislop	Pamour Porcupine Mines	122.5	3.0
Hislop	Young-Davidson Mines	111.9	1.2
Hoblitzell	Noranda Exploration Co. Ltd.	178.8	101.1
Holloway	Amax Minerals Exploration	140.5	127.0
Holloway	Canamax Resources Incorporated	784.1	681.0
Holloway	McIntyre Porcupine Limited	1563.1	1152.6
Holmes	Cunningham, L.	373.9	349.0
Holmes	Minorex Limited	598.1	516.7
Ingram	Marshall, F.	267.6	2.9
Katrine	Kiazyk, B.	152.5	152.5
Katrine	Lacana Mining Company	118.0	115.8
Katrine	Noranda Exploration Co. Ltd.	67.4	63.1
Kerrs	Denison Mines Limited	488.6	8.5
Knight	Sutherland & Associates	1577.4	1075.6
Knight	Timiskaming Nickel Limited	971.7	432.8
Knight	Whitegate Mining Company	289.6	30.5
Knox	Amax Minerals Exploration	111.0	77.0
Lebel	Edenroc Mineral Corporation	92.4	79.6
Lebel	Haas-Warner Mining Limited	67.1	57.3
Lebel	North Kirkland Mines	2648.0	2558.2
Lebel	Rio Tinto Canada Exploration	107.3	100.9
Lebel	S.I.S. Resources	1224.1	1186.2
Lebel	Stewart, A.K.	91.4	0.5
MacMurphy	Madsen Red Lake Gold Mine Ltd.	160.1	6.2
Maisonville	Lacana Mining Company	519.1	472.8
Maisonville	Noranda Exploration Co. Ltd.	180.5	50.9
Maisonville	Rio Tinto Canada Exploration	110.0	93.2
Marriott	Canamax Resources Incorporated	2217.3	1894.4
Marter	Rio Tinto Canada Exploration	105.8	73.7
McCool	Amax Minerals Exploration	131.0	77.0
McCool	Lee Geo-Indicators Limited	113.4	1.0
McElroy	Amax Exploration Incorporated	937.8	739.8
McElroy	Amax Minerals Exploration	796.8	777.6
McElroy	Lampe Resources Company Limite	242.6	240.2
McElroy	Superior Northwest Incorporated	1262.8	13.2
McFadden	San Rafael Resources	308.1	3.5
McGarry	Amalgamated Larder	269.7	247.5
McGarry	Forbes, C. Leahy, M.	122.2	119.2
McGarry	Lampe Resources Company Ltd.	209.1	204.5
McGarry	Walker, J.O.	482.9	8.0

TABLE 5. CONTINUED

Township	Company	Drillhole Length (m)	Core Stored (m)
McNeil	Manville Canada Incorporated	142.4	2.0
McNeil	Noranda Exploration Co. Ltd.	133.8	88.7
McNeil	Weekley, L.	1347.2	1199.2
McVittie	Amalgamated Larder	1192.9	1084.9
McVittie	Bustræen, M.	587.3	7.3
McVittie	Lenora Exploration	9209.4	8313.0
McVittie	MacGregor, R.A.	97.5	1.0
McVittie	Noranda Exploration Co. Ltd.	69.0	69.0
McVittie	Smith, L.	99.4	1.6
McVittie	Swansea Gold Mines Limited	848.7	539.3
Melba	Here Fault Copper Limited	1204.0	835.0
Melba	Rosario Resources	381.3	372.2
Michaud	Amax Minerals Exploration	160.0	130.3
Michaud	Redstone Resources Incorporated	700.4	570.9
Michaud	Renzy Mines Limited	2197.2	19.1
Midlothian	Larche-Rousseau	1133.7	17.2
Midlothian	Regal Goldfields Limited	1524.9	1473.6
Milner	Sutherland, D.	126.5	1.8
Montrose	Hanna Mining Company	90.4	66.9
Morrisette	Edda	175.6	161.8
Morrisette	Merrick-Link	156.4	152.1
Morrisette	Rosario Resources	769.6	617.8
Morrisette	Ward, J.	99.7	96.6
Munro	Amax Minerals Exploration	1927.7	1793.7
Natal	Sutherland & Associates	882.4	405.4
Natal	Timiskaming Nickel Limited	440.7	119.8
Newman	Noranda Exploration Co. Ltd.	310.8	189.3
North Williams	Metron Exploration Limited	30.8	1.0
Noseworthy	Newmont Exploration Canada Ltd.	926.1	14.5
Ossian	Lacana Mining Company	163.1	128.0
Ossian	Noranda Exploration Co. Ltd.	127.7	120.1
Ossian	Rio Tinto Canada Exploration	124.5	112.0
Otto	Minorex Limited	292.3	275.9
Otto	Rio Tinto Canada Exploration	116.4	110.9
Pacaud	Laskowski, H.	317.6	310.0
Pense	Gereghty, G.J.	466.0	6.5
Pense	Hudson Bay Mining Limited	99.7	1.7
Playfair	Cunningham, L.	213.7	155.8
Playfair	Playfair Resources	311.2	225.0
Powell	Welsh, G.	121.6	1.4
Ratray	Noranda Explorations Co. Ltd.	214.0	2.3
Rickard	Amax Minerals Exploration	695.0	455.5
Robillard	MacDonald, N.W.	141.7	0.3
Sangster	Shell Canada Resources Inc.	664.1	601.6
Skead	Canadian Nickel Company Ltd.	745.6	7.6
Skead	Noranda Exploration Co. Ltd.	223.4	2.3
Skead	Rio Tinto Canada Exploration	741.5	8.0
Skead	Superior Northwest Incorporated	607.1	6.7
Skead	Utah Mines Limited	445.4	5.0
Sothman	Manville Canada Incorporated	163.9	2.5
Stoughton	Nufort Resources Incorporated	857.3	798.7
Teck	Lake Shore Mines Limited	67.4	55.2
Teck	Chorzepa, E.	61.0	59.7
Teck	Edenroc Mineral Corporation	359.4	339.8
Teck	Forbes C., Leahy, M.	243.8	241.4
Teck	Guaranty Trust Company	197.0	190.0
Teck	Harrington, P.	754.9	704.7

TABLE 5. CONTINUED

Township	Company	Drillhole Length (m)	Core Stored (m)
Teck	Labrador Exploration Limited	776.9	658.2
Teck	Lac Minerals	1050.4	990.2
Teck	Lake Shore Mines Limited	3452.2	2001.1
Teck	Marshall Minerals	164.9	163.1
Teck	McKinnon, D.	49.1	0.5
Teck	Newmont Exploration Canada Ltd.	1900.5	1806.2
Teck	S.I.S. Resource	156.1	153.3
Teck	Stewart, A.K.	244.9	233.4
Teck	Wright-Hargreaves Limited	760.1	575.8
Teefy	Amax Minerals Exploration	994.0	541.6
Teefy	Canamax Resources Incorporated	1622.7	938.2
Thackeray	Noranda Exploration Company Ltd.	542.3	313.9
Tweed	Utah Mines Limited	196.6	140.5
Tyrrell	Sutherland & Associates	309.4	133.2
Walker	Canamax Resources Incorporated	114.0	65.4
Walker	Noranda Exploration Co. Ltd.	140.9	132.2
Walker	Surveymin Limited	343.2	272.0
Warden	Amax Minerals Exploration	372.0	231.2
Wilkie	Nahanni Mines Limited	579.8	527.1
Wilkie	Noranda Exploration Co. Ltd.	237.4	163.9
Zavitz	Newmont Exploration Canada Ltd.	640.3	502.8
Total		129810.9	87216.2

the ropy lava flow is a 0.3 m thick rusty (pyritic) more schistose sedimentary rock. Overlying this interflow sedimentary rock is mostly massive basalt flow which, where exposed, is covered to the south by sedimentary rock of the Coleman Member of the Gowganda Formation, Cobalt Embayment. The Gowganda sedimentary rock contact dips steeply, indicating it does not over-fill a deep northeast-trending trough in Archean basement rocks that may be the location of the Proterozoic fault line scarp of the Larder Lake Fault. Downstream from the beaver dam, a sub-concordant syenite porphyry sill occurs and is composed mainly of white feldspar phenocrysts in a red coloured matrix containing 0.2% pyrite. North of this sill is pillow breccia, containing some arcuate to partly angular fragments displaying chilled margins 2 cm thick. The Archean exposure farthest to the southeast is relatively soft (carbonate and silica-bearing) olive drab rock containing some disseminated and streaked pyrite.

Bulldozer blade stripping of soil to the south by CMB Holdings exposed Archean pale buff (sericitic) sedimentary rock in contact with mafic igneous rock that contains angular fragments (up to 10 cm long) of sedimentary rock. Toward the beaver pond on this freshly stripped outcrop is greyish black tuffaceous sedimentary rock containing mafic minerals, white carbonate, 4 to 10% pyrite, and significant concentrations of gold. Some of the chlorite and pyrite are interbanded.

Eight metres northeast, along the beaver pond's southwestern shore, from the above described interflow sedimentary rock from being as the beaver pond's southern end, is a unit of pinkish syenite-metasomatized ropy lava. Farther northwest along the beaver pond's southwestern shore is a lime-rich feldspathic, folded, bedded lens of recrystallized sedimentary rocks less than 1 m thick, with pebbles and porphyroblasts at its northern contact. Farther northwest is a ropy lava unit, then a flow breccia or agglomerate unit containing less

chlorite, whiter weathered surfaces, and fragments that are differentially weathered along what may be reaction rims. Farther northwest is a 4 m thick unit of crystal tuff that contains pebbles in its northern portion. Farther northwest is a unit of flow breccia or agglomerate, and still farther northwest is found medium-grained pale pink syenite, resembling that which bears gold to the north in Holmes Township near Dixon Lake. This syenite contains mafic inclusions and is criss-crossed by anastomosing seams of chlorite, probably caused by hydrothermal solutions.

Gold is concentrated in the above mentioned interflow sedimentary rocks, particularly where they contain silica, pyrite, sericite, chlorite, and carbonate.

GOLDEN HARKER PROSPECT, HARKER TOWNSHIP

From 1924 to 1929, No. 1 shaft was sunk, several levels established, and 7000 feet (2134 m) of lateral work done. No. 2 shaft was sunk to 58 feet (18 m). The only

production achieved was circa 1980, when Pamour Porcupine Mines Limited milled Golden Harker dump's development and drift muck at Pamour No. 1 mine mill east of Timmins.

Diamond drilling during 1984 by Discovery Mines Limited and Lenora Explorations Limited intersected the type of syenite that is a late differentiate of tholeiitic basalt and also the type of syenite that is a partial melt of volcanic and interflow sedimentary rocks, and contains some gold.

Exploration is directed (A. Troop, consulting geologist, Troop Exploration and Development Incorporated, personal communication, 1984) to searching for stopeable thicknesses of laterally extensive gold-bearing interflow sedimentary rock (composed of silica, sericite, and a maximum of 15% pyrite) such as was found by Barrick Resources Limited in Holloway Township, in 2 of several prominent interflow sedimentary rock zones north of (stratigraphically below) the Golden Harker Prospect.

SHELDON-LARDER MINES LIMITED GOLD PROSPECT, MCGARRY TOWNSHIP

Aurelian Developers Limited diamond drilled near Larder Lake's northeast arm, approximately along strike southwest from the ore zone that trends under the mill of Kerr Addison Mines Limited.

Conglomerate here is largely from an ultramafic source. Characteristically the green chlorite (Mg-Fe silicate derived from pyroxene), white carbonate (Ca from pyroxene), and quartz veins (from breakdown of talc) all tend to be barren of gold.

The gold is in pebbles and other epiclasts of pyritic, siliceous-cemented mudstone broken up and transported short distances to form part of a polymictic conglomerate here. Sandy material, drapes of mud around pebbles, mud chips, and a little mudstone conglomerate indicate this to be a wet beach deposit (G. Hinse, consulting geologist, Sudbury, personal communi-

cation, 1984). This offshore (littoral) environment provided enough alkalinity to precipitate sodium silicate (which became leached to form silicification or silica cement) and enough oxygen to aid precipitation of gold presumably driven off active (organic) carbon during its oxidation to carbonate rock. The mudstone pebbles are grey coloured, indicating sufficient sulphur was present to tie up iron in sulphide mineralization, not the brown and red hues imparted by iron oxides.

T. AND W. SULLIVAN AND W. COOPER COPPER OCCURRENCE, LEBEL TOWNSHIP

West 800 feet (244 m) from a syenitic outcrop, which is south of the footbridge across a creek, is the main pit of claim 476364.

The banded mafic tuff mineralogy consists mainly of black hornblende, yellowish green epidote, and reddish brown garnet. Lenses and cross-cutting streaks of fine- to medium-grained (the latter, presumably recrystallized) pyrite are present, and contain a little chalcopyrite. Some pyrrhotite is present, as well as bands of clear quartz, white quartz, and feldspar with disseminated cubes of pyrite and lesser magnetite. Where coarse-grained pyrite cubes occur in a matrix of massive pyrrhotite, no chalcopyrite is present. This feldspar resembles recrystallized chert (having the grain size of quartz coarsened) in the iron formation near here. Another pit contains more massive amphibolite, with a few pyrite veins and a little chalcopyrite.

These copper occurrences are in impure sulphide iron formation, a facies change approximately along strike from the Adams Taconite Iron Mine North Pit. Their metamorphic grade is elevated by the adjacent Lebel Township syenitic stock, of which they are part of the epidote-garnet amphibolite facies of the metamorphic aureole.

RECOMMENDATIONS FOR EXPLORATION

BASAL TILL SAMPLING

In 1984 overburden drilling by the sonic method was used for the Ontario Ministry of Natural Resources' Black River-Matheson project and also by several companies tracing heavy minerals (particularly gold), especially in basal lodgement till. Sonic overburden drilling is advantageous over reverse-circulation overburden drilling insofar as it provides a little-disturbed stratigraphic section of the soil, and more complete recovery of gold because during drilling it does not use return water that might incidentally float off fine-grained, e.g. "flour", gold. However, unlike overburden drilling using reverse circulation, sonic drilling also does not float off gold that is present as thin films precipitated hydromorphically on otherwise unrelated detrital grains, i.e. gold that does not represent detrital dispersion.

GOLD

Sedimentation is prominent in the history of recently discovered large gold deposits, e.g. those in the Hemlo and Lake Abitibi areas (the latter area through Ontario's Holloway Township, e.g. Barrick Resources Corporation and Canamax Resources Incorporated, and through Quebec's Casa Berardi Township, e.g. Golden Knight Resources Incorporated and Inco Limited). Sedimentation may have concentrated the gold by 2 processes, 1 being hot springs chemically precipitating sediments which are largely inorganic, and another being restricted lagoonal (inland sea) shallow-shelf, largely organic (and partly epiclastic and inorganic, evaporitic) chemical sedimentation (Owsiacki and Lovell 1984). Both types were, in open systems, dispersed by felsic intrusions, amphibolite metamorphism, and tectonic stresses which, however, in some closed systems concentrated gold further by pumping it into structural traps and metasomatic aureole isograd locations.

As example of the shallow shelf environment is the 80 km-long southward-veining homocline that extends almost the entire east-west length of the Black River-Matheson (BRIM) project area. The areal extent of the homocline is clearly indicated on the colour contoured aeromagnetic map (scale 1:80 000) available from Dataplotting Services Incorporated, Don Mills, Ontario. About 85% of known gold occurrences in the Black River-Matheson homocline plot along the long narrow magnetic lows that characterise Mg-rich tholeiitic basalt and interflow sedimentary rocks (contrasted with parallel magnetic highs caused by Fe-rich tholeiitic basalt). A single general stratigraphic zone of the homocline contains the Ross gold mine of Pamour Porcupine Mines Limited and McDermott discovery of Barrick Resources Corporation. Along strike, each channel-filling polymictic deltaic pebbly grey wacke represents each large drainage basin (provenance area). Across strike 10 km (the maximum stratigraphic thickness of the homocline, which is north across Cook Township and the southern part of Guibord Township), 10 or more roughly parallel stratabound auriferous zones exist. Prominent in Harker and Holloway Townships are the concordant to subconcordant or disconformable McDermott, Mattawasaga, Harlight, Golden Harker, and Iris zones. Several channel locations are "consequent", having been perpetuated throughout a period of time, i.e. repeated stratigraphically almost directly above earlier channels. Flanking and off-shore from these channels are gold-bearing fine-grained sedimentary rocks, and they too are repeated in overlying strata, i.e. across strike. These gold-bearing interflow sedimentary strata, where composed mainly of fine-grained silica, carbonate, sericite, and more than 1% pyrite, contain gold concentrations of more than 0.03 of a Troy ounce gold per ton (1 g/t) in samples from many locations, and in some places constitute large tonnages of more than 0.1 ounce gold per ton.

A way by which this shallow-shelf gold may have concentrated is as follows (including suggestions by G. Hinse, personal communication, 1984):

Gold dissolved in hot spring fluids, and presumably also in cyanide manufactured by bacteria particularly during the sudden proliferation of biomass (mainly blue-green algae and bacteria) 2700 million years ago (Schidowski 1983).

Subaerial erosion at about that time transported organic material derived from blue-green algae and accompanying colonies of bacteria down-river beyond the delta apron into a regressed inland sea, to help form the offshore fertile shallow shelf. Gold arrived in the shallow shelf adhering to organic-protected clay-colloid mixtures, and was precipitated on growing pyrite crystals and also on the fertile shelf's active (biogenic) carbon (nature's "carbon-in-pulp" extraction process). Oxidation of the active carbon (where not prevented by burial in clastic debris, thereby preserving the carbonaceous material commonly referred to as "graphite") formed carbonate rock, and gold and gangue solutions were driven into fractures. Sericite formed by diagenetically altering clay that was cemented by silica. Further maturing chemically in a slightly alkaline environment produced the silica-sericite-pyrite-gold upper laminae of the Black River-Matheson chemical sedimentary sequences that have carbonate rock at their (chemically immature) bases. The gold-to-silver ratio at the Ronda Gold Mine, Shining Tree, is 1:5. In places, further chemical maturing in the form of leaching removed Ca and to a lesser extent Ag and thereby upgraded the original carbonate's Fe and Mg so as to residually concentrate ferroan dolomite or ankerite and increase the original Au:Ag ratio (5:1 in Porcupine).

Overlying ultramafic (where present, as in Larder Lake gold mines) and mafic flows incorporated the partly chemical sedimentary substrate, and thus became altered (variably carbonatized,

silicified, pyritized, propylitized, and argillized). Typically the mafic flow provided insufficient heat to drive the gold out of pyrite, but ultramafic flows, where present, heat-pumped the gold from the interflow sediment into solutions that precipitated in fractures as quartz veins bearing coarse-grained free gold (Au:Ag = 17:1 in Larder Lake gold mines).

Where carbonate was largely leached away, sulphate was correspondingly residually concentrated, and during further chemical maturing of the sediment some of the sulphate's calcium was replaced by barium, thus forming barite. Gold in a sediment so mature as this is largely native, having been leached out of pyrite, and also the Au:Ag ratio is high (averaging about 20:1 at Hemlo).

Where the upgrading was mechanical in addition to chemical, e.g. South African Witwatersrand paleoplacer-Carbon leader gold ores, gold concentrations formed having high Au:Ag ratios (Boyle 1979) as in some of the Witwatersrand (Au:Ag = 13:1) ores (Reimer 1984) and to unknown extents in the Cobalt Embayment Lorrain Formation physically and chemically mature sandstones (Colvine 1981, 1983; Mossman and Harron 1983a, 1983b), and in Pleistocene esker gravels (Lee 1965).

In Kirkland Lake (Au:Ag = 6:1) and Matachewan (Au:Ag = 4:1) gold mines, upgrading occurred in a different way - by partial melting of the intercalated gold-bearing sedimentary and volcanic rocks to form syenitic rocks that heat pumped gold with solutions into structural traps such as shears, faults, fissures, and axial areas of folds.

ONTARIO GEOLOGICAL SURVEY ACTIVITIES

BRIM (Operation Black River-Matheson) is funded equally by the Ontario Ministry of Northern Affairs and the Ontario Ministry of Natural Resources.

PRECAMBRIAN GEOLOGY SECTION

R. Johnstone continued mapping in Beatty, Munro, and McCool Townships as part of a program to carry out detailed, synoptic, and stratigraphic mapping along the Destor-Porcupine Fault from east of Timmins to the Quebec border (BRIM).

ENGINEERING AND TERRAIN GEOLOGY SECTION

J.M. Richard mapped the Quaternary geology of the Porquis Junction and Watabeag River area. In addition to outlining sources of sand and gravel, information was gathered to aid mineral exploration (BRIM).

GEOPHYSICS-GEOCHEMISTRY SECTION

R.B. Barlow and D. Krentz initiated a research study in the Matheson area for the purpose of developing shallow electromagnetic sounding methods.

V.K. Gupta, D.R. Wadge, and P. Mark conducted a gravity survey in the Kirkland Lake area.

J.A.C. Fortescue and C.L. Baker conducted a basal till geochemistry project in the Matheson area using a sonic drill and a back-hoe (BRIM).

MINERAL DEPOSITS SECTION

S. Marmont continued the age dating of rocks in the Timmins- Kirkland Lake area.

M.C. Cherry continued to evaluate the relationship between gold mineralization and granitoid intrusions in the Abitibi Belt.

A.C. Colvine continued a Huronian metallogenic study with emphasis on paleoplacer gold.

D. Long and A.C. Colvine continued studies of the Huronian Supergroup designed to evaluate sedimentological controls on placer gold deposits.

P.J. Whittaker, J. Malczak, and D.G. Troop examined the gold, metallic, and industrial minerals in the Black River-Matheson area (BRIM).

J.V. Hamilton completed detailed mapping of McGarry and McVittie Townships to determine structural and stratigraphic relationships near the the Larder Lake break.

RESEARCH BY OTHER ORGANIZATIONS

GEOSCIENCE RESEARCH GRANT PROGRAM

University of Toronto

Grant 118: J.D. Redman, D.W. Strangway, and O.M. Ilkissik - Surface Electromagnetic Mapping in Selected Positions in Northern Ontario

Grant 138: F.J. Wicks, W. Pu, and K. Hedjran - Mineralogy and Geochemistry of the Chrysotile Asbestos Deposits of Ontario: Munro Mines and Garrison Deposit

McMaster University

J.H. Crocket, N. Blum, T. Hurley, R. Bowins, G. McRoberts, A. Fyon, R.H. McNutt, H.P. Schwarcz, and C.E. Rees

Grant 132: Geological and Geochemical Studies of the Boston and Temagami Iron Formations and their Contiguous Volcanosedimentary Piles

REFERENCES

Baker, C.L.

1980: Quaternary Geology of the Magusi River Area (32 D/5), Districts of Cochrane and Timiskaming; p.112-113 in Summary of Field Work, 1980, by the Ontario Geological Survey, edited by V.G. Milne, O.L. White, R.B. Barlow, J.A. Robertson, and A.C. Colvine, Ontario Geological Survey, Miscellaneous Paper 96, 201p.

1982: Report on the Sedimentary and Provenance of Sediments in Eskers in the Kirkland Lake Area, and on the Finding of Kimberlite Float in Gauthier Township; p.125-127 in Summary of Field Work, 1982, by the Ontario Geological Survey, edited by John Wood, Owen L. White, R.B. Barlow, and

A.C. Colvine, Ontario Geological Survey, Miscellaneous Paper 106, 235p.

Baker, C.L., Seaman, A.A., and Steele, K.G.

1980: Quaternary Geology of Ramore Area, Districts of Cochrane and Timiskaming; Ontario Geological Survey, Preliminary Map, P.2381, Geological Series, scale 1:50 000. Geology 1979.

Baker, C.L., and Steele, K.G.

1984: Sonic Drilling - Exploration Basics in the Matheson Area (abstract); p.23 in Geoscience Research Seminar and Open House '84, December 4-5, 1984, Abstracts, Ontario Geological Survey, 23p.

Baker, C.L., Steele, K.G., McClenaghan, M.B., and Fortescue, J.A.C.

1984: Location of Gold Grains in Sonic Drill Core Samples from the Matheson Area, Cochrane District; Ontario Geological Survey, Map P.2736, Geophysical/Geochemical Series-Preliminary Map, scale 1:100 000. Geology 1984

Baker, C.L., Steele, K.G., and Seaman, A.A.

1982: Quaternary Geology of the Magusi River Area, Cochrane and Timiskaming Districts; Ontario Geological Survey, Map P.2783, Geological Series-Preliminary Map, scale 1:50 000. Geology 1980.

Boyle, R.W.

1979: The Geochemistry of Gold and its Deposits; Geological Survey of Canada, Bulletin 280, 584p.

Cherry, M.E.

1982: Felsic Intrusion Associated Lode Gold Deposits in the Matheson Area, Cochrane District; p.176-179 in Summary of Field Work, 1982, by the Ontario Geological Survey, edited by John Wood, Owen L. White, R.B. Barlow, and A.C. Colvine, Ontario Geological Survey, Miscellaneous Paper 106, 235p.

- Colvine, A.C.
1981: Reconnaissance of the Lorrain Formation, Northern Cobalt Embayment; p.187-189 *in* Summary of Field Work, 1981, by the Ontario Geological Survey, edited by John Wood, O.L. White, R.B. Barlow, and A.C. Colvine, Ontario Geological Survey, Miscellaneous Paper 100, 255p.
- 1983: Mineral Deposits Studies in the Huronian Supergroup; p.253- 255 *in* Summary of Field Work, 1983, by the Ontario Geological Survey, edited by John Wood, Owen L. White, R.B. Barlow, and A.C. Colvine, Ontario Geological Survey, Miscellaneous Paper 116, 313p.
- Gartley, L.
1984: Report of all Physical Work and Surveys Performed in Ontario in 1983; Ontario Ministry of Natural Resources.
- Jensen, L.S.
1975: Ramore Area, District of Timiskaming and Cochrane; p.73-75 *in* Summary of Field Work, 1975, by the Geological Branch, edited by V.G. Milne, D.F. Hewitt, K.D. Card, and J.A. Robertson, Ontario Division of Mines, Miscellaneous Paper 63, 158p.
- 1978: Regional Stratigraphy and Structure of the Timmins-Kirkland Lake Area, District of Cochrane and Timiskaming and the Kirkland Lake Larder Lake Area, District of Timiskaming; p.67-72 *in* Summary of Field Work, 1978, by the Ontario Geological Survey, edited by V.G. Milne, O.L. White, R.B. Barlow, and J.A. Robertson, Ontario Geological Survey, Miscellaneous Paper 82, 235p.
- 1980: Kirkland Lake-Larder Lake Synoptic Mapping Project, Districts of Cochrane and Timiskaming; p.55-60 *in* Summary of Field Work, 1980, by the Ontario Geological Survey, edited by V.G. Milne, O.L. White, R.B. Barlow, J.A. Robertson, and A.C. Colvine, Ontario Geological Survey, Miscellaneous Paper 96, 201p.
- 1982a: Precambrian Geology of the Lightning River Area, Cochrane District; Ontario Geological Survey, Map P.2433, Geological Series- Preliminary Map, scale 1:63 360 or 1 inch to 1 mile. Geology 1973.
- 1982b: Precambrian Geology of the Magusi River Area, Cochrane District; Ontario Geological Survey, Map P.2434, Geological Series- Preliminary Map, scale 1:63 360 or 1 inch to 1 mile. Geology 1968-1972.
- Jensen, L.S., and Langford, F.F.
1983: Geology and Petrogenesis of the Archean Abitibi Belt in the Kirkland Lake Area, Ontario; Ontario Geological Survey, Open File Report 5455, 520p., 9 tables, 106 figures, and 2 maps.
- Krentz, D., and Barlow, R.B.
1984: The Transient Electromagnetic Sounding of the Quaternary Geology in the Black River Matheson Area (abstract); p.21 *in* Geoscience Research Seminar and Open House '84, December 4-5, 1984, Abstracts, Ontario Geological Survey, 23p.
- Lee, H.A.
1965: Investigation of Eskers for Mineral Exploration; Geological Survey of Canada, Paper 65-14, p.1-17.
- MERQ-OGS
1983: Lithostratigraphic Map of the Abitibi Subprovince; Ontario Geological Survey - Ministère de l'Énergie et des Ressources, Quebec; 1:500 000; catalogued as 'Map 2484' in Ontario and 'DV 83-16' in Quebec.
- Mossman, D.J., and Harron, G.A.
1983a: Origin and Distribution of Gold in Huronian Supergroup, Canada - the Case for Witwatersrand-type Paleoplacers; Journal of Precambrian Geology, Volume 20, Number 2-4, p.543-583.
- 1983b: Witwatersrand-type Paleoplacer Gold in the Huronian Supergroup of Ontario, Canada; Geoscience Canada, Volume 11, Number 1, p.33-40.
- OGS
1984: Airborne Electromagnetic and Total Intensity Magnetic Survey, Matheson-Black River Area, District of Cochrane; by Questor Surveys Limited for the Ontario Geological Survey, Maps 80 572 through 80 611, Geophysical/Geochemical Series, scale 1:20 000. Survey and Compilation March to July, 1983.
- Owsiacki, L., and Lovell, H.
1984: Geology, Silver and Gold Deposits: Cobalt and Kirkland Lake; Geological Association of Canada, p.76-114.
- Pitcher, D.H., Barlow, R.B., and McNeill, J.D.
1984: Mapping the Overburden in the Black River-Matheson (BRIM) Area, District of Cochrane, Employing an Airborne Time-Domain System; p.299-307 *in* Summary of Field Work, 1984, by the Ontario Geological Survey, edited by John Wood, Owen L. White, R.B. Barlow, and A.C. Colvine, Ontario Geological Survey, Miscellaneous Paper 119, 309p.
- Reimer, T.O.
1984: Alternative Model for the Derivation of Gold in the Witwatersrand Supergroup; Journal of Geological Society of London, Volume 141, p.263-272.
- Schidlowski, M.
1983: Organic Matter in Sedimentary Rocks; Terra Cognita, Volume 4, Number 1, p.45-49.
- Tintor, N.
1983: Camflo Mines Gold Discovery Has Large Tonnage Potential; The Northern Miner, December 22, 1983.
- Trowell, N.F.
1982: Black River-Matheson, District of Cochrane; p.65-60 *in* Summary of Field Work, 1982, by the Ontario Geological Survey, edited by John Wood, Owen L. White, R.B. Barlow, and A.C. Colvine, Ontario Geological Survey, Miscellaneous Paper 119, 309p.

- tario Geological Survey, Miscellaneous Paper 106, 235p.
- Trowell, N.F., and Johnstone, R.
1983: Black River-Matheson Area, District of Cochrane; p.59-62 *in* Summary of Field Work, 1983, by the Ontario Geological Survey, edited by John Wood, Owen L. White, R.B. Barlow, and A.C. Colvine Ontario Geological Survey, Miscellaneous Paper 116, 313p.
- Vagners, U.J.
1983: Quaternary Geology of the Matheson and Lightning River Areas, District of Cochrane; p.101-103 *in* Summary of Field Work, 1983, by the Ontario Geological Survey, edited by John Wood, Owen L. White, R.B. Barlow, and A.C. Colvine, Ontario Geological Survey, Miscellaneous Paper 116, 313p.
- Weatherston, G.L.
1984: 1983 Ontario Mineral Score; Ontario Ministry of Natural Resources, Video Census Series No. 3, 242p.
- Whittaker, P.J.
1984: Geological Setting of Gold Mineralization in the Black River-Matheson Area (abstract); p.2 *in* Geoscience Research Seminar and Open House '84, December 4-5, 1984, Abstracts, Ontario Geological Survey, 23p.
- Whittaker, P.J., and Malczak, J.
1984: Mineral Deposits Investigations in the Black River-Matheson Area, District of Cochrane; p.290-294 *in* Summary of Field Work, 1984, by the Ontario Geological Survey, edited by John Wood, Owen L. White, R.B. Barlow, and A.C. Colvine, Ontario Geological Survey, Miscellaneous Paper 119.
- Val d'Or, Quebec, Canada; Journal of Geochemical Exploration, Volume 19, Number 1-3, p.447-464.
- Almond, D.C., Ahmed, F., and Shaddad, M.Z.
1984: Setting of Gold Mineralization in the Northern Red Sea Hills of Sudan; Economic Geology, Volume 79, Number 2, p.389-392.
- Alper, J.
1984: Bioengineers are Off to the Mines; High Technology, Volume 4, Number 4, p.32-36.
- Amor, S.D., and Nichol, I.
1983: Identification of Diagnostic Geochemical Alteration in the Wallrocks of Archean Volcanic-Exhalative Massive Sulfide Deposits; Journal of Geochemical Exploration, Volume 19, Number 1-3, p.543-562.
- Appel, P.W.U., and Secher, K.
1984: On a Gold Mineralization in the Precambrian Tartoq Group, SW Greenland; Journal Geological Society of London, Volume 141, Number 2, p.273-278.
- Barnes, R.G.
1983: Stratiform and Stratabound Tungsten 1983: Stratiform and Stratabound Tungsten Mineralization in the Broken Hill Block, N.S.W.; Journal of the Geological Society of Australia, Volume 30, Numbers 1 and 2, p.225-239.
- Barongo, J.O.
1984: Geophysical Investigations for Kimberlite Pipe in the Greenstone Belt of Western Kenya; Journal of African Earth Science, Volume 1, Number 3/4, p.235-253.
- Blom, R.G., Crippen, R.E., and Elachi, C.
1984: Detection of Subsurface Features in SEASAT Radar Images of Means Valley, Mojave Desert, California; Geology, Volume 12, Number 6, p.346-349.
- Bossellini, A.
1984: Progradation Geometries of Carbonate Platforms: Examples from the Tertiary of the Dolomites, Northern Italy; Sedimentology, Volume 31, Number 1, p.1-24.
- Brimhall, G.H., Cunningham, A.B., and Stoffregen, R.
1984: Zoning in Precious Metal Distribution Within Base Metal Sulfides: A New Lithologic Approach Using Generalized Inverse Methods; Bulletin of the Society of Economic Geologists, Volume 79, Number 2, p.209-226.
- Brooks, R.R.
1983: Geozoology in Mineral Exploration; Episodes, Volume 1983, Number 3, p.27-32.
- Bubela, B., and Cloud, P.
1983: Sulfide Mineralization of Microbial Cells; BMR Journal of Australian Geology and Geophysics, Volume 8, Number 4, p.355-357.
- Buchan, K.L., and Schwarz, E.J.
1981: Uplift Estimated from Remanent Magnetization: Munro Area of Superior Province Since 2150 M.Y. Ago; Canadian Journal of Earth Sciences, Volume 18, Number 7, p.1164-1173.
- Burn, R.G.
1984: Factors Affecting the Selection of Methods of Gold Analysis; Mining Magazine, May 1984, p.468-475.
- Campbell, I.H., and Barnes, S.J.
1984: A Model for the Geochemistry of the Platinum-Group Elements in Magmatic Sulfide Deposits; Journal of the Mineralogical Association of Canada, Volume 22, Number 1, p.151-160.
- Cant, D.J.
1984: Development of Shoreline-Shelf Sand Bodies in a Cretaceous Epeiric Sea Deposit; Journal of Sedimentary Petrology, Volume 54, Number 2, p.541-556.
- Carlson, J.A., Johnson, R.B., McCallum, M.E., and Padget, J.P.
1982: Kimberlites: Where?; Terra Cognita, Volume 2, Number 3, p.203-207.
- Colley, S., Thomson, J., Wilson, T.R.S., and Higgs, N.C.

**PUBLICATIONS ADDED TO
THE KIRKLAND LAKE
RESIDENT GEOLOGIST
LIBRARY DURING 1984**

Aftabi, A., and Azzaria, L.M.
1983: Distribution of Mercury Compounds in Ore and Host Rocks at Sigma Gold Mine

- 1984: Post-Depositional Migration of Elements During Diagenesis in Brown Clay and Turbidite Sequences in the North East Atlantic; *Geochimica et Cosmochimica Acta*, Volume 48, Number 6, p.1223-1235.
- Crone, W., Larson, L.T., Carpenter, R.H., Chao, T.T., and Sanzolone, R.F.
1984: A Comparison of Iron Oxide-Rich Joint Coatings and Rock Chips as Geochemical Sampling Media in Exploration for Disseminated Gold Deposits; *Journal of Geochemical Exploration*, Volume 20, Number 2, p.161-178.
- Drake, L.D.
1983: Ore Plumes in Till; *Journal of Geology*, Volume 91, Number 6, p.707-713.
- Driese, S.G., and Dott Jr., R.H.
1984: Model for Sandstone-Carbonate "Cyclothems" Based on Upper Member of Morgan Formation (Middle Pennsylvanian) of Northern Utah and Colorado; *The American Association of Petroleum Geologists Bulletin*, Volume 68, Number 5, p.574-597.
- Dupere, Jean
1984: Asbestos Industry at the Crossroads: Current Position and Outlook; *Mining Engineering*, Volume 36, Number 7, p.727-730.
- Elmore, R.D.
1984: The Copper Harbor Conglomerates: A Late Precambrian Fining- Upward Alluvial Fan Sequence in Northern Michigan; *Geological Society of America Bulletin*, Volume 95, Number 5, p.610-617.
1983: Precambrian Non-Marine Stromatolites in Alluvial Fan Deposits, the Copper Harbour Conglomerate, Upper Michigan; *Sedimentology*, Volume 30, Number 6, p.829-842.
- England, P., and Bickle, M.
1984: Continental Thermal and Tectonic Regimes During the Archean; *The Journal of Geology*, Volume 92, Number 4, p.353-367.
- Ericksson, K.A.
1983: Siliciclastic-Hosted Iron Formations in the Early Archean Barberton and Pilbara Sequences; *Journal of the Geological Society of Australia*, Volume 30, Number 4, p.473-482.
- Fitch, F.J., and Miller, J.A.
1983: K-Ar Age of the East Peripheral Kimberlite at De Beers Mine, Kimberley, R.S.A.; *Geological Magazine*, Volume 120, Number 5, p.505-512.
- Foscolos, A.E.
1984: Catagenesis of Argillaceous Sedimentary Rocks; *Geoscience Canada*, Volume 11, Number 2, p.67-75.
- Gobeil, A., and Racicot, D.
1983: Carte Lithostratigraphique de la Region de Chibougamau; *Ministere de l'Energie et des Ressources*, MM 83-02, 14p.
- Gravenor, C.P., Von Brunn, V., and Dreimanis, A.
1984: Nature and Classification of Waterlain Glaciogenic Sediments, Exemplified by Pleistocene, Late Paleozoic and Late Precambrian Deposits; *Earth-Science Reviews*, Volume 20, Number 2, p.105-166.
- Grossman, E.L.
1984: Carbon Isotopic Fractionation in Live Benthic Foraminifera - Comparison with Inorganic Precipitate Studies (Organic); *Geochimica et Cosmochimica Acta*, Volume 48, Number 6, p.1505-1512.
- Guha, J., and Gobeil, A.
1984: Chibougamau - Stratigraphy and Mineralization in an Archean Belt with a Difference; *Canadian Institute of Mining and Metallurgy Geology Division, Symposium - Field Trips Guidebook*, 338p.
- Guha, J., and Chown, E.H.
1984: Chibougamau - Stratigraphy and Mineralization; *The Canadian Institute of Mining and Metallurgy, Special Volume 34*, 534p.
- Gurney, J.J., and Harris, J.W.
1982: Diamonds; *Terra Cognita*, Volume 2, Number 2, p.199-202.
- Haldorsen, S.
1983: Mineralogy and Geochemistry of Basal Till and Their Relationship to Till-Forming Processes; *Norak Geologisk Tidskrift*, Volume 63, Number 1, p.15-25.
- Hallbauer, D.K., and von Gehlen, K.
1983: The Witwatersrand Pyrites and Metamorphism; *Mineralogical Magazine*, Volume 47, p.473-479.
- Hallberg, J.A.
1984: A Geochemical Aid to Igneous Rock Type Identification in Deeply Weathered Terrain; *Journal of Geochemical Exploration*, Volume 20, Number 1, p.1-8.
- Hopper, C.H.
1942: Geology of the Matachewan Consolidated Mine, Northern Ontario; *Canadian Institute of Mining and Metallurgy Bulletin*, Volume 45, p.387-400.
- House, C.I., and Shergold, H.L.
1983: Adsorption of Polyvalent Metal Species on Activated Carbon; *Transactions Institution of Mining and Metallurgy, Section C*, Volume 93, p.C19-C22.
- House, L.S., and Jacob, K.H.
1983: Earthquakes, Plate Subduction, and Stress Reversals in the Eastern Aleutian Arc; *Journal of Geophysical Research*, Volume 88, p.9347-9373.
- Hubert, C., Trudel, P., and Gelinas, L.
1984: Archean Wrench Fault Tectonics and Structural Evolution of the Blake River Group, Abitibi Belt, Quebec; *Canadian Journal of Earth Sciences*, Volume 21, Number 9, p.1024-1032.
- Huppert, H.E., Sparks, R.S.J., Turner, J.S., and Arndt, N.T.
1984: Emplacement and Cooling of Komatiite Lavas; *Nature*, Volume 309, Number 5963, p.19-22.

- Jedwab, J., and Boulegue, J.
1984: Graphite Crystals in Hydrothermal Vents; *Nature*, Volume 310, Number 5972, p.41-43.
- Jermy, C.A., and Mason, T.R.
1983: A Sedimentary Model for the Berea Formation in the Glenwood Tunnel, Durham; *Transactions of the Geological Society of South Africa*, Volume 84, Number 2, p.117-125.
- Jones, A.P., and Wyllie, P.J.
1984: Minor Elements in Perovskite from Kimberlites and Distribution of the Rare Earth Elements: An Electron Probe Study; *Earth and Planetary Science Letters*, Volume 69, Number 1, p.128-140.
- Karous, M., and Hjelt, S.E.
1983: Linear Filtering of VLF Dip-Angle Measurements; *Geophysical Prospecting*, Volume 31, Number 5, p.782-794.
- Kerrick, R., and Watson, P.
1984: The Macassa Mine Archean Lode Gold Deposit, Kirkland Lake, Ontario: Geology, Patterns of Alteration, and Hydrothermal Regimes; *Economic Geology*, Volume 79, Number 5, p.1104-1130.
- Lalonde, J.P.
1983: Ground-Water Geochemistry in the Abitibi Volcanic Belt of Quebec; *Journal of Geochemical Exploration*, Volume 19, Number 1-3, p.207-223.
- Lavreau, J.
1984: Vein and Stratabound Gold Deposits of Northern Zaire; *Mineralium Deposits*, Volume 19, Number 2, p.158-165.
- Locat, J., Ballivy, G., and Lefebvre, G.
1984: Notes, sur la Minerologie des Sediments Fins du Lac Ojibway, en Particulier Ceux de la Region de Matagami, Quebec; *Geographie Physique et Quaternaire*, Volume 38, Number 1, p.49-57.
- Lyons, L.A.
1983: Discovery and Development of Australian Diamonds; *World Mining*, Volume 36, Number 9, p.50-56.
- Mann, H., and Fyfe, W.S.
1984: An Experimental Study of Algal Uptake of U, Ba, V, Co and Ni from Dilute Solutions; *Chemical Geology*, Volume 44, p.385-398.
- Matthews, E.R.
1983: Measurements of Beach Pebble Attrition in Palliser Bay, Southern North Island, New Zealand; *Sedimentology*, Volume 30, Number 6, p.787-799.
- McCallum, M.E., Coopersmith, H.G., and Hodge, C.W.
1982: Kimberlites: How? Where?; *Terra Cognita*, Volume 2, Number 3, p.209-215.
- McClay, K.R.
1983: Structural Evolution of the Sullivan Fe-Pb-Zn-Ag Orebody, Kimberly, British Columbia, Canada; *Economic Geology*, Volume 78, Number 7, p.1398-1424.
- Mossman, D.J., and Harron, G.A.
1984: Witwatersrand-Type Paleoplacer Gold in the Huronian Supergroup of Ontario, Canada; *Geoscience Canada*, Volume 11, Number 1, p.33-40.
- Mullins, H.T., Heath, K.C., Van Buren, H.M., and Newton, C.R.
1984: Anatomy of a Modern Open-Ocean Carbonate Slope: Northern Little Bahama Bank; *Sedimentology*, Volume 31, Number 2, p.141-168.
- Pasteris, J.D.
1984: Kimberlites: Complex Mantle Melts; *Annual Review of Earth and Planetary Sciences*, Volume 12, p.133-153.
- Perrault, G., and Trudel, P.
1984: Auriferous Halos Associated with the Gold Deposits at Lamaque Mine, Quebec; *Economic Geology*, Volume 79, Number 2, p.227-238.
- Ramani, R.V., and Sweigard, R.J.
1984: Impacts of Land Use Planning on Mineral Resources; *Mining Engineering*, Volume 36, Number 4, p.362-369.
- Robert, F., and Brown, A.C.
1984: Progressive Alteration Associated with Gold-Quartz-Tourmaline Veins at the Sigma Mine, Abitibi Greenstone Belt, Quebec; *Economic Geology*, Volume 79, Number 2, p.393-399.
- Rock, N.M.S.
1984: Nature and Origin of Calc-Alkaline Lamprophyres: Minettes, Vogesites, Kersantites and Spessartite; *Earth Sciences*, Volume 74, Number 4, p.193-227.
- Sawyer, E.W.
1983: The Structural History of a Part of the Archean Quetico Metasedimentary Belt, Superior Province, Canada; *Precambrian Research*, Volume 22, Number 3-4, p.271-294.
- Scatena-Wachel, D.E., and Jones, A.P.
1984: Primary Baddeleyite (ZrO₂) in Kimberlite from Benfontein South Africa; *Mineralogical Magazine*, Volume 48, Number 2, p.257-261.
- Schidlowski, M.
1984: Organic Matter in Sedimentary Rocks: "The Dust we Tread Upon Was Once Alive"; *Terra Cognita*, Volume 4, Number 1, p.45-49.
- Scott, S.D., Kalogeropoulos, S.I., Shegelski, R.J., and Siriunas, J.M.
1983: Tuffaceous Exhalites As Exploration Guides for Volcanogenic Massive Sulphide Deposits; *Journal of Geochemical Exploration*, Volume 19, Number 1-3, p.500-502.
- Setterfield, T., Watkinson, D.H., and Thurston, P.C.
1983: Quench-Textured, Pillowed Metabasalts and Copper Mineralization Mayburn Mine, Northwestern Ontario; *Canadian Institute of Mining and Metallurgy Bulletin*, Volume 76, Number 859, p.69-74.
- Shelton, J.W.
1984: Listric Normal Faults: An Illustrated Summary; *The American Association of Petroleum Geologists Bulletin*, Volume 68, Number 7, p.801-815.
- Shirey, S.B., and Hanson, G.N.
1984: Mantle-Derived Archaean Monozodiorites and Trachyan-desites; *Nature*, Volume 310, Number 3, p.222-224.

- Smith, T.E., Choudhry, A.G., and Huang, C.H.
1983: The Geochemistry and Petrogenesis of the Archean Gamitagama Lake Igneous Complex, Southern Superior Province; *Precambrian Research*, Volume 22, Numbers 3 and 4, p.219-244.
- Smith, T.J., Cloke, P.L., and Kesler, S.E.
1984: Geochemistry of Fluid Inclusions from the McIntyre-Hollinger Gold Deposit, Timmins, Ontario, Canada; *Economic Geology*, Volume 79, Number 6, p.1265-1285.
- Smoot, J.P.
1983: Depositional Subenvironments in an Arid Closed Basin: the Wilkins Peak Member of the Green River Formation (Eocene), Wyoming, U.S.A.; *Sedimentology*, Volume 30, Number 6, p.801-827.
- Sutherland, D.G., Dale, M.L.
1984: Method of Establishing the Minimum Sample Size for Sampling Alluvial Diamond Deposits; *Institute of Mining and Metallurgy, Section B*, Volume 93, p.B55-B58.
- Svisero, D.P., Meyer, H.O.A., Haralyi, L.E., and Hasui, Y.
1983: A Note on the Geology of Some Brazilian Kimberlites; *Journal of Geology*, Volume 92, Number 3, p.331-338.
- Szabo, J.P., and Angle, M.P.
1983: The Influence of Local Bedrock: An Important Consideration in the Interpretation of Textural and Mineralogic Analysis of Till; *Journal of Sedimentary Petrology*, Volume 53, Number 3, p.981-989.
- Taylor, G.R.
1983: Copper and Gold in Skarn at Brown's Creek, Blayney, N.S.W.; *Journal of the Geological Society of Australia*, Volume 30, Number 4, p.431-442.
- Taylor, R.B., and Steven, T.A.
1983: Definition of Mineral Resources Potential; *Economic Geology*, Volume 78, Number 6, p.1268-1270.
- Taysayev, T.T.
1984: Suffosional Gold-Dispersion Halos and Their Use in Prospecting in the Bald-Peak Zone; *Norsk Geologisk*, Volume 262, Number 1, p.75-77.
- Toporkov, V.Y.
1983: Geochemical Characteristics and Mineralization Criteria for Metasomatites in some Gold Deposits; *Geochemistry International*, Volume 20, Number 3, p.162-174.
- Tucker, M.E.
1984: Diagenesis, Geochemistry, and Origin of a Precambrian Dolomite: The Beck Spring Dolomite of Eastern California; *Journal of Sedimentary Petrology*, Volume 53, Number 4, p.1097-1119.
- Ujike, O.
1984: Chemical Composition of Archean Pontiac Metasediments, Southwestern Abitibi Belt, Superior Province; *Canadian Journal of Earth Sciences*, Volume 21, Number 6, p.727-731.
- Visser, J.N.T.
1984: The Problems of Recognizing Ancient Subaqueous Debris Flow Deposits in Glacial Sequences; *Transactions of the Geological Society of South Africa*, Volume 84, Number 2, p.127-135.
- Warren, P.H.
1984: Primordial Degassing, Lithosphere Thickness, and the Origin of Komatiites; *Geology*, Volume 12, Number 6, p.335-338.
- Wesnousky, S.G., Scholz, C.H., Shimazaki, K., and Matsuda, T.
1983: Earthquake Frequency Distribution and the Mechanics of Faulting; *Journal of Geophysical Research*, Volume 88, Number B11, p.9331-9340.
- Winchester, J.A., and Max, M.D.
1984: Element Mobility Associated with Syn-Metamorphic Shear Zones Near Scotchport, N.W. May, Ireland; *Journal of Metamorphic Geology*, Volume 2, Number 1, p.1-11.
- Wynn, F.C., and Luce, R.W.
1984: Geophysical Methods as Mapping Tools in a Strata-Bound Gold Deposit: Haile Mine, South Carolina Slate Belt; *Economic Geology*, Volume 79, Number 2, p.383-388.
- Yardley, B.W.D.
1983: Quartz Veins and Devolatilization During Metamorphism; *Journal of the Geological Society of London*, Volume 140, Part 4, p.657-663.
- Young, G.J.C., Douglas, W.D., and Hampshire, M.J.
1984: Carbon in Pulp Process for Recovering Gold from Acid Plant Calcines at President Brand; *Mining Engineering*, Volume 36, Number 3, p.257-264.

Cobalt Resident Geologist Area, Northeastern Region

Leo Owsicki

Resident Geologist, Ontario Ministry of Natural Resources, Cobalt

INTRODUCTION

During 1984, relatively stable precious metal prices and a general recovery in the economy combined to generate a significant rise in exploration and production activity in the Cobalt Resident Geologist area. In addition, the further development of 2 new important prospects, the Silverside Resources Incorporated's silver deposit in Lorrain Township and the Dymond Clay Products Limited's metallurgical limestone quarry in Bucke Township, provided renewed visibility and served to emphasize the as yet remaining potential of the Cobalt mining camp. A recent option agreement between Bigstone Minerals Limited and Sulpetro Minerals Limited for the latter's Cobalt area holdings should result in an exploration increase over the next few years on these properties. A further positive development for the industry this year is the recent decision on the Temagami Indian Land Claim by the Ontario Supreme Court, in favour of the provincial government. Although the area under dispute remains closed to staking, pending an appeal decision by the Indians, this long standing constraint on exploration is much nearer to resolution than it has ever been.

One potentially major negative factor that will influence exploration in the coming years is the recent rapid fall in the price of gold and silver. If the prices fall further, or remain at their presently low levels for an extended period of time, development and exploration in the area may be seriously affected.

The numerous research, compilation, and mapping projects now being undertaken by the office staff and University students, funded through the Ontario Geoscience Research Grant Program, have been well received by the industry and public. Many of these studies are currently being finalized while others are in various stages of completion. New data provided as a result of these studies should help to increase our understanding of the geology and ore

forming processes active in the camp to a degree where new exploration approaches may eventually be developed.

RESIDENT GEOLOGIST'S ACTIVITIES

During the year, the Cobalt Office was staffed by Leo Owsicki, Resident Geologist; and part-time personnel including P. Anderson, Resource Geologist; K. Larabie, Secretary; R. Larsen, Contract Geologist; R. Clark, Junior Assistant; and A. Marvin, Experience '84 student.

A building leased last year as a core storage facility to preserve "critical" core was totally destroyed by fire in March 1983. All ore and rock samples collected by the former Resident Geologist, R. Thomson, were lost in the fire as well as many original underground mine plans, diamond-drill core, racks, and equipment. Since this time, a temporary space has been rented to store core made available from current drilling. Rental of a new building is presently being arranged, and core will be moved to this more permanent location if the building is obtained.

Assistance was provided to individuals and firms applying for various government grants under a variety of program names. One such grant was recently awarded under the auspices of the Canada Works - Section 38 and Ontario Resource Program to the Township of Coleman for a Community Mineral Resource Enhancement project. Funds for equipment and supervisory assistance are being provided by this office. Six men are being employed for a 4-month period to clear township boundary lines and mine roads in order to facilitate claim staking and increase safety along mine access roads.

The compilation and publication of Geological Data Inventory Folios was continued during the year. Twenty-six (26) folios have been published and 7 are currently in press. In the past 16 months, a total of 47 townships have been

completed, representing 58% of the Cobalt Resident area.

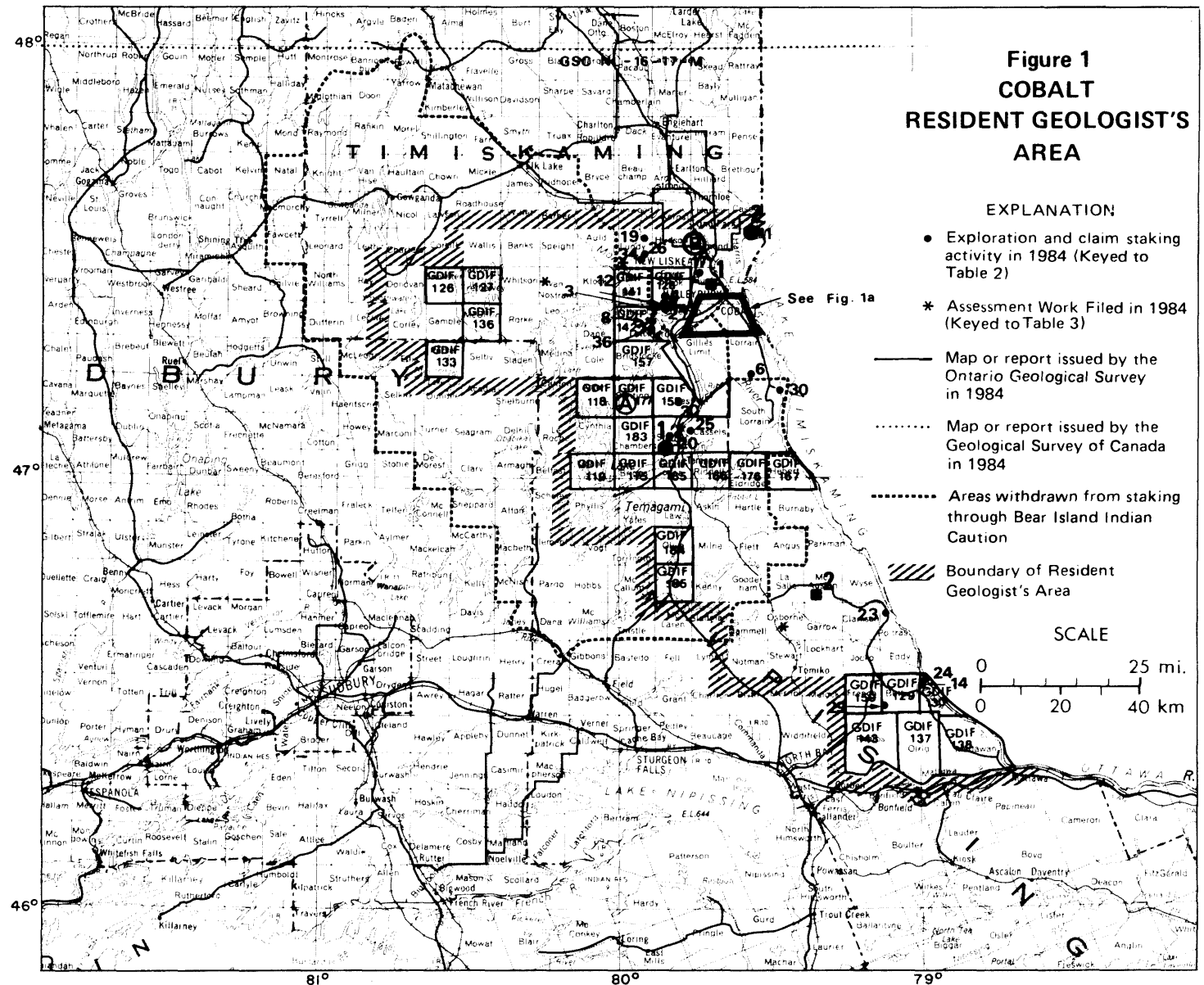
A new field guide of the Cobalt area was published in May by the Geologist Association of Canada/Mineralogical Association of Canada (GAC/MAC) (Owsicki and Lovell 1984). A field trip was conducted in conjunction with the GAC/MAC Meeting in London, Ontario, May 14-16, 1984, for representatives of mining companies from Canada, the United States, Spain, Portugal, Norway, and France. Similar field trips were conducted over the course of the year for University students and industry representatives. Both the field guide and field trips are important in introducing new companies to the exploration potential of the area and in educating those not familiar with the local geology.

Technical assistance and consultative services were provided to prospectors, industry representatives, geologists, company management, government, and the general public as a means of encouraging and facilitating effective exploration and development in the area. The results of this aid are most obvious in the following 2 instances: (1) the original discovery hole of a potential new silver mine was drilled by Silverside Resources Incorporated on the basis of geological and structural interpretations provided by the Resident Geologist; and (2) Dymond Clay Products Limited expanded from a small agri-lime operation to a significant producer of metallurgical grade limestone due, in large part, to the multifaceted services provided by the Resident Geologist Office.

Additional programs being carried out by office staff include:

1. The continuation of a regional and structural study of Archean basement rocks and their mineral potential in the area extending from Temagami north to New Liskeard. Detailed mapping and sampling of a volcanic inlier situated in Banting Township has been completed (Owsicki 1984b) as part of this study and a report was published.

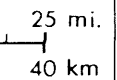
**Figure 1
COBALT
RESIDENT GEOLOGIST'S
AREA**



EXPLANATION

- Exploration and claim staking activity in 1984 (Keyed to Table 2)
- * Assessment Work Filed in 1984 (Keyed to Table 3)
- Map or report issued by the Ontario Geological Survey in 1984
- Map or report issued by the Geological Survey of Canada in 1984
- Areas withdrawn from staking through Bear Island Indian Caution
- ▨ Boundary of Resident Geologist's Area

SCALE



- | | |
|---|--|
| <ul style="list-style-type: none"> ● Producing Mines, 1984 <ol style="list-style-type: none"> 1. Sherman Mine (Dofasco, Tetapaga Mining Co. Ltd.) . . . Fe 2. Langis Mine (Agnico-Eagle Mines Ltd.) Ag 3. Beaver-Temiskaming Mine (Agnico-Eagle Mines Ltd.) . . Ag 4. Canadaka Tailings Mine (Sulpetro Minerals Ltd.) Ag ⊕ Mines Producing in 1984 and Subsequently Closed <ol style="list-style-type: none"> 1. Silver Queen Mine (R.A. Gilson & Associates and Starlight Energy Corp.) Ag Ⓛ Mines Under Development, 1984 <ol style="list-style-type: none"> 1. King Edward Mine (Silver Century Explorations Ltd. and Agnico-Eagle Mines Ltd.) Ag ⊕ Mines Currently Maintained on Stand-by Basis <ol style="list-style-type: none"> 1. Conicil (Sulpetro Minerals Ltd.) Ag 2. Lawson (Sulpetro Minerals Ltd.) Ag 3. Cleopatras (Sulpetro Minerals Ltd.) Ag 4. University (Sulpetro Minerals Ltd.) Ag | <ul style="list-style-type: none"> ■ Producing Quarries <ol style="list-style-type: none"> 1. Dymond Clay Products Ltd. Limestone 2. McLaren's Bay Mica Stone Quarries Stone Ⓐ Operating Refineries <ol style="list-style-type: none"> 1. Agnico-Eagle Refinery 2. Cobalt Refinery Ltd. ① Operating Mills <ol style="list-style-type: none"> 1. Sulpetro Minerals Ltd. Canadaka Mill 2. Agnico-Eagle Mines Ltd. Penn Mill Ⓐ Location of Resident's Field Mapping in 1984 Ⓑ Location of OGS Field party in 1984 |
|---|--|

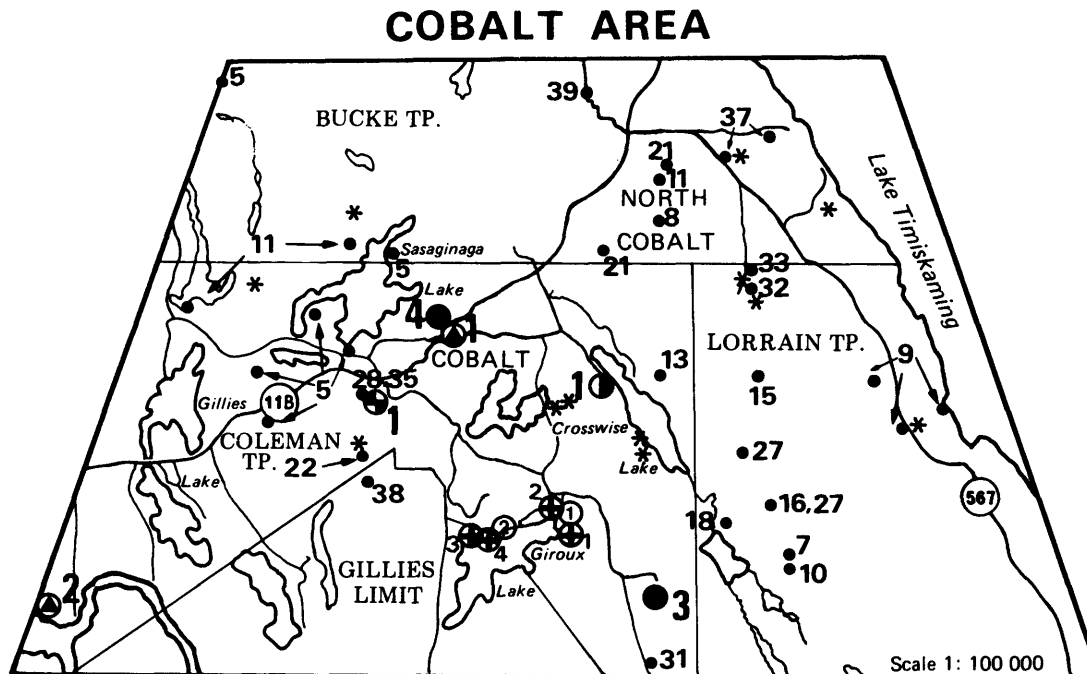


Figure 1a (base map after OGS map 5024)

2. A Tailings Inventory Study, which will provide maps showing all tailings and mill locations in the camp, detailed maps of individual tailings distributions and cover, and a report including individual mill histories, tailings mining and milling methods, case histories of mined tailings, and descriptions of attempts at rehabilitation of local tailings.

3. Compilation of an up-to-date property map of the Cobalt camp. The map, at a scale of 1:20 000 is currently 80% complete. The remainder of the area consists of extensive patented ground positions held by small interests dating back to the early 1900s.

Use of the facilities and services provided by the Resident Geologist Office continued to increase at a substantial pace since opening in 1981. Public lectures dealing with new developments in the Cobalt mining camp were, on occasion, presented at various functions.

MINING ACTIVITY

In spite of the current relatively low prices for silver, production increased during 1984 to a level unmatched in the Cobalt/Gowganda camps since 1978. The rise was due, in large part, to a massive production increase by Agnico-Eagle Mines Limited and to a lesser extent to increased production from the Sulpetro Minerals Limited tailings mine and new production from a number of small exploration ventures. A rebound in the automobile industry was similarly responsible for a production increase of iron ore at the Sherman Mine. The Dymond Clay Products Limited metallurgical limestone quarry came on stream late in the year and production of this material increased by a factor of ten from 1983 and should increase by a similar factor in 1985.

Two area mills operated during the year. The Penn Mill of Agnico-Eagle Mines Limited ran for a 12-month period for the first time in many years. All feed originated from local mines owned and operated by Agnico-Eagle Mines Limited. Sulpetro Minerals Limited's

Canadaka Mill operated for a 6-month period from May to November. Minor custom milling was undertaken in addition to the processing of tailings.

The Agnico-Eagle Mines Limited refinery operated continuously throughout the year. Much of the concentrate was derived from area mines owned by the company. Minor custom refining was carried out for 3 or 4 unaffiliated mining companies. Earlier in the year, Caral Minor Metals Limited received a substantial grant, under a federal government incentives program to develop and build a custom roasting facility. The plant is expected to reduce the amount of arsenic in high arsenic polymetallic concentrates to levels acceptable to most smelters. Arsenic trioxide would be recovered as a by-product and sold. A roaster, capable of processing 20 tons/day has been built and commercial production is scheduled to start by the end of 1984. The Cobalt Refinery Limited operated intermittently during the year. Approximately 15 tonnes of film was ashed and shipped to Montreal for recovery

TABLE 1. MAPS AND REPORTS PERTAINING TO THE COBALT RESIDENT GEOLOGIST AREA PUBLISHED DURING 1984 BY THE ONTARIO GEOLOGICAL SURVEY, MINISTRY OF NATURAL RESOURCES

Open File Reports OFR 5470 OFR 5486 (Vol. 1, 2, 3) OFR 5508 OFR 5510 OFR 5520 OFR 5523	Geological Data Inventory Folios GDIF 118 GDIF 119 GDIF 126 GDIF 127 GDIF 128 GDIF 129 GDIF 130 GDIF 133 GDIF 136 GDIF 137 GDIF 138 GDIF 141 GDIF 142 GDIF 143 GDIF 157 GDIF 158	GDIF 159 GDIF 165 GDIF 166 GDIF 167 GDIF 175 GDIF 176 GDIF 177 GDIF 183 GDIF 184 GDIF 185 Coloured Maps MAP 2205 (reprint) MAP 2361 (reprint) Mineral Resources Branch Publications MDC 25	Miscellaneous Reports MP 117 MP 119 MP 121 General Index Vol. 8 General Index Vol. 9 Geological Survey of Canada Open File Reports GSC OFR 1089 GSC OFR 1090 GSC OFR 1091 GSC Magnetic Anomaly Map NL 16-17-M A.E.C.L. TR-238
---	---	--	---

of lead and silver. Plans are currently being formulated by the operators to develop a small lead extraction plant at this site to recover metals from lead/silver concentrate, residue, bag house dust, etc.

The quantity of mineral commodities mined and paid for in 1984 increased dramatically from that produced in 1983. Silver production increased 43% to 1 634 500 ounces. Production of iron pellets increased by 33% to 1 016 000 tonnes and metallurgical and agricultural grade limestone to 1100 tonnes and 500 tonnes respectively. Minor amounts of decorative building stone and substantial quantities of sand and gravel were also quarried during the year. In addition, cobalt, copper, and nickel were mined along with silver, but not recovered.

BEAVER-TEMISKAMING MINE (AGNICO-EAGLE MINES LIMITED)

Silver mining, exploration, and development continued at an increased pace throughout 1984. New cross-cutting was carried out on the 1300-foot and 1600-foot Levels to follow-up new drill-indicated ore intersections. The bulk of development work was carried out on the 1330-foot Level where modest drifting, cross-cutting, and exploration raising

were undertaken. The bulk of mining again focused on 3 major veins: the 37, 41, and 44. Four new, and relatively short, ore vein structures were opened-up during the year and mining and development of these (51, 52, 53, and 56) is in progress.

Extensive exploration diamond drilling was carried out during the year throughout much of the lower workings.

SULPETRO MINERALS LIMITED (CANADAKA DIVISION)

A tailings mine located immediately north of the Town of Cobalt was restarted in May and continued operations for a 6-month period. Production increased 28% from last year to 45 350 tonnes. All material was processed at the local Canadaka Mill (wholly owned by Sulpetro Minerals Limited). Approximately 115 000 ounces of silver were recovered. The mill is currently custom milling approximately 900 tonnes of Manridge Explorations Limited's ore (1 week).

Underground workings at the Conisil, Cleopatra, Lawson, and University Mines are being pumped-out and the facilities are maintained. The headframe at the

University Mine, destroyed by fire last year, was rebuilt.

It was recently announced (The Northern Miner, November 1984) that Bigstone Minerals Limited has entered into an option agreement to acquire all Cobalt area assets and properties currently held by Sulpetro Minerals Limited. They would do this by forming a new company, Canadaka Mines Limited, to explore the Cobalt properties. Part of the agreement would require Bigstone to spend \$2.5 million over 3 years in exploration and an additional \$1.5 million on subsequent development.

SHERMAN MINE (DOFASCO INCORPORATED AND TETAPAGA MINING COMPANY LIMITED)

This Temagami area mine was shut down for a 5-week period during the summer. Although this was the third such consecutive closure, it was for a shorter period of time than last year and it was possible to increase production to 1 016 000 tonnes of iron ore pellets from 3.76 million tonnes of crude ore. Waste rock removed totaled 5.1 million tonnes. All mining operations were confined to the west pit (43%) and east pit (57%). Developments at the east pit included an extension of the first bench to

within 1300 feet of the eastern end of the ore body and mining down to a third bench.

Discussion and studies are currently underway to investigate the possibilities of fluxing pellets with limestone at the mine site prior to shipment to Dofasco Incorporated's smelter in Hamilton.

LANGIS MINE (AGNICO-EAGLE MINES LIMITED)

The discovery of a new "orebody" in the fall of 1983 has spurred development and exploration at this mine. Underground exploration diamond drilling increased by 31% from last year and a new program of long hole drilling has been proposed for the near future to explore the eastern limits of the property.

New developments during the year include: (1) dewatering of the 6 shaft workings to the 435-foot Level; (2) extension of the workings from the 5th Level of the 3 shaft to the east (approximately 215 m (700 feet) of cross-cutting); (3) establishment of a (30-foot) deep winze on this level to join the 4th Level of the 6 shaft workings; and (4) recribbing of drifts on this level and driving of a new cross-cut from these workings 67 m (220 feet) southeast to the discovery vein system (64-110).

Mining was confined during the year to the original discovery vein (201) which was mined-out in August. The stope yielded 17 592 tons of ore averaging 15 ounces silver per ton. Two additional short veins were also mined and 2 new veins, the 103 and 108, are currently being prepared for development.

All ore shoots occur within steep veins cutting relatively flat-lying Huronian Coleman Member siltstone and conglomerate exposed beneath a Nipissing diabase sill and immediately above steeply dipping Archean metavolcanic rocks. One anomalous ore intersection was pulled from the Nipissing diabase above the new vein system.

SILVER QUEEN MINE (R.A. GILSON AND ASSOCIATES AND STARLIGHT ENERGY CORPORATION)

This formerly producing property was acquired early in the year by R.A. Gilson and Associates and subsequently optioned to Starlight Energy Corporation of Vancouver. Initial exploration involved extensive overburden stripping both along strike and on upward projections of previously mined veins. Blasting and trenching followed, with limited mining from the surface of old crown pillars and vein extensions. The company reports that approximately 7000 tons of ore have been stockpiled. Mining activity at the property was terminated in September.

EXPLORATION ACTIVITY

Exploration activity in the area increased markedly from last year as both new and established companies renewed their efforts to locate new silver deposits and expand reserves of old deposits (Figure 1, Tables 2, 3). The discovery of a new silver prospect by Silverside Resources Incorporated in 1983 (Owsiacki 1984a) is largely responsible for this revival of interest in the Cobalt camp. Only minor interest was expressed in other commodities including gold, diamonds, and cobalt. Although claim staking has remained relatively static over the past few years, numerous patented claims in the area have recently changed hands or been optioned by mining interests.

Combined surface and underground diamond drilling activity increased to the highest levels recorded since the late 1970s (Figure 2). The total footage drilled in 1984 rose to 31 982 m (104 927 feet) and is indicative of the overall increase in exploration activity. Major exploration and development undertaken during the year is summarized below.

Highland-Crow Resources Limited and Teck Corporation, as joint venture partners, continued to expand their ground position in the area both through staking and optioning of properties. Northgane

Minerals Limited entered into an option agreement with these companies, requiring exploration expenditures of \$0.5 million in order to earn a 50% interest in the properties. As part of this agreement, 5 diamond-drill holes, totaling 1220 m (4003 feet) were drilled during the year to intersect 2 targets located in Bucke Township. Results revealed the presence of anomalous mineralization and alteration commonly developed within the Cobalt camp.

Teck Corporation has expressed a renewed exploration interest in the Cobalt area and is currently investigating various joint venture possibilities with small property holders in the camp.

Underground exploration at the King Edward Mine property of Silver Century Explorations Limited was accelerated by Agnico-Eagle Mines Limited as part of an earlier option agreement. Although promising new silver occurrences were intersected on the bottom level prior to Agnico's participation, extensive underground diamond drilling has since revealed no continuity to the veins. Diamond drilling was undertaken from both existing mine levels and long holes were drilled under adjoining properties held by Agnico-Eagle Mines Limited to test for new vein structures. Few promising intersections were encountered but exploration is expected to continue into 1985.

Agnico-Eagle Mines Limited expanded their property holdings south and east of the Langis Mine in Harris Township following a new underground silver discovery made in 1983 (Owsiacki 1984a). Line-cutting and geophysical surveys have since been completed and preparations for diamond drilling of specific target areas are currently underway. In addition, a property belonging to Frankfield Explorations Limited, located near Silverside Resources Incorporated's silver discovery in Lorrain Township, was optioned.

Korich Mining Company Limited acquired the old Smith Cobalt Mines property in Coleman

EXPLORATION ACTIVITY DURING THE YEAR.

TABLE 2

Number on Figure	Individual or Company	Activity
1	Agnico-Eagle Mines Ltd.	Geophysical survey, line-cutting, Harris Township
2	Armstrong, M.	Claim staking (3), Coleman and Firstbrook Townships
3	Benner, R.	Claim staking (5), geophysical survey, Coleman and Firstbrook Townships
4	Black Giant Mines Ltd.	Claim staking (12), Firstbrook Township
5	Boston Creek Mines Ltd.	Claim staking (20), Coleman and Bucke Townships
6	Clarke, R.M.	Claim staking (7), Lorrain Township
7	Giroux, O.L.	Claim staking (1), Lorrain Township
8	Gore, J.	Claim staking (3), Bucke and Coleman Townships
9	Gossan Resources Ltd.	Claim staking (8), surface diamond drilling, Lorrain Township
10	G.Q.R. Resources	Claim staking (4), Lorrain Township
11	Highland-Crow Resources Ltd./Teck Corporation	Claim staking (12), Bucke and Coleman Townships
12	Hudson Bay Mines Ltd., The	Surface diamond drilling, Firstbrook Township
13	Korich Mining Co. Ltd.	Surface diamond drilling, Coleman Township
14	Kyanite Mining Corporation	Bulk sampling, Antoine Township
15	Lepaladan Corporation Ltd.	Geological mapping, line-cutting, Lorrain Township
16	Marshall, W.	Claim staking (1), Lorrain Township
17	Monopros	Linecutting, geophysical survey, surface diamond drilling, Bucke Township
18	Moore, R.A.	Claim staking (2), Lorrain Township
19	Morgan, K.A.	Claim staking (2), Lundy Township
20	Niemetz, H.	Surface diamond drilling, trenching, sampling, Strathy Township
21	Northgane Minerals Ltd.	Surface diamond drilling, Bucke Township

TABLE 2 Continued

Number on Figure	Individual or Company	Activity
22	Outcrop Explorations Ltd.	Claim staking (1), trenching, stripping, bulk sampling, shaft de-watering, Coleman Township
23	Pharand, P. E.	Claim staking (5), Poitras Township
24	Plexman, E.J.	Claim staking (2), Antoine Township
25	Prospector's Airways 1981	Line-cutting, Strathy Township
26	Purdon, R.H.	Claim staking (5), prospecting, Lundy Township
27	Quevillon, G.	Claim staking (2), Lorrain Township
28	R.A. Gilson and Associates	Stripping, trenching, prospecting, Coleman Township
29	Rodgers, D.A.	Claim staking (1), trenching, Butler Township
30	Royal Gold and Silver Corporation	Milling, sampling, South Lorrain and Strathy Townships
31	Shaft & Tunnel Engineering Services Ltd.	Claim staking (2), Coleman Township
32	Silver Lake Resources Inc.	Surface diamond drilling, Lorrain Township
33	Silverside Resources Inc.	Seismic survey, surface diamond drilling, ramp design, Lorrain Township
34	Simpson, F.P.	Claim staking (6), prospecting, Lundy Township
35	Starlight Energy Corporation	Stripping, trenching, bulk sampling, Coleman Township
36	Taylor, M	Claim staking (1), Coleman Township
37	T.T.L. Minerals Ltd.	Claim staking (2), geophysical survey, shaft collaring, de-watering shaft, geological underground mapping, sampling, Bucke Township
38	Wabigoon Resources Ltd.	Sampling, property report, Coleman Township and Gillies Limit
39	Weiss, D.	Claim staking (2), Bucke Township

TABLE 3

ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.

SUDBURY MINING DIVISION
SYMBOLS AND ABBREVIATIONS

Ag-Silver	DDU-Underground Diamond Drilling (where shown, the numbers following "DDU" indicate the number of holes drilled and the total length drilled respectively)	SA-Sampling, Assays
Assess-Assessment Work		rTr-Rock Trenching
Au-Gold		UG-Underground Work
BM-Base Metal		VLF-Very Low Frequency
Co-Cobalt	EM-Electromagnetic Survey	
D-Donated by Company or Individual	Geochem-Geochemical Survey	
DDS-Surface Diamond Drilling (where shown, the numbers following "DDS" indicate the number of holes drilled and the total length drilled respectively)	GL-Geological Survey	
	Mag-Magnetometer Survey	
	OMEPE-Ontario Mineral Exploration Program	
	PEM-Pulse Electromagnetic	

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Bucke Twp.	31M/5	Highland-Crow Resources Ltd.	Ag, BM	Assess	Geochem, GL, SA	1982	2.5369	
Bucke Twp.	31M/5	Teledyne Canada Ltd.	Co, Ag	OMEPE	DDS 36-10905, SA	1981	63.4105	
Bucke Twp.	31M/5	T.T.L. Minerals Ltd.	Ag	D	UG	1984		
Coleman Twp.	31M/5	Gilson, R.R.	Ag	Assess	rTr	1984		
Coleman Twp.	31M/5	Highland-Crow Resources Ltd.	Ag, BM	Assess	PEM	1982	2.5501	
Coleman Twp.	31M/5	P.E.C. Explorations Ltd.	Ag	D	DDS 41-7830, GL	1949-54		
Coleman Twp.	31M/5	P.E.C. Explorations Ltd.	Ag	D	DDS 9-2501, GL	1979		
Coleman Twp.	31M/5	Silver Century Explorations Ltd.	Ag	OMEPE	DDU 43-10821, SA	1981	63.4002	
Coleman Twp.	31M/5	Silver Century Explorations Ltd.	Ag	OMEPE	DDU 27-4858, SA, DDS 2-2152	1982, 1983	63.4172	
Firstbrook Twp.	31M/5	Benner, R.	Ag	Assess	DDS 4-2091, SA	1983		
Lorrain Twp.	31M/5	Gossan Resources Ltd.	Ag	D	DDS 2-1635	1984		
Lorrain Twp.	31M/5	Silverside Resources' Inc.	Ag	OMEPE	DDS 9-4480, Mag, EM, SA, VLF	1981	63.3986	
Lorrain & Bucke Twps.	31M/5	Silverside Resources Inc.	Ag	OMEPE	DDS 31-14934, SA	1982	63.4171	
Lundy Twp.	41P/8, 9	Ferguson, B.	Ag	D	SA	1983		
Lundy Twp.	41P/8, 9	Ferguson, B.	Ag	Assess	Mag	1984	2.7207	
Osborne Twp.	31L/11	Vaillancourt, G.	?	Assess	rTr	1982		
Strathy Twp.	31M/4	Niemetz, H.	Au, Ag	D	DDS 4-396, SA	1982		

TABLE 3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Strathy Twp.	31M/4	Niemetz, H.	Au, Ag	D	DDS 6-664, SA, GL	1983		
Strathy Twp.	31M/4	Niemetz, H.	Au, Ag	D	DDS 5-317, SA	1984		
Van Nostrand Twp.	41P/8	Mortimer, C.	Ag	Assess	rTr	1983		

Township early in the year. The company is currently completing a first diamond-drill hole, drilled to test strike extensions of old veins previously identified on the property. A deep shaft, with fairly extensive underground workings is located on the claim group. The shaft was put down in the past to explore the possible continuity of high grade silver veins mined at the formerly producing Deerhorn or Cross Lake O'Brien Mine adjoining to the west. The claims are underlain by a shallow-dipping Nipissing diabase sill (approximately 80 m thick at this location). Huronian Coleman Member sedimentary rocks underlie the diabase and unconformably rest on Archean mafic metavolcanic and interflow metasedimentary rocks.

T.T.L. Minerals Limited recently acquired a small claim group in Bucke Township. The claims are underlain by pockets of Coleman Member pebbly quartzite unconformably overlying Archean mafic metavolcanic rocks, feldspar porphyry, quartz-eye porphyry, and mineralized interflow cherts, situated below the eroded base of a Nipissing diabase sill. The porphyritic units are identical to a late Archean rhyolite porphyry associated with silver veins discovered at the Silverside Resources Incorporated prospect 2 km to the south. The North Cobalt shaft, located in the western limits of the property, was collared and the underground workings pumped out. An underground mapping and sampling program is currently underway. At least 2 cobalt arsenide-bearing pink carbonate veins are exposed on the 4 levels of underground workings. In addition, a VLF electromagnetic

survey was completed during the summer and 2 anomalies outlined. The most prominent of these may represent the extension of the Agaunico dike. High-grade silver veins were followed along the contacts of this dike to the east on the property of the formerly producing Agaunico Mine.

Two prospectors have staked a single claim on a previously unknown amethyst occurrence in Butler Township. Prospecting, trenching, and blasting exposed a number of parallel, narrow, amethyst-bearing veins which cut Grenville-age granitic gneisses. The main vein reaches widths of 10 cm and is comprised of translucent to purple amethyst crystals. The zoned crystals attain lengths of 3 cm within local swells.

Outcrop Explorations Limited acquired the old Argentite Silver claim in Coleman Township and initiated a program of stripping, trenching, sampling, and dewatering of 2 old shafts. Sampling along a previously identified vein structure provided numerous values of ore grade silver and cobalt. A bulk sampling program has since been proposed for this vein.

H. Niemetz continued a program of trenching, sampling, and drilling on a claim held in Strathy Township. Gold values are found in association with a zone containing massive arsenopyrite/pyrite/chalcopyrite stringers and quartz veins cutting Archean intermediate to mafic tuffs and flows. The mineralized zone appears to be an extension of a gold-bearing massive arsenopyrite vein, explored in the past on the adjoining Penrose Mine claims (Bennett 1978). Gold values of up to 0.35 ounce gold

per ton over 2.0 feet were intersected in drillholes put down by Teck Corporation in 1983.

The Hudson Bay Mines Limited continued a drill program on claims optioned from R. Benner in Firstbrook Township (Owsiacki 1984a). Eight holes, totaling 1220 m (4000 feet) were drilled to investigate the potential for development of silver-bearing carbonate veins above a Huronian/Archean unconformity. No significant mineralization was intersected and the option was subsequently dropped. During the summer, the claim group was extended to the south, nearer an outcropping of Nipissing diabase, and VLF surveys extended to cover this area. Efforts are currently underway to raise funds for further drilling of geophysical targets identified on these claims.

Gossan Resources Limited acquired 12 claims in Lorrain Township during the year. A diamond drill program has since been carried out on the basis of structure determined from air photo interpretations. Two deep holes were drilled in an attempt to intersect these projected structures and the Huronian/Archean unconformity below a Nipissing diabase sill. Both holes were abandoned in diabase and no significant mineralization was encountered.

Silver Lake Resources Incorporated entered into an option agreement early in the year with Silverside Resources Incorporated. The agreement gives Silver Lake Resources Incorporated the right to earn a 50% interest in the Lorrain Township property after exploration and development expenditures of \$2 million. During the course of

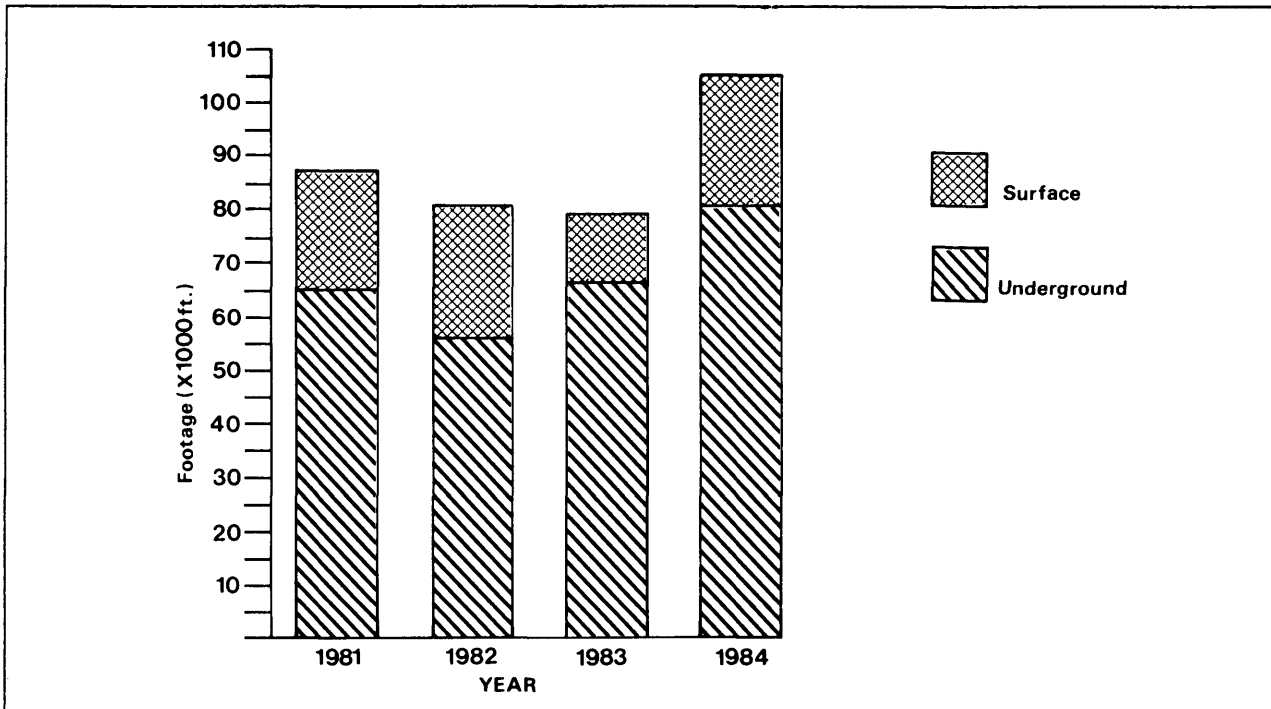


Figure 2. Exploration diamond drilling activity in the Cobalt Resident Geologist Area.

the year, both companies continued extensive delineation drilling of the ore zone. In addition, a seismic survey was undertaken to map the overburden thickness over the deposit and a study initiated to determine a ramp design for future underground access and exploration. The ramp has a projected length of 610 m (2000 feet) and will end in the ore zone at a vertical depth of 116 m (380 feet). The companies have reported that 5 principle silver-bearing veins have been identified to date.

Lepaladan Corporation Limited holds a 15-claim group adjacent to the southern and eastern boundaries of the Silverside Resources Incorporated property. A line-cutting and geological mapping program has been initiated on this property in the vicinity of previously drilled minor silver intersections. A follow-up drill program designed to retest these areas has been proposed for the winter.

Other companies active in the area included Royal Gold and Silver Corporation, Falconbridge

Limited, Inco Limited, Monopros Limited, Silvermaque Mining Limited, Black Giant Mines Limited, North Kirkland Mines Limited, Gilrow Resources Limited, Wabigoon Resources Limited, M M Porcupine Gold Mines Limited, Boston Creek Mines Limited, Stroud Resources Limited, Jedburgh Resources Limited, G.Q.R. Resources Limited, and Prospector's Airways 1981.

Prospecting activity continues to increase despite the continuing negative effects of a Land Caution filed by the Temagami Indian Band and dropping precious metal prices. A more complete summary of exploration activity in the Cobalt Resident Geologist area in 1984 is provided in Table 2 and Figures 1 and 1a. Data submitted for assessment purposes or donated are summarized in Table 3 and relevant recent Ontario Geological Survey and Geological Survey of Canada publications are listed in Table 1.

INDUSTRIAL MINERALS

Dymond Clay Products Limited have been expanding a limestone quarry near Haileybury and accelerating processing of metallurgical grade limestone since the completion of a market study (Kriens 1984) and a pre-engineering feasibility study (H.G. Engineering Incorporated 1984). It was established in these reports that the demand for metallurgical limestone is good but future demand and expansion will depend on the companies ability to produce lime. Drilling and blasting of 15 000 tons of broken ore in 1984 doubled the pit size. Channel sampling of this dump returned an average grade of 53% CaO with less than 3% combined MgO, Fe₂O₃, Al₂O₃, and SiO₂. Crushing facilities were moved to the quarry site in the fall and sufficient material crushed to meet contract obligations for the winter. A \$75 000 grant through the Northern Ontario Rural Development and Assistance (NORDA) Program will aid the company in expanding the plant further. In

1984, production of metallurgical grade limestone more than doubled from the previous year to 1100 tonnes and is estimated at 5000 tonnes for 1985.

Quarrying of decorative building stone continued on a seasonal demand basis in McAuslan Township.

ONTARIO GEOLOGICAL SURVEY ACTIVITIES

ENGINEERING AND TERRAIN GEOLOGY SECTION

A peatland inventory project was initiated in the New Liskeard area in 1983 and completed this year. Peat bogs were studied and their resource potential identified (Riley 1984). Project data and results were compiled by Hunter and Associates Limited (1984).

RESEARCH BY OTHER ORGANIZATIONS

CARLETON UNIVERSITY

G. Burbidge initiated field studies during the summer as part of a Ph.D. thesis investigating the regional sedimentology of the lower Gowganda Formation in the Cobalt Embayment.

B. Wilson, P. Mustard and M. Goodz are finishing M.Sc. studies investigating the sedimentology of Huronian rocks and sulphur isotope geochemistry of Archean interflow metasedimentary rocks, Huronian sedimentary rocks, and veins found in the Cobalt area.

R. Rainbird is studying the regional sedimentology of the Firstbrook Member of the Gowganda Formation as part of an M.Sc. thesis.

J. Gebert, E. Dodd, and Z. Arias are completing site specific projects in the immediate Cobalt camp as part of B.Sc. thesis studies.

MCMASTER UNIVERSITY

A. Fyon conducted field investigations in the general vicinity of the Sherman Iron Mine near Temagami. The focus of the project is the resolution of the stratig-

raphy of the host volcanic piles. Alteration associated with gold and base metal occurrences within these rocks was concurrently defined.

RECENT PUBLICATIONS AND REFERENCES

Andrews, A.J., Kerrich, R., and Owsicki, L.

1984: Petrographic and Geochemical Studies of the Ag-Co-Ni Arsenide Vein Deposits, Cobalt and Gowganda, Ontario; p.42 in Abstracts of the GAC-MAC Joint Annual Meeting, May 14-16, 1984.

Bennett, G.

1978: Geology of the Northeast Temagami Area, District of Nipissing; Ontario Geological Survey Report 163, 128p. Accompanied by Maps 2323 and 2324, scale 1:31 680 or 1 inch to 1/2 mile, and 1 chart.

Crocket, J.H., Blum, N., Hurley, T., Bowins, R., McRoberts, G., Fyon, A., McNutt, R.H., Schwarcz, H.P., and Rees, C.E.

1984: Geological and Geochemical Studies of the Boston and Temagami Iron Formations and their Contiguous Volcanosedimentary Piles; Grant 132, p.72-83 in Geoscience Research Grant Program, Summary of Research, 1983-1984, edited by V.G. Milne, Ontario Geological Survey, Miscellaneous Paper 121, 252p.

Donaldson, J.A., Goodz, M.D., Michel, F.A., Mustard, P., Rainbird, R., Rust, B.R., Watkinson, D.H., and Wilson, B.

1984: Sedimentary Rocks and Stratabound Mineralization in the Cobalt Region; Grant 173, p.198-210 in Geoscience Research Grant Program, Summary of Research, 1983-1984, edited by V.G. Milne, Ontario Geological Survey, Miscellaneous Paper 121, 252p.

Goodz, M.D., Watkinson, D.H., Pertold Z., Buzek, F., and Robinson, D.

1984: Geology and Sulphur-Isotope Geochemistry of the Beaver-Temiskaming Silver

Mine, Cobalt, Ontario; p.67 in Abstracts of the GAC-MAC Joint Annual Meeting, May 14-16, 1984.

H.G. Engineering Incorporated

1984: Pre-Engineering Feasibility Study Limestone Crushing Facility in Northern Ontario; Ontario Geological Survey, Open File Report 5523, 40p., 3 diagrams in back pocket.

Hunter and Associates Limited

1984: Peat and Peatland Evaluation of the New Liskeard Area; Ontario Geological Survey, Open File Report 5486, Volumes 1, 2, and 3.

Kriens, J.

1984: Market Study: Limestone Uses in Northern Ontario and Northwestern Quebec; Ontario Geological Survey, Open File Report 5510, 44p., 6 tables, 1 figure, and 1 appendix.

Miall, A.D.

1983: Glaciomarine Sedimentation in the Gowganda Formation (Huronian), Northern Ontario; Journal of Sedimentary Petrology, Volume 53, p.447-491.

Owsicki, Leo

1984a: Report of Activities 1983, Cobalt Resident Geologist Area, Northeastern Region; p.169-178 in Report of Activities 1983, Regional and Resident Geologists, edited by C.R. Kustra, Ontario Geological Survey, Miscellaneous Paper 117, 265p.

1984b: Geology of the McLean Lake-Lundy Lake Area, Nipissing District; p.237-241 in Summary of Field Work, 1984, Ontario Geological Survey, edited by John Wood, Owen L. White, R.B. Barlow, and A.C. Colvine, Ontario Geological Survey, Miscellaneous Paper 119, 309p.

Owsicki, L., and Lovell, H.

1984: Geology, Silver and Gold Deposits: Cobalt and Kirkland Lake; GAC-MAC Joint Annual Meeting, May 14-15, 1984, Field Trip Guidebook 4, 114p.

Riley, J.L.

1984: Peatland Inventory Project, 1984; p.110-116 in Summary

- of Field Work, 1984, Ontario Geological Survey, edited by John Wood, Owen L. White, R.B. Barlow, and A.C. Colvine, Ontario Geological Survey, Miscellaneous Paper 119, 309p.
- Roy, J.L., and Morris, W.A.
1984: Precambrian Polar Wander Paths -An Assessment of the Data Base; p.101 *in* Abstracts of the Geological Association of Canada-Mineralogical Association of Canada (GAC-MAC) Joint Annual Meeting, May 14-16, 1984.
- Scammell, R.J.
1984: The Geology of Precambrian Strata East of Cobalt, Ontario, unpublished B.Sc. Thesis, Carleton University, Ottawa, Ontario.
- Strong, D.F., and Scott, S.D.
1984: Fluid Inclusions of Ag-Co-Ni Arsenide Veins in the Cobalt- Gowganda Area, Ontario; p.108 *in* Abstracts of the GAC-MAC Joint Annual Meeting, May 14-16, 1984.
- Soucie, G.
1979: A Lithogeochemical Study of Metasomatic Alteration in the Temagami Greenstone Belt, Northeastern Ontario; unpublished M.Sc. Thesis, Laurentian University, Sudbury, Ontario.
- Thode, H.G., and Goodwin, A.M.
1983: Further Sulphur and Carbon Isotope Studies of Late Archean Iron Formation of the Canadian Shield and the Rise of Sulphate Reducing Bacteria; Precambrian Research, Volume 20, p.337-356.

Sault Ste. Marie Resident Geologist Area, Northeastern Region

G. Bennett¹, E.J. Leahy², and K.D. Booth³

¹Resident Geologist, ²Resource Geologist, ³Economic Geologist, Ontario Ministry of Natural Resources, Sault Ste. Marie

INTRODUCTION

The permanent staff of the Sault Ste. Marie Resident Geologist Office consists of E.J. Leahy, Resource Geologist, and G. Bennett, Resident Geologist. Contract staff include Brenda Fremlin, Secretary, and L.J. Ashick and E.J. Wheatley who acted as geological assistants for part of the year.

The Wawa Economic Geologist Program commenced in June under the supervision of K.D. Booth who was assisted by W.T. Curtis. The Sault Ste. Marie Industrial Minerals Program began in June under the supervision of J.J. Kral. J.J. Kral was assisted by P. Beach and J.P. Matte. A study of magnetic and geochemical anomalies in the granitic terrain north of Sault Ste. Marie was commenced by C.A. Leslie in June and continued under the direction of D.J.J. Tortosa who assumed the project in July. D.J.J. Tortosa was assisted by E.J. Haley. These 3 projects are funded by the Ontario Ministry of Northern Affairs. Preliminary reports for these projects are included in this report.

This is the second year of operation of the Sault Ste. Marie Drill Core Library. A summary of the operations of the Drill Core Library is included in this report.

RESIDENT GEOLOGIST ACTIVITIES

The number of public inquiries to the Sault Ste. Marie Resident Geologist Office in 1984 was slightly more than in 1983, a year which showed a dramatic increase in public inquiries over previous years. As a result more time was spent responding to requests for information and consultation. In addition, talks on general geological subjects and the results of exploration in the Hemlo area were given to local citizens groups. A geological field trip through the Elliot Lake area was conducted for a university group. Four days were spent on a reconnaissance of the geology of Michipicoten Island. The Resident Geologist assisted J.A.C. Fortescue

(Geophysics/Geochemistry Section, Ontario Geological Survey, Toronto) with a remote sensing evaluation in the Montreal River area in August. The Resident Geologist visited 16 active and 5 inactive properties during the 1984 field season. Research was continued on a study of the lower Huronian stratigraphy and Huronian volcanic rocks between Elliot Lake and Sault Ste. Marie. Much of the Resident Geologist's time was spent in administrative duties pertaining to the 3 Ministry of Northern Affairs funded projects.

During the past year the Resource Geologist supervised the preparation of Geological Data Inventory Folios; supervised an industrial minerals project carried out by J. Kral; conducted a series of 10 classes of 3 1/2 hours each followed by a field trip for local prospectors. He also carried out ongoing revisions to the microfiche assessment file library, indexed and added to the technical articles file, and spent a great deal of time assisting the record number of visitors to the Sault Ste. Marie office. Much time was spent doing general office duties in the absence of a full time secretary.

CLAIM STAKING ACTIVITY

Between January 1 and November 30, 1984, 1555 mining claims were recorded in the Sault Ste. Marie Mining Division. This is only a fraction of the total number staked in 1983. The reason for this is that by the end of 1983 most of the favourable ground had been staked as a result of the gold discoveries near Hemlo. In addition, the falling price of precious metals produced a more cautious approach to mineral exploration in 1984.

Figure 2 shows the trend in claim staking activity in the Sault Ste. Marie Mining Division since 1960.

MINING ACTIVITY

The Algoma Ore Division of The Algoma Steel Corporation Limited continued production of iron ore at Wawa through 1984 with the exception of a 4-week shutdown in August and September. From January 1 to November 30, 1984, 1 160 545 long tons of sinter was produced from 1 697 000 tons of ore.

Mining operations at Elliot Lake continued at an expanded pace in 1984.

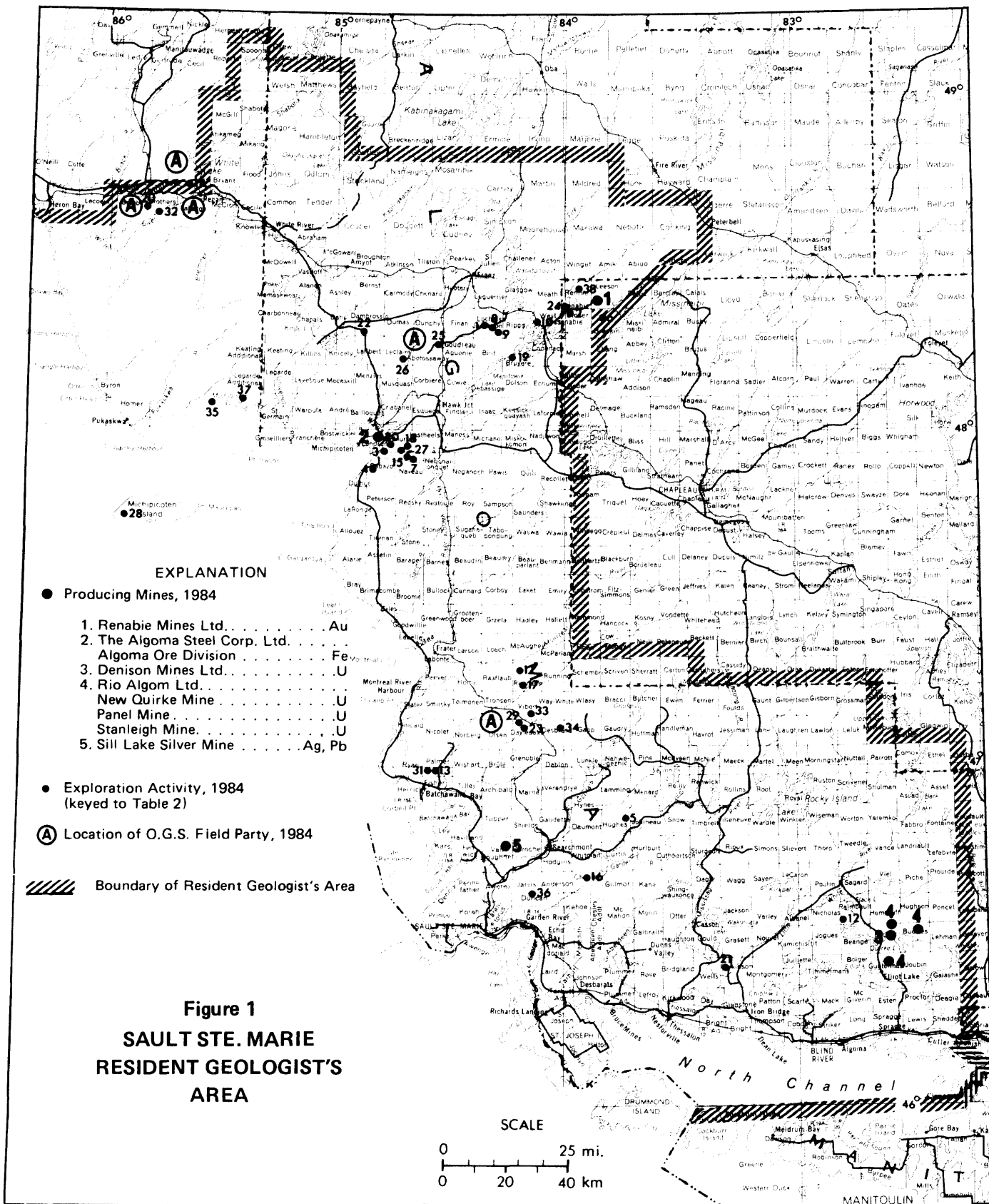
The milling rate of Denison Mines Limited is being maintained at about 11 000 tons per day. A total of 1 875 000 tons of ore averaging 1.79 pounds (814 g) of uranium oxide per ton was processed during the first 6 months of 1984 (The Northern Miner, October 4, 1984).

Denison is planning to use heap leaching methods to mine low grade ore at a much lower cost than that of conventional mining. Experiments have indicated that about 65% of the uranium can be extracted by this process.

Denison Mines Limited employs about 2150 people at its Elliot Lake operation.

Rio Algom Limited operates the New Quirke, Stanleigh, and Panel Mines at Elliot Lake. The Stanleigh Mine has undergone extensive renovations and now produces about 4000 tons of ore per day. The total production from Rio Algom's operations in the Elliot Lake area is expected to yield 7 million tons of uranium oxide in 1984. Heap leaching is expected to provide an increasing proportion of total output (The Northern Miner, August 9, 1984). Rio Algom employs 2850 in its Elliot Lake operations.

The Renabie Mine in Leeson Township continued gold production through 1984. Renabie is owned by Barrick Resources Corporation (50%) and Cullaton Lake Gold Mines Limited (50%). Campbell Resources Incorporated is the operator of the mine.



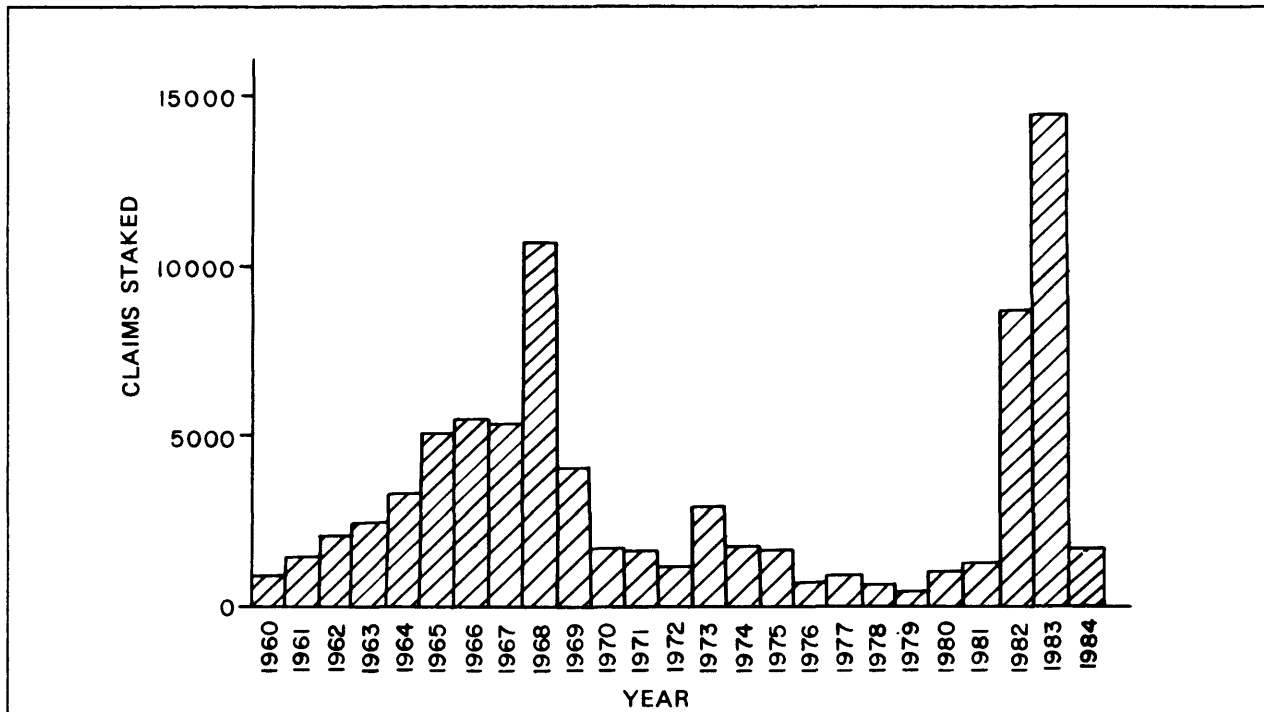


Figure 2. Number of claims recorded in the Sault Ste. Marie Mining Division in 1984.

Deep drilling at Renabie confirmed the presence of substantial new reserves below the 3100-foot (945 m) level. An internal shaft with a planned depth of 1400 feet (425 m) is under development to gain access to these deeper reserves. A major expansion program underway at Renabie is expected to be completed in early 1986.

Mining activity resumed at the former Prace (lead-silver) Mine in Vankoughnet Township 29 km north of Sault Ste. Marie. The property is now under the ownership of Sill Lake Silver Mines Limited, a private corporation. As of late-1984, Sill Lake Silver Mines employed a staff of about 16 with a production rate of about 100 tons per day, but plans to increase this to about 200 tons per day in 1985. Ore from the mine is trucked to the mill of Algoma Metal Refining Incorporated (the former Gould Copper Mine) in Gould Township.

In 1984, Royal Gold and Silver Corporation entered into an

agreement with Sill Lake Silver Mines Limited to extract argentiferous galena from 4000 tons of tailings from earlier operations. Royal Gold and Silver shipped about 75 tons of galena concentrate from the Sill Lake Mine in 1984.

Noranda Incorporated, Teck Corporation, and Lac Minerals Limited are each engaged in the construction of mining and milling plants for their Hemlo orebodies. A description of the activity in the Hemlo area is found in the report of the Thunder Bay Resident Geologist (this volume).

BKK Engineering Limited is engaged in a project to extract gold from the tailings of the old Havilah Gold Mine in Galbraith Township.

EXPLORATION ACTIVITY

Mineral exploration in the Sault Ste. Marie Mining Division continued at a relatively high level, although somewhat reduced from the peak of the previous year. Again

gold was the commodity of choice. Base metal prospects rarely received attention unless there was known associated precious metals.

Tables 1 and 2 summarize the exploration activity in the Sault Ste. Marie Mining division during 1984.

GOLD

In 1984, Westfield Minerals Limited stepped up exploration on the Mishibishu Lake Gold Property it holds with Windarra Minerals Limited. A preliminary diamond drilling program of 790 m began in April. The drilling and surface work indicated the presence of a zone of sheared and altered metasedimentary and metavolcanic rocks up to 760 m wide and 6.7 km long.

Three drill rigs began a 5800 m diamond drilling program late in the year. The Northern Miner (November 8, 1984) reported that Hole 20 intersected a 9 m wide zone of narrow quartz veins and stringers which yielded a weighted

EXPLORATION ACTIVITY DURING THE YEAR.

TABLE 1

Number on Figure	Individual or Company	Activity
1.	F. T. Archibald	Geological survey Jacobson Township
2.	D. Belanger	Airborne EM, Mag., VLF-EM, Stover Township
3.	BKK Consulting Limited	Airborne Mag., EM, McMurray and Rabazo Townships
4.	Bridget Lake Resources Ltd.	Trenching, bulk sampling, road construction , Rabazo Township
5.	C. Campbell, S Powley	Drilling, Hughes Township
6.	Canreos Minerals Limited	Bulk sampling, Drilling, Brackin Township
7.	C. Clement	Mag. survey, Naveau Township
8.	Cline Development Corp.	Drilling, Mag., Jacobson Township
9.	Cymbal Explorations Limited	Basal till survey, Jacobson Township
10.	Y. Desjardins	Prospecting, Sampling, West Township
11.	Dryden Resources Limited	Airborne geophysics, Batchawana area
12.	Enerxex Developments Inc.	EM, Mag., Nicholas and Raimbault Townships
13.	Getty Mines Limited	Drilling, Palmer Township
14.	Golden Terrace Resources Limited	Geological, geophysical, geochemical surveys, white Lake area
15.	G. Graton	Mag. survey, Naveau Township
16.	J. Haugeneder, W. Richards	Drilling, Sampling, Chesley Township
17.	Hemgold Resources Ltd.	Airborne geophysics, Batchawana area
18.	R. Henderson	Sampling, Prospecting, McMurray Township
19.	Kingswood Explorations Ltd.	Drilling, Bruyere Township
20.	Lac Minerals Ltd.	Geochemical and Geological surveys, Bomby and Brothers Townships
21.	Longbow Explorations Ltd.	Trenching, Sampling, Wells Township
22.	A. MacDonald	Mag, VLF survey, Dambrossio Township
23.	Massive Energy Corporation	Geological and geochemical surveys, Drilling, Davieaux Township
24.	R.J. McGowan	Airborne Mag, E.M., Stover, Meath and Rennie Townships
25.	R.J. McGowan	Airborne Mag, E.M., Abotossaway Township
26.	R. J. McGowan	Mag., E.M., LeClaire Township
27.	Monte Cristo Resources Ltd.	Mag., E.M., McMurray Township
28.	Nearctic Resources Ltd.	Geological, Geochemical surveys, Drilling, Michipicoten Island
29.	Ontex Resources Ltd.	Geological mapping, Prospecting, Davieaux Township
30.	Pango Gold Mines Ltd.	Geological and Geophysical surveys, McMurray Township
31.	J.F. Paquette	Mag. survey, Palmer Township
32.	Rado Reef Resources Ltd.	Mag., E.M. surveys, Bombay and Brothers Townships
33.	Sands Minerals Corp.	Geological, Geochemical, Geophysical surveys, Davieaux Township
34.	Santa Maria Resources Ltd.	Geological, Geochemical surveys, Desbiens Township
35.	Wasabi Resources Ltd.	Geological, Geophysical surveys, Mishibishu Lake area
36.	Watson Lake Explorations Ltd.	Drilling Geological mapping, Duncan and Jarvis Townships
37.	Westfield Minerals Ltd.	Drilling, Geological, Geochemical surveys, Mishibishu Lake area
38.	Westfield Minerals Ltd.	Drilling, Geological survey, Rennie Township

TABLE 2

ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.

SAULT STE. MARIE MINING DIVISION

AEM-Airborne Electromagnetic
 AMAG -Airborne Magnetometer
 ARAD-Airborne Radiometric
 D-Donated
 DD-Diamond Drill
 DDH-Diamond Drill Hole
 EM-Electromagnetic Survey
 G-Ground Survey
 GEM-Ground Electromagnetic

GL-Geological Survey
 GMAG-Ground Magnetometer
 GEOCHEM-Geochemical
 GRAD-Ground Radiometric
 OV-Overburden
 P-Induced Polarization
 Str-Stripping
 VLF-Very Low Frequency

Ag-Silver
 Au-Gold
 BM-Base Metals
 Cu-Copper
 Fe-Iron
 Pb-Lead

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Abotossaway	42C/2	Manwa Expl.Serv.Ltd.	Au, BM	Asses.	GMAG, VLF	1984	Abotossaway	0044
Aibanel	41J/10	Canamax Res.Ltd.	Au, BM	Asses.	AMAG, AEM, ARAD	1983	Aibanel	0047
Bailloquet	42C/2	Osisko Lake M.Ltd.	Au, BM	Asses.	GL, VLF	1983	Bailloquet	0020
Bailloquet	42C/2	Hemgold Res. Inc.		Asses.	AMAG, AVLF	1983	Chabanel	0050
Bridgeland	42J/5&6	Eldon Mines Alg.	Au, BM	Asses.	D.D.	1983	Bridgeland	0029-A1
Bruyere	42C/1&8	Kingswood Expl.Ltd.	Au, BM	Asses.	D.D.; Assays	1984	Bruyere	0019
Chabanel	42C/2	Canamax Res. Ltd.		Asses.	AMAG, AVLF	1983	Chabanel	0049-A1
Chabanel	42C/2	Hemgold Res.Inc.		Asses.	AMAG, AVLF	1983	Chabanel	0050
Cooper	42C/10	Pezamerica Res.	AU, BM	Asses.	AEM, AMAG	1983	Hambleton	0012
Copenace	42C/1&8	Tundra Gold Mines		Asses.	AMAG, AVLF	1983	Copenace	0012
Cudney	42C/9&10	Captain Consol.Res.		Asses.	AMAG, AVLF	1983	Cudney	0010
Dahl	42C/7	Murray, B.		Asses.	AMAG, AVLF	1983	Dahl	0011
Dambrossio	42C/7	Murray, B.		Asses.	AMAG, AVLF	1983	Dahl	0011
Daumont	41J/13	Highland-Crow Res.	AU, BM	Asses.	GMAG, SP, EM, GL	1983	Gaudette	0024
Daumont	41J/13	Highland Crow Res.	AU, BM	Asses.	DDH, Assays	1983	Daumont	0014
Dolson	42C/1	Tundra Gold Mines		Asses.	AMAG, AVLF	1983	Dolson	0016
Dolson	42C/1	Tundra Gold Mines		Asses.	AMAG, AVLF	1983	Dolson	0017-A1
Doucett	42C/10	Tundra Gold Mines		Asses.	AMAG, AVLF	1983	Doucett	0011
Duncan	41K/9	Longbow Expl.		Asses.	AMAG, AVLF	1983	Duncan	0012
Duncan	41K/9	Longbow Expl.	Ag, BM	Asses.	Prop.Repts.	1981	Jarvis	0023 - A1
Echum	42C/1	Shunock, M.			GMAG, GVLF	1984	Echum	0012-A1
Esquega	42C/2	J-Q & Dasher	Au	Asses.	GVLF, D.D.	1983	Esquega	0028
Finan	42C/7&8	Canamax Expl.	Au	Asses.	AMAG, AEM	1983	Finan	0014
Finan	42C/7&8	Magino Joint Venture	Au	Asses.	D.D., Assays, Rpt's	1981-83	Finan	0027
Finan	42C/7&8	Canamax Res. Ltd.		Asses.	AMAG, AEM	1983	Finan	0028-A1
Gapp	410/4	Noranda Expl. Ltd.	BM	Asses.	GMAG, GHEM	1983	Gapp	0018-A1
Gapp	410/4	Noranda Expl. Ltd.	BM	Asses.	GMAG, GHEM	1983	Gapp	0019-A1
Gapp	410/4	Noranda Expl. Ltd.	BM	Asses.	GMAG, GHEM	1983	Gapp	0020-A1
Gapp	410/4	Fraser, R.J.	BM	Asses.	Assays	1982	Gapp	0021
Gapp	410/4	Noranda Expl. Ltd.	BM	Asses.	GMAG, GEM, Assays	1983	Gapp	0017
Gaudette	41J/13	Highland-Crow Res.Ltd.	AU, BM	Asses.	GMAG, SP, EM, GL	1983	Gaudette	0024
Groseilliers	41N/14	McMillan Energy		Asses.	AMAG, AEM	1983	Groseilliers	0015
Hambleton	42C/14	Pezamerica Res.Corp.	AU, BM	Asses.	AEM, AMAG	1983	Hambleton	0012
Hembrutt	41J/10	Canamax Res. Ltd.	AU, BM	Asses.	AMAG, AEM, ARAD	1983	Aibanel	0047

TABLE 2 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Hembruff	41J/10	Pearson, W.N.			D.D., Assays	1965(?)	Hembruff	0016
Jacobson	42C/8	Hemgold Res.	AU	Asses.	AMAG, AEM	1983	Riggs	0019 - A1
Jacobson	42C/8	Cymbal Expl.		Asses.	GRAD	1983	Jacobson	0054-A1.
Jacobson	42C/8	Gulf Minerals			GEM	1978	Jacobson	0055-A1
Jacobson	42C/8	Cymbal Expl. Ltd.	Au	Asses.	OV Drilling	1984	Jacobson	0058
Jacobson	42C/8	Anaconda Expl. Ltd.	Au	Asses.	GMAG, GVLF, I.P.	1982-83	Jacobson	0059
Jacobson	42C/8	Cline Develp. Corp.	Au	Asses.	GMAG	1984	Jacobson	0060-A1
Jacobson	42C/8	Archibald, F.T.	Au	Asses.	GL	1984	Jacobson	0060-C1
Jacobson	42C/8	Anaconda Can. Ltd.		Asses.	GL, IP, DD, Assays	1983	Jacobson	0056
Jarvis	41K/9	Longbow Expl. Ltd.	Ag, BM	Asses.	Prop. Reports	1981	Jarvis	0023-A1
Jarvis	41K/9	Longbow Expl. Ltd.		Asses.	AMAG, AVLF	1983	Duncan	0012
Jogues	41J/7	Morgan Hydro Carb.	U	Asses.	U.D.	1978-79	Jogues	0022
Jollineau	41J/13	Watkins, J.	Ag, BM	Asses.	Trenching	1983	Jollineau	0013 - A1
Keating	42C/3	Noranda Expl. Ltd.	Au	Asses.	D.D.H.	1983	Keating	0016
Leclair	42C/2	McGowan, R.J.	Au, BM	Asses.	GMAG, GVLF	1984	Leclair	0016
Leeson	42B/5	North Goldfields Res.		Asses.	GMAG, GEM	1983	Leeson	0028
Leeson	42B/5	Shunock, M.	Au, BM	Asses.	GMAG, GVLF	1983-84	Leeson	0029-A1
Lendrum	41N/15	Algoma Steel Corp.			GMAG	1980	Lendrum	0016-A1
Lendrum	41N/15	Algoma Steel Corp.			GMAG	1981	Lendrum	0016-B1
Lendrum	41N/15	Osisko Lake M. Ltd.	Au, BM	Asses.	GL, VLF	1983	Bailloquet	0020
Lendrum	41N/15	Hemgold Res. Inc.		Asses.	AMAG, AVLF	1983	Chabanel	0050
Lunkie	41J/13	Noranda Expl. Ltd.	Au, BM	Asses.	GMAG, GHEM	1983	Lunkie	0010-A1
Lunkie	41J/13	Noranda Expl. Ltd.	Au, BM	Asses.	GMAG, GHEM	1983	Lunkie	0011
Matthews	42C/12	Lobo Gold & Res. Inc.	Au	Asses.	GMAG, GVLF	1983	Matthews	0010-A1
Matthews	42C/12	Honcho Gold Mines Inc.	Au	Asses.	GMAG, GVLF	1983-84	Matthews	0011-A1
McMurray	41N/15	Algoma Steel Corp.		Asses.	GEM	1981	McMurray	0046-A1
McMurray	41N/15	Dunraine M.L.	Au	Asses.	GL	1982	McMurray	0047-A1
McMurray	41N/15	Henderson, R.	Au	Asses.	Stripping	1983	McMurray	0047-C1
McMurray	41N/15	Pango Gold M. Ltd.	Au	Asses.	GMAG, GRAD	1982	McMurray	0048
McMurray	41N/15	Nakusp Res. Ltd.	Au	Asses.	Property Rept.	1983	McMurray	0050-A1
McMurray	41N/15	Northern Horizon Res.	Au	Asses.	AEM	1983	McMurray	0051
McMurray	41N/15	Nakusp Res. Ltd.	Au	Asses.	Assays	1983	McMurray	0052-A1
McMurray	41N/15	Henderson, K.	Au	Asses.	Assays	1983	McMurray	0052-B1
McMurray	41N/15	Henderson, R.	Au	Asses.	Assays	1983	McMurray	0052-C1
McMurray	41N/15	Monte Christo Res.	AU	Asses.	GMAG, GVLF	1984	McMurray	0053-A1
Meath	42C/8	Cut Thumb Mines	AU	Asses.	GL	1983	Meath	0026
Meath	42C/8	Teck Expl. Ltd.	AU	Asses.	DDH	1984	Meath	0028-A1
Meath	42C/8	Cut Thumb Mines		Asses.	AMAG, AEM	1983	Meath	0027
Mosambik	42C/15	Golden Bull Res.		Asses.	AMAG, AVLF	1983	Mosambik	0012
Mosambik	42C/15	Admiral Mines Ltd.		Asses.	AMAG, AVLF	1983	Mosambik	0013
Mosambik	42C/15	McKinnon, Don		Asses.	AMAG, AVLF	1983	Mosambik	0014
Mosambik	42C/15	McKinnon, Don	AU	Asses.	AMAG, AVLF	1983	Mosambik	0015-A1
Musquash	42C/2	Noranda Expl. Ltd.	AU	Asses.	GMAG, EM, GL	1981	Musquash	0012-A1
Nahwegezhic	41J/13	Algoma Ore Prop.	FE	D	GL	1942	Nahwegezhic	0012

TABLE 2 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Nameigos	42C/10	Denver Silver Inc.			AMAG, AEM	1983	Nameigos 0011	
Nameigos	42C/10	International Westward		Asses.	AMAG, AEM	1983	Nameigos 0012	
Nameigos	42C/10	Annie Lake Mines Ltd.		Asses.	AMAG, AEM	1983	Nameigos 0013	
Nameigos	42C/10	Pez Group		Asses.	AMAG, AEM	1983	Nameigos 0014	
Nameigos	42C/10	Saxton Industries		Asses.	AMAG, AEM	1984	Nameigos 0015	
Nameigos	42C/10	Beaver Energy Res.		Asses.	AMAG, AEM	1983	Nameigos 0016	
Nameigos	42C/10	Pryme Energy Res.		Asses.	AMAG, AEM	1983	Nameigos 0017	
Naveau	41N/15	Cureatz, J.		Asses.	GMAG, GVLF	1983	Naveau 0020-A1	
Nichoias	41J/10	Canamax Res. Ltd.	Au, BM	Asses.	AMAG, AEM, ARAD	1983	Albanel 0047	
Nicolet	41N/1	DeKalb Mining			GL, DDH, Assays	1981	Nicolet 0035	
Nicolet	41N/1	Tribag Mining			DDH	1966	Nicolet 0036	
Nicolet	41N/1	DeKalb Mining			GL, DDH, Assays	1982	Nicolet 0037-A1	
Nicolet	41N/1	(Unknown)			Report	1901?	Nicolet 0037-C1	
Odlum	42C/14	Can. Pac. Ry.		D	GL	1958	Odlum 0010-A1	
Odlum	42C/14	Pezamerica Res.	Au, BM	Asses.	AEM, AMAG	1983	Hambleton 0012	
Palmer	41K/15	Rupert, R.J.	Au	Asses.	GMAG	1984	Palmer 0032-A1	
Poulin	41J/10	Canamax Res. Ltd.	Au, BM	Asses.	AMAG, AEM, ARAD	1983	Albanel 0047	
Rabazo	41N/15	Canabec Expl. Ltd.		Asses.	GMAG, GEM	1983	Rabazo 0027-A1	
Rabazo	41N/15	Canabec Expl. Ltd.		Asses.	GL	1983	Rabazo 0027-C1	
Rabazo	41N/15	Canabec Expl. Ltd.		Asses.	GMAG, GEM, GL	1983	Rabazo 0028	
Rabazo	41N/15	Morton, J.N.			Stripping	1983	Rabazo 0029-A1	
Rabazo	41N/15	Golden Pond Res.	Au	Asses.	DD	1984	Rabazo 0030	
Raimbault	41J/10	Canamax Res. Ltd.	Au, BM	Asses.	AMAG, ARAD, AEM	1983	Albanel 0047	
Rennie	42B/5	Renable Mines	Au	Asses.	DDH	1984	Rabazo 0031-A1	
Rennie	42B/5	Tundra Gold Mines Ltd.	Au	Asses.	AMAG, AEM	1983	Rabazo 0032	
Riggs	42C/8	Gldn.Shadow-Lava Cap		Asses.	GMAG, GEM	1983	West 0017 - A1	
Riggs	42C/8	Hemgold Res.	Au	Asses.	AMAG, AEM	1983	Riggs 0019-A1	
Sagard	41J/10	Canamax Res. Ltd.	Au, BM	Asses.	AMAG, AEM, ARAD	1983	Albanel 0047	
Strickland	42C/10	Pez Group	Au	Asses.	AMAG, AEM	1983	Strickland 0010	
Strickland	42C/10	Pezamerican Res.	Au, BM	Asses.	AEM, AMAG	1983	Hambleton 0012	
Tarbutt	41J/5	Tech. Mine Cons.			AMAG, AEM, ARAD	1956	Tarbutt 0011-A1	
Tarbutt	41J/5	Kennco Expl.	Cu		Report	1956	Tarbutt 0012-A1	
Tedder	42C/11	Pezamerica Res.	Au, BM	Asses.	AEM, AMAG	1983	Hambleton 0012	
Viel	41J/10	Canamax Res. Ltd.	Au, BM	Asses.	AMAG, AEM, ARAD	1983	Albanel 0047	
Way-White	41N/1	Noranda Expl. Ltd.		Asses.	GMAG, GHEM	1983	Way-White 0010-A1	
West	42C/8	Golden Shadow-Lava Cap.		Asses.	GMAG, GEM	1983	West 0017-A1	
Pilot Harbour	41N/13NE	Brass Ring Res.		Asses.	AMAG, AEM	1983	41N/13NE - 0012	
Pilot Harbour	41N/13NE	Mid-North Eng.		Asses.	AMAG, AEM	1983	41N/13NE - 0013	
Pilot Harbour	41N/13NE	Cotton Valley Res.		Asses.	AMAG, AEM	1983	41N/13NE - 0014	
Pilot Harbour	41N/13NW	Noranda Expl.		Asses.	GMAG, GEM	1983	41N/13NW - 0010	
Pilot Harbour	41N/13NW	New Beginnings Res.		Asses.	AMAG, AEM	1983	41N/13NW - 0011	
Abbie Lake	42C/03NW	Tundra Gold Mines Ltd.		Asses.	AMAG, AEM	1983	42C/03NW - 0012	
Mishibishu Lake	42C/03SW	Sanderson, C.D.		Asses.	Trenching	1983	42C/03SW - 0018 - A1	

TABLE 2 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Mishibishu Lake	42C/03SW	Wasabi Resources		Asses.	AMAG, AEM	1983	42C/03SW - 0019	
Mishibishu Lake	42C/03SW	St. Fabien-Westfield		Asses.	D.D.	1983	42C/03SW - 0020	
Mishibishu Lake	42C/03SW	Westfield Minerals		Asses.	Geochem.	1983	42C/03SW - 0021 - A1	
Mishibishu Lake	42C/03SW	Westfield Minerals		Asses.	Geochem.	1983	42C/03SW - 0021 - B1	
Mishibishu Lake	42C/03SW	Westfield Minerals		Asses.	D.D.	1984	42C/03SW - 0022	
Mishibishu Lake	42C/03SW	St. Fabien-Westfield		Asses.	Rept, Str, Assays	1982	42C/03SW - 0023	
Mishibishu Lake	42C/03SW	Westfield Minerals		Asses.	Assays	1982	42C/03SW - 0024 - A1	
Mishibishu Lake	42C/03SW	Westfield Minerals		Asses.	GMAG, IP, DD, GL	1983	42C/03SW - 0025	
Pukaskwa River	42C/04NE	Captain Consolidated		Asses.	AMAG, AEM	1983	42C/04NE - 0015	
David Lakes	42C/04SE	547475 Ontario Ltd.		Asses.	AMAG, AEM	1983	42C/04SE - 0013	
Camp Lake	42C/04SW	White, V.		Asses.	AMAG, AEM	1983	42C/04SW - 0012	
Camp Lake	42C/04SW	Kwapp et al.		D	Property Report	1911	42C/04SW - 0011 - A1	
Camp Lake	42C/04SW	Noranda Expl.		Asses.	GMAG, GVLF	1983	42C/04SW - 0011 - B1	
Jarvey Lake	42C/06SW	Tundra Gold Mines Ltd.		Asses.	AMAG, AEM	1983	42C/06SW - 0010 - A1	
Denis Lake	42C/11NW	Giant Chief Mining		Asses.	AMAG, AEM	1983	42C/11NW - 0010 - A1	
Denis Lake	42C/11NW	Kenergy Resources		Asses.	AMAG, AEM	1983	42C/11NW - 0011 - A1	
Denis Lake	42C/11NW	Danra Resources		Asses.	AMAG, AEM	1984	42C/11NW - 0012	
White Lake - South	42C/12NE	Score Res.		Asses.	DD, Trench, Assays	1983	42C/12NE - 0014	
White Lake - South	42C/12NE	Transpacific Asbestos		Asses.	GL.	1983	42C/12NE - 0015	
White Lake - South	42C/12NE	Noranda Expl.		Asses.	AEM, AMAG, RES	1983	42C/12NE - 0016	
White Lake - South	42C/12NE	Score Res.		Asses.	GMAG, VLF	1983	42C/12NE - 0017 - A1	
White Lake - South	42C/12NE	Golden Shield Res.		Asses.	GMAG	1983	42C/12NE - 0018 - A1	
White Lake - South	42C/12NE	Score Resources		Asses.	GL	1983	42C/12NE - 0019	
White Lake - South	42C/12NE	Emerald Lake Res.		Asses.	GL, GMAG, VLF	1984	42C/12NE - 0020	
White Lake - South	42C/12NE	Gallo Expl. Services		Asses.	AMAG, AEM	1983	42C/12NE - 0021	
White Lake - South	42C/12NE	Agillis Engineering		Asses.	AMAG, AEM	1983	42C/12NE - 0022	
White Lake - South	42C/12NE	Golden Terrace Res.		Asses.	AMAG, AEM	1983	42C/12NE - 0023	
White Lake - South	42C/12NE	Hawley, G.		Asses.	GL, GEOCHEM	1983	42C/12NE - 0024	
White Lake - South	42C/12NE	Lac Minerals Ltd.		Asses.	GEOCHEM.	1983-84	42C/12NE - 0025	
Molson Lake	42C/12NW	Canada(117454)Ltd.		Asses.	DD; Assays	1983	42C/12NW - 0018 - A1	
Molson Lake	42C/12NW	Rose Resources		Asses.	GMAG, GEM, GL	1983	42C/12NW - 0019	
Molson Lake	42C/12NW	Harlin Resources		Asses.	GMAG, GEM, GL, Assay	1983	42C/12NW - 0020	
Molson Lake	42C/12NW	Narex Ore Search		Asses.	AMAG, AEM	1983	42C/12NW - 0021	
Molson Lake	42C/12NW	HRC Hemlo Resource		Asses.	AMAG, AEM	1983	42C/12NW - 0022	
Molson Lake	42C/12NW	Golden Sceptre - Goliath			GL, GEOCHEM, SP, IP, MAG, DD, Trenching	1981-83	42C/12NW - 0023	
Molson Lake	42C/12NW	Pricemore Resources			GMAG, GEM	1983	42C/12NW - 0024 - A1	
Molson Lake	42C/12NW	Livesey, D.			AMAG, AEM	1983	42C/12NW - 0024 - C1	
Molson Lake	42C/12NW	H R C Hemlo Resource			AMAG, AEM	1983	42C/12NW - 0025 - A1	
Molson Lake	42C/12NW	Lac Minerals Ltd.			GL	1983	42C/12NW - 0026'	
Molson Lake	42C/12NW	Belont Resources			GEOCHEM	1983	42C/12NW - 0027	
Molson Lake	42C/12NW	Lac Minerals Ltd.		Asses.	GL	1983	42C/12NW - 0028	
Molson Lake	42C/12NW	Rado Reef Res.		Asses.	GMAG, GVLF	1983-84	42C/12NW - 0029	
Molson Lake	42C/12NW	Pricemore Res.		Asses.	GEOCHEM	1983	42C/12NW - 0030	

TABLE 2 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Molson Lake	42C/12NW	Lac Minerals		Asses.	GL	1983	42C/12NW - 0031	
Molson Lake	42C/12NW	Lac Minerals		Asses.	GL	1983	42C/12NW - 0032	- A1
Molson Lake	42C/12NW	Lac Minerals		Asses.	GL	1983	42C/12NW - 0033	- A1
Molson Lake	42C/12NW	Lac Minerals		Asses.	GL	1983	42C/12NW - 0034	- A1
Molson Lake	42C/12NW	Lac Minerals		Asses.	GL	1983	42C/12NW - 0035	- A1
Molson Lake	42C/12NW	Lac Minerals		Asses.	GL	1983	42C/12NW - 0036	- A1
Molson Lake	42C/12NW	Lac Minerals		Asses.	GL	1983	42C/12NW - 0037	- A1
Molson Lake	42C/12NW	Lac Minerals		Asses.	GL	1983	42C/12NW - 0038	- A1
Molson Lake	42C/12NW	Lac Minerals		Asses.	GL	1983	42C/12NW - 0039	- A1
Molson Lake	42C/12NW	554588 Ontario Ltd.		Asses.	AEM,AMAG	1983	42C/12NW - 0040	
Molson Lake	42C/12NW	H.W. Reserve Prop.		Asses.	AEM,AMAG	1983	42C/12NW - 0041	
Molson Lake	42C/12NW	Calpetro - Prolific		Asses.	AEM,AMAG	1983	42C/12NW - 0042	
Molson Lake	42C/12NW	Capoose Minerals		Asses.	AEM,AMAG	1983	42C/12NW - 0043	
Molson Lake	42C/12NW	Dejour Mines-Nova Co		Asses.	GMAG,GVLF	1983-84	42C/12NW - 0044	- A1
Molson Lake	42C/12NW	Glory Expl.		Asses.	AMAG,AEM	1983	42C/12NW - 0044	- C1
Molson Lake	42C/12NW	Lac Minerals		Asses.	GL	1983	42C/12NW - 0045	- A1
Molson Lake	42C/12NW	Lac Minerals		Asses.	GEOCHEM	1983-84	42C/12NW - 0046	
Molson Lake	42C/12NW	Lac Minerals		Asses.	GEOCHEM	1983-84	42C/12NW - 0047	
Molson Lake	42C/12NW	Lac Minerals		Asses.	GEOCHEM	1983-84	42C/12NW - 0048	
Molson Lake	42C/12NW	Lac Minerals		Asses.	GEOCHEM	1983-84	42C/12NW - 0049	
Molson Lake	42C/12NW	Lac Minerals		Asses.	GEOCHEM	1983-84	42C/12NW - 0050	
Molson Lake	42C/12NW	Lac Minerals		Asses.	GEOCHEM	1983-84	42C/12NW - 0051	
Molson Lake	42C/12NW	Lac Minerals		Asses.	GEOCHEM	1983-84	42C/12NW - 0052	
Molson Lake	42C/12NW	Lac Minerals		Asses.	GEOCHEM	1983-84	42C/12NW - 0053	
Molson Lake	42C/12NW	Lac Minerals		Asses.	GEOCHEM	1983-84	42C/12NW - 0054	
Molson Lake	42C/12NW	Lac Minerals		Asses.	GEOCHEM	1983-84	42C/12NW - 0055	
Molson Lake	42C/12NW	Lac Minerals		Asses.	DD	1983	42C/12NW - 0056	
Molson Lake	42C/12NW	Kelly Desmond		Asses.	GMAG,GEM	1983	42C/12NW - 0057	
Oskabukuta Lake	42C/12SE	Proflex Ltd.		Asses.	AMAG,AEM	1983	42C/12SE - 0010	
Oskabukuta Lake	42C/12SE	Ebony Gold Mines		Asses.	AMAG,AEM	1983	42C/12SE - 0011	- A1
Herrick Lake	42C/12SW	Pez Group		Asses.	AMAG,AEM	1983	42C/12SW - 0013	
Herrick Lake	42C/12SW	New Beginnings Res.		Asses.	AMAG,AEM	1983	42C/12SW - 0014	
Herrick Lake	42C/12SW	Canreos Minerals		Asses.	GMAG,GEM	1983-84	42C/12SW - 0015	- A1
Herrick Lake	42C/12SW	John Brown Mining		Asses.	GMAG,GEM	1983-84	42C/12SW - 0016	
White Lake - North	42C/13SE	Sunexco Energy Corp.		Asses.	AMAG,AEM	1983	42C/13SE - 0012	
White Lake - North	42C/13SE	United Westland Res.		Asses.	AMAG,AEM	1983	42C/13SE - 0013	
White Lake - North	42C/13SE	Levelland Energy		Asses.	AMAG,AEM	1983	42C/13SE - 0014	
White Lake - North	42C/13SE	Ventora Resources		Asses.	AMAG,AEM	1983	42C/13SE - 0015	
White Lake - North	42C/13SE	Midnapore Resources		Asses.	DD, Assays	1984	42C/13SE - 0016	
White Lake - North	42C/13SE	Midnapore Resources		Asses.	DD, Assays	1984	42C/13SE - 0017	- A1
White Lake - North	42C/13SE	Midnapore Resources		Asses.	GMAG,GVLF	1983	42C/13SE - 0018	
White Lake - North	42C/13SE	Brass Ring Resources		Asses.	AMAG,AEM	1983	42C/13SE - 0019	
White Lake - North	42C/13SE	Dunes Explorations		Asses.	AMAG,AEM	1983	42C/13SE - 0020	
White Lake - North	42C/13SE	Schiralli, R.A.		Asses.	AMAG,AEM	1984	42C/13SE - 0021	

TABLE 2 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Mussy Lake	42D/09SE	Maple Leaf Petroleum		Asses.	GMAG, EM	1983	42D/09SE - 0017	
Mussy Lake	42D/09SE	Maple Leaf Petroleum		Asses.	GL, GEOCHEM	1984	42D/09SE - 0018	
Mussy Lake	42D/09SE	Pacific Seadrift		Asses.	GMAG, GVLF	1984	42D/09SE - 0019	
Mussy Lake	42D/09SE	Walhalla - Maple Leaf		Asses.	GL, GEOCHEM, GVLF, IP	1983-84	42D/09SE - 0020	

average of 0.341 ounce gold per ton over 5.6 m; this included a high grade zone of 3.77 ounces gold per ton over 0.46 m.

Hole 22, drilled below Hole 20 and from the same set-up, returned several high grade intersections associated with narrow quartz veins. Hole 27, farther northwest, returned weighted averages of 0.852 ounce gold per ton over 1.4 m and 0.23 ounce gold per ton over 2.4 m. Hole 19, collared about 4.3 km southeast of Holes 20 and 22, intersected 1.2 m grading 0.0647 ounce gold per ton.

Massive Energy Corporation Limited holds a 263-claim group and options on 2 groups totaling 34 claims in Davieux Township in the Batchawana area. During 1984, Massive Energy completed reconnaissance geological, geochemical, and geophysical surveys over an east-west strip 1 km wide by 10 km long. Detailed surveys were carried out along a 400 m wide zone within the reconnaissance survey. Early in 1984, 15 drillholes totaling 1600 m were drilled to test the gold potential of a pyritic chert unit (lean "iron formation"). Additional stripping and trenching was done over a known gold occurrence south of Spruce Lake.

The Northern Miner (May 31, 1984) stated that Massive Energy Limited reported some sections of drill core had returned up to 0.15 ounce gold per ton. On September 27, 1984, The Northern Miner reported that channel sampling on the Hammer-Bridge Property, optioned by Massive Energy, returned grades averaging 0.137 ounce gold per ton over a width of 0.6 to 2 m and length of 18 m.

Dejour Mines Limited, Sands Minerals Corporation, and Ontex

Resources Limited have properties adjacent to Massive Energy Limited. The work done on these properties is listed in Table 1.

BASE METALS

Westfield Minerals Limited returned to its Conboy Lake zinc-silver property in Rennie Township to carry out detailed geological mapping, trenching, and extensive stripping. The main showing consists of a unit of massive sphalerite, in places over 1 m wide. The massive sphalerite and an underlying(?) zone of disseminated sphalerite carry significant silver values. The geological setting suggests a stratabond massive sulphide deposit. A drilling program was started in late 1984 to test the depth potential of the deposit which has a known mineral inventory of 70 000 tons grading 11% zinc, and 9.0 ounces silver per ton.

Late in 1984 Westfield Minerals Limited announced that trenching over soil geochemical anomalies (gold), just south of the zinc zone, had returned grab samples of up to 0.27 ounce gold per ton. Resampling and assaying of old drilling which had intersected the gold zone returned 0.11 ounce gold per ton over 1.15 m, 0.125 ounce gold per ton over 1.37 m, and 0.125 ounce gold per ton over 1.22 m.

In 1984 Nearctic Resources Incorporated received an Exploratory Licence of Occupation to undertake mineral exploration on Michipicoten Island, which had been identified as a candidate provincial park by the Ontario Ministry of Natural Resources. The licence consists of 2 parcels; one of 3253.75 ha on the western portion of the island and one of 1424.5 ha

along the northeastern shore. The terms of the licence are aimed at providing protection of environmentally sensitive areas while allowing thorough and efficient mineral exploration by the company.

During the summer of 1984 Nearctic carried out geophysical, geological, and geochemical surveys and a preliminary diamond drilling program on the larger (western) parcel of the licenced area.

As of December 1984, application has been made for 2 additional Exploratory Licences of Occupation on Michipicoten Island.

Watson Lake Mines Limited, a wholly owned subsidiary of Long Bow Exploration Incorporated, holds 93 claims including the Jardun Mine, a former base metal producer in Jarvis and Duncan Townships near Sault Ste. Marie. The company carried out geological surveys and a 4893-foot (1491 m) diamond drilling program on the property in the summer of 1984.

SAULT STE. MARIE DRILL CORE LIBRARY

The Sault Ste. Marie Core Storage Library was officially opened on June 26th, 1984. Staff included D.E. Messenger, J.D. Melisek, T. Wheatly, M. Gaudreau, and J. Penttinen as technicians and J.P. Donald as geologist.

A total of 48 000 m of complete core and a further 21 000 m of telescoped core is now compiled in the Library. There is additional room for about 31 000 m of complete core.

Core collected this year totals 14 500 m obtained from 31 core storage sites in the region. Eleven

of these sites represented 1984 drilling programs.

The computer system used for storing drill core data has been augmented to include a summary of abbreviated rock types for holes stored in the Library. This feature allows a search by rock type, texture, or formation.

Computer data files are also being compiled for several thousand thin sections and hand samples from completed Ontario Geological Survey projects in the region.

A listing of drill core in storage is available free upon request by contacting the Core Library at (705) 949-1231 or by correspondence to the Resident Geologist Office, 875 Queen St. E., Sault Ste. Marie, Ontario, P6A 2B3.

SAULT STE. MARIE RECONNAISSANCE GEOLOGY PROJECT

INTRODUCTION

The reconnaissance geology project was initiated to evaluate a number of selected geophysical, geochemical, and geological anomalies within the granitic and gneissic terrains in the Algoma District. The District was subdivided into 3 subareas of granitic and gneissic rocks (Figure 3): Area 1 extends from Sault Ste. Marie east to Elliot Lake, and from the edge of the Huronian Supergroup north to the Algoma District boundary; Area 2 extends from Mamainse Point to Wawa; and Area 3 extends from Wawa to Hemlo.

Work started on the project during the latter part of July with field work focusing on the western half of Area 1. The area is easily accessible by truck and all-terrain-vehicles over secondary roads and bush-roads, and lakes provide further access by boat, canoe, or float plane.

Targets evaluated were based on aeromagnetic, radiometric, and geochemical anomalies defined by previous federal and provincial surveys. Mineral occurrences and isolated "greenstone" segments

were evaluated in terms of their regional geological and metallogenic significance to provide a better understanding of the geological, tectonic, and mineralization history of the area. The data from these studies will be used to formulate exploration strategies and thereby promote mineral exploration in the district.

GEOLOGICAL SETTING

The granitic and gneissic terrains throughout Area 1 are categorized (Giblin *et al.* 1979) as consisting of unsubdivided granites, gneisses, and migmatites containing small isolated segments of "greenstone". The rocks are transected by northwest-, north-northwest-, and northeast-trending lineaments. Northwest- and north-northwest-trending diabase dikes are numerous. In a regional geological synthesis of the Central Superior Province, Card (1979) subdivided the area into plutonic and gneissic domains. The gneissic domains are geologically complex areas consisting of amphibolite, quartzofeldspathic gneisses, migmatites, and intrusive rocks. The plutonic domains consist of large areas of coarse-grained granite, monzonite, and subordinate granodiorite. Boundaries between domains are diffuse.

FIELD INVESTIGATIONS

Investigations of a number of aeromagnetic anomalies (M-1 to M-12, Figures 3, 4, and 5) indicate that they are caused by either: (1) iron formation-amphibolite remnants surrounded by or contained within granite, granodiorite, or tonalite gneiss; (2) diabase dikes containing magnetite which commonly trend to the northwest; (3) by quartz-magnetite veins occurring in the granitic country rocks adjacent to diabase dikes; or (4) by magnetite-bearing felsic plutonic rocks.

Two large radiometric anomalies (R-1 and R-2) may be caused by the presence of potassium-rich granites, with above average uranium and thorium occurring in accessory minerals such as zircon,

monazite, and uraninite. In both radiometric anomalies the granites become more calcic away from the radiometric highs. It appears that these plutonic rocks are a continuation of the radioactive granites in the Elliot Lake area (R-3, Figure 3).

Geochemical anomalies north of Sault Ste. Marie were investigated in order to determine the source of uranium in lake sediments and waters for geochemical anomaly SSM-1, and the source of Pb, Mo, Zn, Cu, Fe, and Mn in lake sediments for geochemical anomaly SSM-2. The anomalous uranium in lake sediments and waters for SSM-1 is probably due to the presence of radioactive granites in the area. Notably, the geochemical contours display some continuity with the total count airborne radiometric data from the Ranger Lake area. The anomalous metal values for SSM-2 are likely due in part to the occurrence of sulphide mineralization, and the presence of "greenstone" segments and Keweenaw volcanic rocks in the immediate area.

Two isolated segments of "greenstone" (G-1 and G-2) were investigated during the field work. Segment G-1 is quite small but contains metavolcanic and volcanoclastic rocks typical of most greenstone belts. Segment G-2, however, consists of quartzofeldspathic, layered paragneisses which have been partly migmatitized and contain minor amphibolite. The boundary with the enclosing granites and gneisses are characterized by the development of agmatitic rocks.

All mineral occurrences visited have a northwest trending structural control and most are closely associated with northwest-trending diabase dikes and subordinate lamprophyre dikes. The U-Fe, Cu-Fe, Pb-Zn-Ag, and some of the Fe occurrences are localized at the dike-country rock contact, in structurally preferred sites. As well, there appears to be a change from oxidized assemblages (i.e. hematite-pitchblende-calcite) in the west near the Keweenaw basal unconformity, to more reduced,

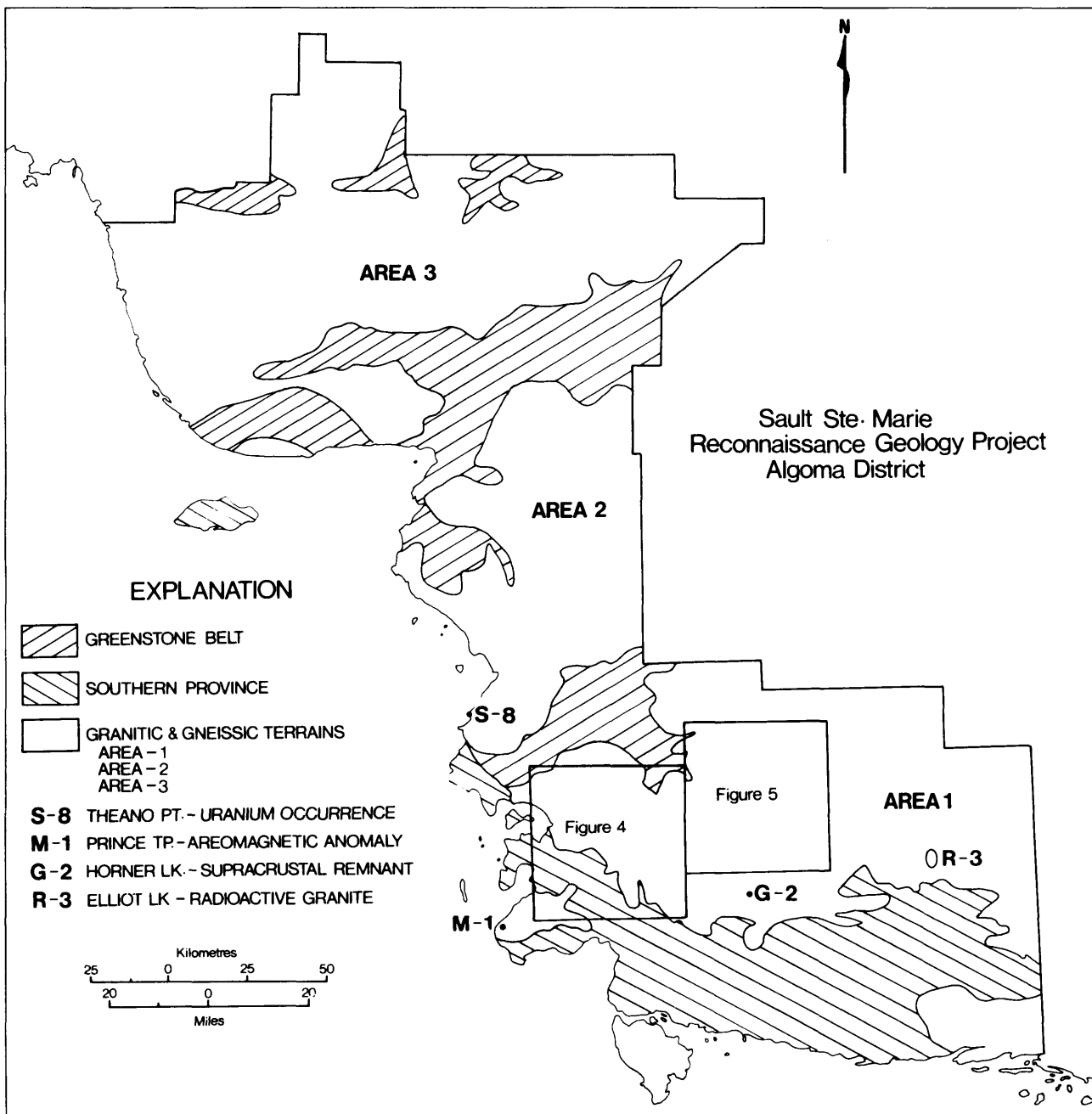


Figure 3. Sault Ste. Marie Reconnaissance Geology Project, Algoma District.

sulphide-bearing assemblages in the east (i.e. chalcopyrite-pyrite; galena-argentite-sphalerite; magnetite-pyrite-quartz).

An Open File Report, to be submitted by the end of March 1985, will elaborate on these observations and other available data. A final report will include an appendix containing information on each target and a 1:250 000 scale map indicating the locations visited, magnetic, radiometric, and geochemical anomalies, and geological targets and mineral occurrences.

WAWA ECONOMIC GEOLOGIST'S REPORT

INTRODUCTION

The Wawa Economic Geologist Program which began in June 1984, was initiated by the Sault Ste. Marie Resident Geologist Office and is funded by the Ontario Ministry of Northern Affairs.

The program encompasses an area from Pukuskwa National Park east to the Town of Missanabie (Figures 6, 7) and is staffed by Ken Booth and Warren Curtis.

The function of the Economic Geologist Program is to aid prospectors and exploration companies, and assisting with preliminary geological mapping and sampling of prospects. Another facet of the program is to compile data on new and known mineral occurrences for publication as Geological Data Inventory Folios by the Ontario Geological Survey.

MINERAL EXPLORATION IN THE WAWA-MISSANABIE AREA

In the Wawa area, gold continued to be the metal on which exploration was concentrated. A number of individuals and companies carried out exploration in 1984 (Table 1). Four of these programs are briefly described below.

Canamax Resources Incorporated carried out a detailed program in Finan Township on the old Kremzar Gold Property. The company conducted geophysical

and geological surveys followed by stripping, detailed mapping, and sampling. The surface work indicated a number of targets which were drilled in the Fall of 1984. Assays obtained include 0.34, 0.37 and 0.14 ounce gold per ton over 23, 16.4, and 23 feet (7, 5, and 7 m) respectively. In 1983 the company delineated 100 000 tons at 0.18 ounce gold per ton.

During the first half of 1984, Monk Gold Mines Limited carried out airborne and ground geophysics on its 5-claim gold property group in the northeastern corner of Rabazo Township. A follow-up program of 6 diamond-drill holes was also completed. Gold occurs in flat to gently dipping quartz veins which are hosted in laminated tuff or clastic metasedimentary rock, heavily carbonatized and sheared.

Bridget Lake Resources is carrying out developmental work on the Ranson Property in western Rabazo Township. Gold mineralization occurs in quartz veins hosted in quartz and quartz-feldspar porphyries and in mafic metavolcanic rocks. The company extended an open cut on a quartz vein which occurs at the contact between quartz porphyry and mafic metavolcanic rocks. Visible gold occurs in the vein. A 200 ton bulk sample was sent to the Pamour-Porcupine Mill in Timmins in the early fall of 1984.

Manwa Exploration Services Limited was contracted by International Corona Resources Limited in 1983 to conduct a reconnaissance exploration program on 13 1/2 townships of the Algoma Central Railway. Efforts were concentrated on outlining targets for a winter drill program. Linecutting, geology, and geophysics were carried out in a number of areas.

PROPERTY VISITS

Selected summary reports of property visits are as follows:

Centennial Mine

The Centennial Mine is located in the northwestern corner of Naveau Township and is now controlled by

Sault Meadows Energy Corporation. There are 4 shafts and 2 pits on the property. Three of these shafts date back to 1904 or 1905, while the other, an inclined shaft, was sunk between 1937 and 1939 to a depth of 80 m. Production from these underground workings totaled 610 ounces of gold and 36 ounces of silver from 8612 tons of ore (Ferguson *et al.* 1971, p.25-26). The host rock is homogeneous granodiorite of the Centennial Stock. The veins consist of massive milky white quartz and sugary quartz. The vein can be traced on the surface for 305 m striking 148° and dipping 52° northeast. Mineralization consists of disseminated grains and small veinlets of pyrite. Disseminated carbonate is prevalent in both the quartz and the host rock. Exploration is planned for 1985 and will involve dewatering, mapping, and sampling of the mine.

Kustec Occurrence

S. Kustec of Wawa, Ontario, holds 4 unpatented claims (SSM 774405-774408) in the southwestern corner of Rabazo Township. A quartz vein 3.6 m wide has been exposed by a 6.5 m long trench. There is no record of this work in the Sault Ste. Marie Resident Geologist Office. The quartz has a sugary texture and the mineralization consists of less than 1% pyrite. The vein strikes 085° and dips 70° south. The host rock is a dark, medium-grained amphibole schist but adjacent to the vein there is a layer of chert-magnetite iron formation. The layer is approximately 15 cm in width, the magnetite layer being 5 cm wide. The chert is now recrystallized to a sugary texture. Chip samples taken by the author across the vein assayed 0.01 ounce gold per ton. S. Kustec has completed line-cutting and minor stripping.

Cline Mine

The Cline Mine, 13 km northeast of Goudreau in central Jacobson Township is controlled by Cline Development Corporation (75%) and Prophet Resources Limited

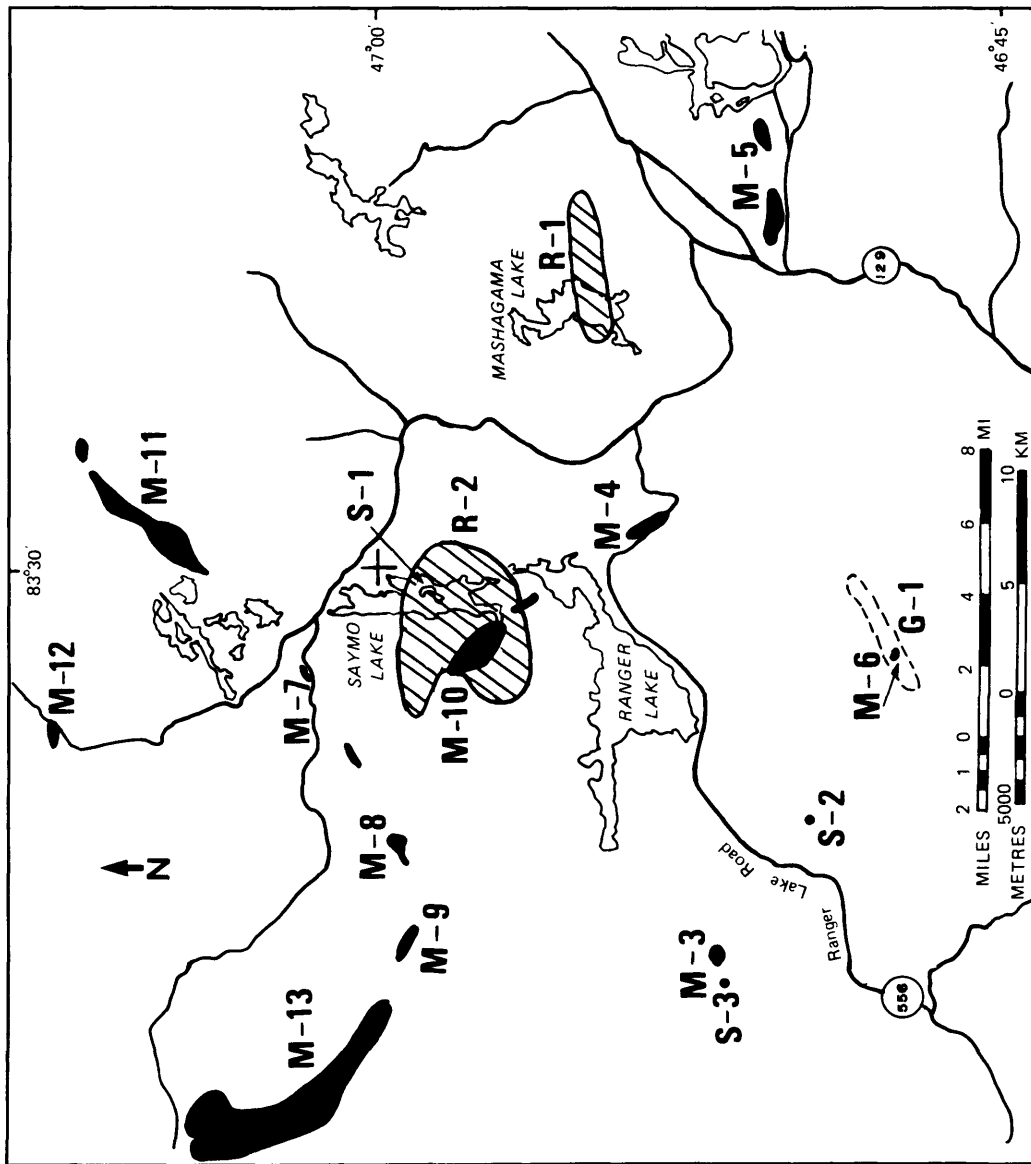


Figure 4. Aeromagnetic anomalies examined in 1984.

EXPLANATION FOR FIGURES 4 AND 5

AEROMAGNETIC ANOMALIES

- M-1: Monzonite to syenodiorite containing magnetite (Figure 3)
- M-2: Diabase-gabbro, quartz-magnetite veinlets
- M-3: Iron formation, amphibolite
- M-4: Diabase, quartz-magnetite veinlets
- M-5: Quartz monzonite containing magnetite
- M-6: Diabase, intermediate volcanic
- M-7: Iron formation, amphibolite
- M-8: Iron formation, amphibolite
- M-9: Mafic to intermediate meta-tuff, iron formation
- M-10: Diabase
- M-11: Amphibolite, iron formation
- M-12: Amphibole-feldspar-quartz-gneiss, iron formation
- M-13: Garden River Iron Formation

RADIOMETRIC ANOMALIES

- R-1: K-feldspar rich granite
- R-2: K-feldspar rich granite
- R-3: Granite, Elliot Lake area (Figure 3)

GEOLOGICAL TARGETS

- G-1: Garden River greenstone segment
- G-2: Horner Lake supracrustal segment (Figure 3)

MINERAL DEPOSITS AND OCCURRENCES

- S-1: Saymo Lake Barite Occurrence
- S-2: Jollineau Pb-Zn-Ag Occurrence
- S-3: Conway Lake Pb-Zn-Ag Occurrence
- S-4: Haviland Bay Sulphide Occurrence
- S-5: Sill Lake Silver Mines Limited
- S-6: Wolfe Lake Copper Occurrence
- S-7: Jardun Pb-Zn-Ag Mines Limited
- S-8: Theano Point Uranium Occurrence (Figure 3)
- S-9: Ranson Cu-Pb-Au-Ag Occurrence

CONTINUATION OF EXPLANATION
OF FIGURES 4 AND 5

GEOCHEMICAL ANOMALIES

SSM-1: Lake Sediments **a** : 20 ppm U
b : 7.6 - 20 ppm U
Lake Waters **c** : 0.16 ppb U

SSM-2: Lake Sediment (Pb-Zn-Cu-Fe-Mn-Mo)
Outline of general area: **d**

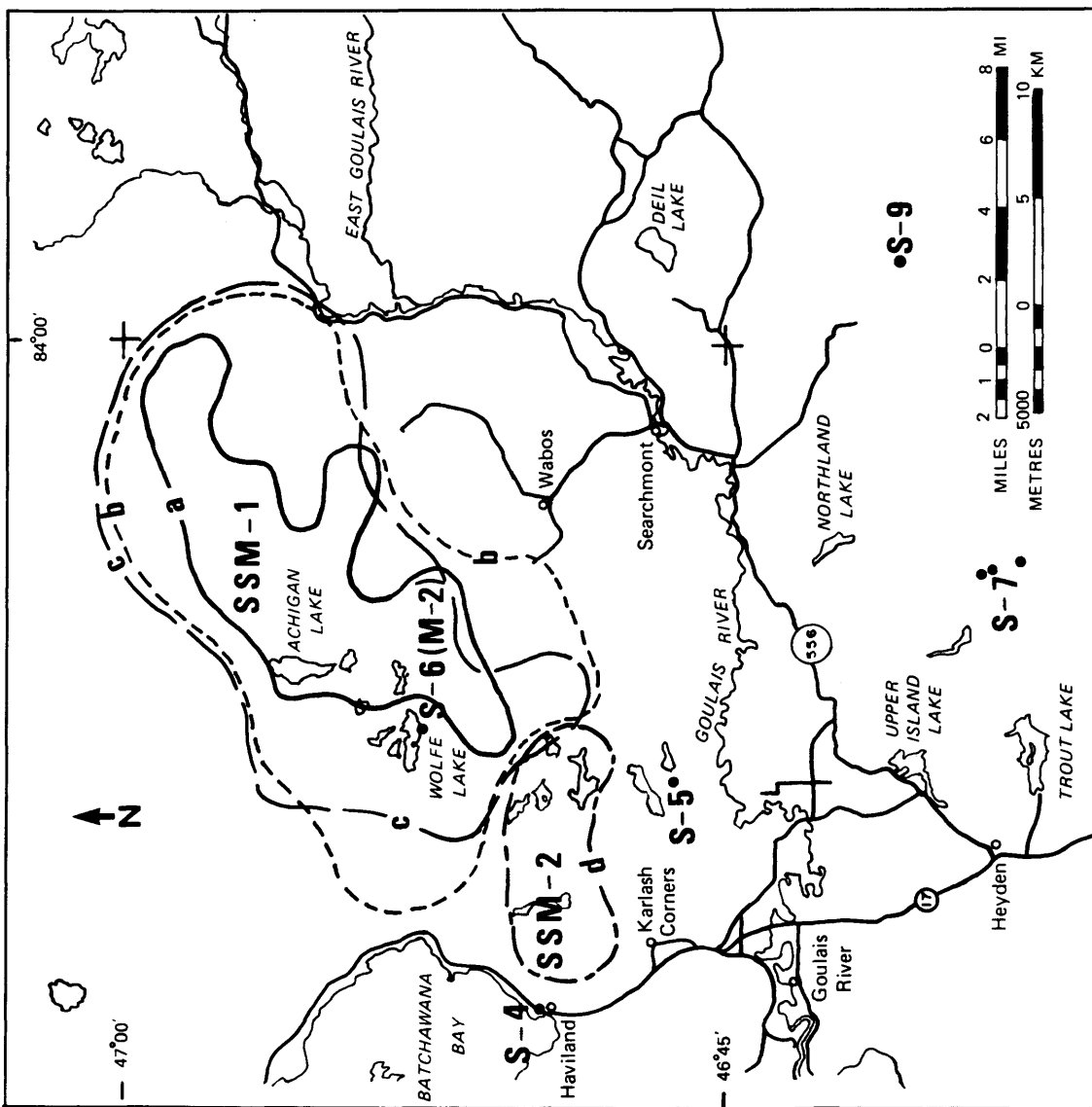


Figure 5. Regional geochemical anomalies.

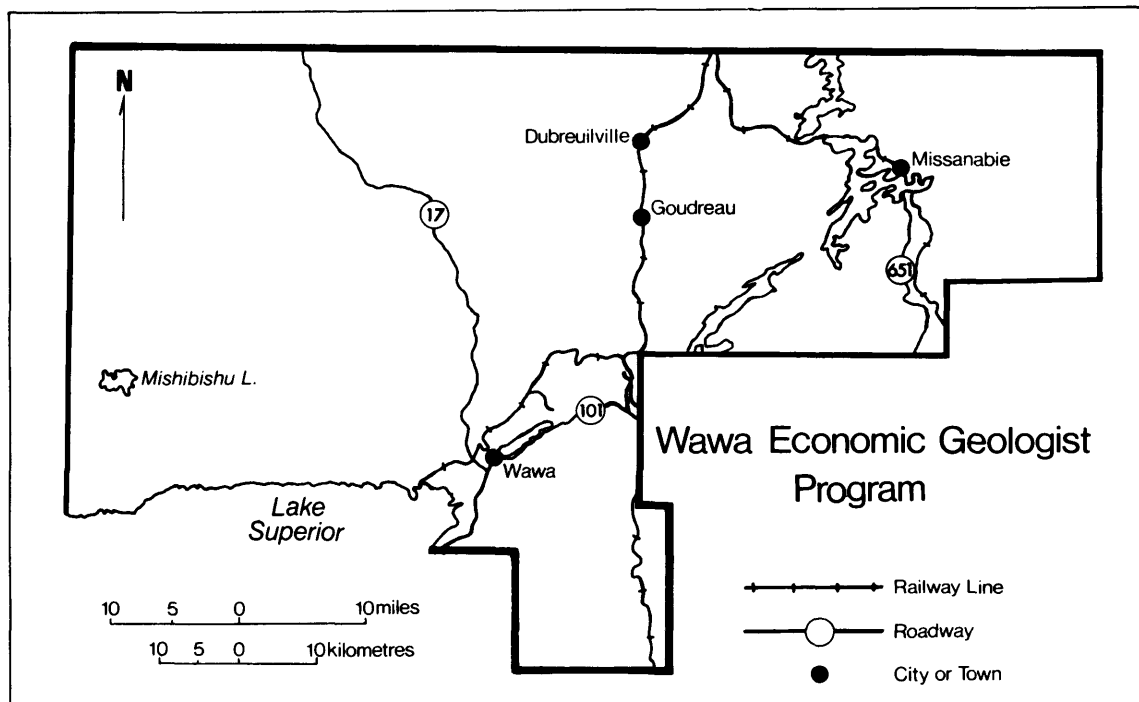


Figure 6. Wawa Economic Geologist Area.

(25%). The mine is the largest past producer in the Wawa area and between 1938 and 1948 produced 63 328 ounces of gold and 10 598 ounces of silver from 331 842 tons of ore. In the summer of 1983 Cline Development completed a geophysical survey and a major hydraulic and mechanical stripping program. Four areas were stripped and three of these which lie 100 m east of the old workings were investigated. The stripped areas expose massive and pillowed mafic metavolcanic rocks intruded by quartz-feldspar porphyry dikes which strike 080° to 090° and dip 72° to 80° south. Intensive shearing is evident along the contacts of the dikes with the metavolcanic rocks. The mafic metavolcanic rocks and the quartz-feldspar porphyries contain up to 3% disseminated pyrite. Grab samples from the metavolcanic rocks and porphyries taken by the author assayed 0.01 ounce gold per ton. The fourth area of stripping encompasses an area 200 by 120 m, and contains coarse-grained mafic volcanic rock, felsic volcanic rock, and porphyritic

dikes. A grab sample from a siliceous unit adjacent to an old portal assayed 0.14 ounce gold per ton. Cline Development, in a joint venture with Prophet Resources, carried out a drill program in December 1984, to test an induced polarization anomaly.

Desjardins Occurrence

Yves Desjardins of Sault Ste. Marie and E. Roy of Missanabie hold 8 unpatented claims in West Township approximately 21 km southwest of the Renabie Mine. Eight old debris-filled trenches are located on claim SSM 710637. The property is underlain by Early Precambrian mafic massive flows, tuff breccias, felsic crystal tuffs, and porphyritic flows.

The trenches expose a shear zone in metavolcanic rocks attaining a maximum width of 20 m. The shear zone strikes 110° and dips 82° southwest. The predominant rock types in the shear zone is a sericite schist containing carbonate and pyrite. Confined to the edges of the shear zone is a chlo-

rite schist. Quartz and quartz-feldspar porphyries are present in the trenches but are not well exposed. Sampling by the authors and others have returned encouraging values. A selected grab sample assayed by the Geoscience Laboratories, Ontario Geological Survey, Toronto, returned a value of 2.40 ounces gold per ton. Other grab samples assayed ranged between 0.11 and 0.46 ounce gold per ton. The best results to date are associated with 35 cm wide zones containing stringers of quartz, carbonate, pyrite, and chalcopyrite.

Rowan Lake Occurrence

The Rowan Lake Occurrence is in Abotossaway Township, 5 km southwest of Goudreau. Bonzano Exploration Limited holds 3 unpatented claims on the northern side of Rowan Lake. The company completed linecutting followed by ground magnetometer and electromagnetic surveys in the Summer of 1984.

An old test shaft 2 by 3 by 5 m, and many pits and trenches

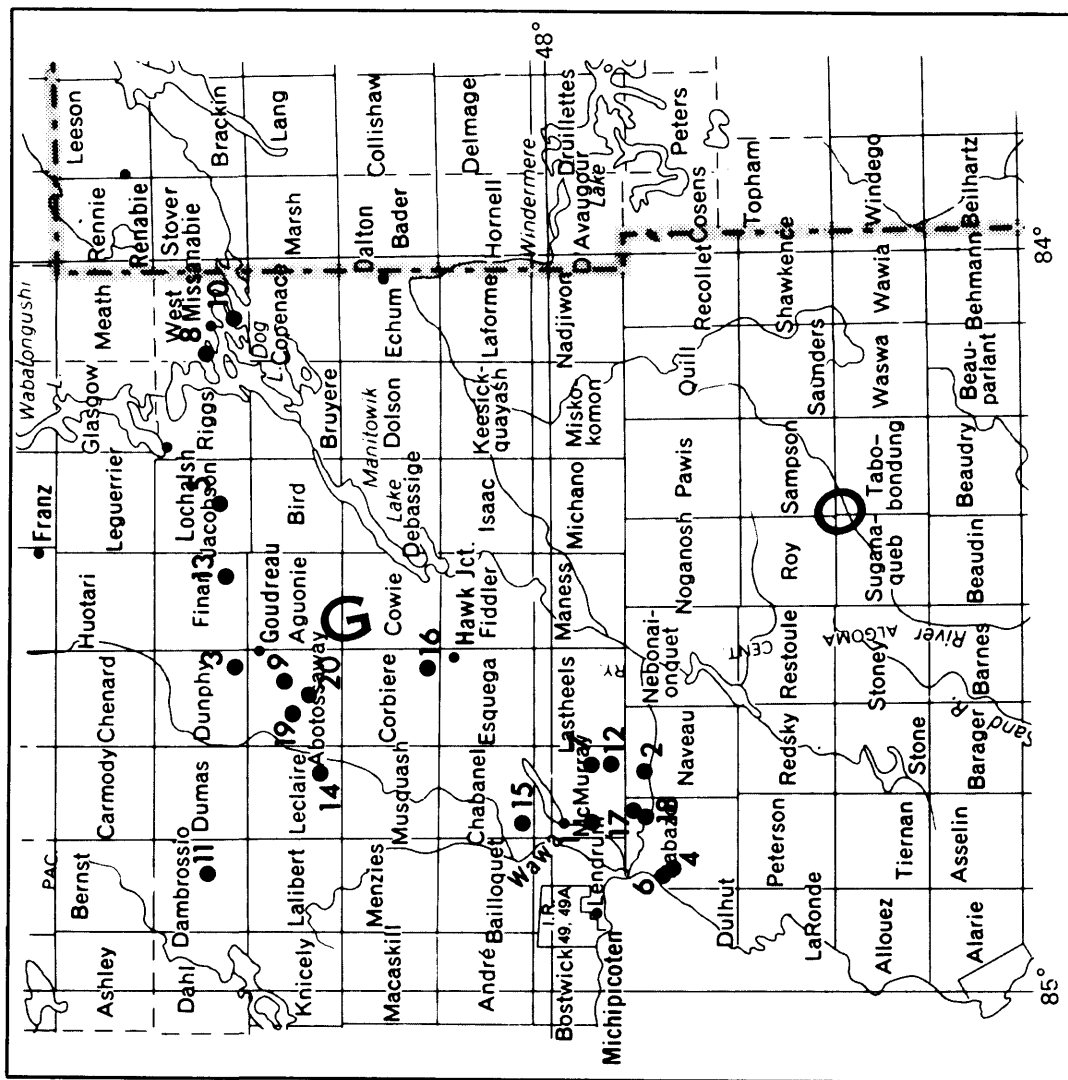
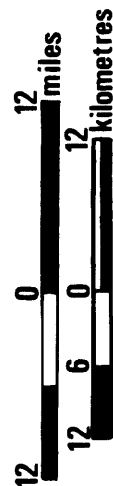


Figure 7. Property visits by the Wawa Economic Geologist.

● Properties Visited: (1984) Wawa Economic Geologist Program

- 1. Caicco Claims
- 2. Centennial Mine
- 3. Troupe Lake Occurrence
- 4. Kustec Occurrence
- 5. Cline Mine
- 6. Bridget Lake Prospect
- 7. Booth Property
- 8. Desjardins Occurrence
- 9. Rowan Lake Occurrence
- 10. Missinabi - Bonzano Occurrence
- 11. Godin Property
- 12. Edina Gold Property
- 13. Canamax Prospect
- 14. Bingham - Holiday Prospect
- 15. Boliden Prospect
- 16. Holdsworth Gold Property
- 17. Norwalk Mine
- 18. Monk Gold Property
- 19. Ego Mine
- 20. Murphy Lake Gold Mine



were found on the claims. The property is underlain by sheared and massive mafic metavolcanic rocks. The rocks are fine to coarse grained and the finer grained rocks contain up to 3% magnetite and up to 12% carbonate. Chlorite schist occurs in the shaft area. Shearing strikes 080° and dips 85° north. A milky white quartz vein found in the chlorite schist in the shaft area parallels the schistosity, and lacks mineralization. Six channel samples, each approximately 0.4 m in length, were taken at the top of the shaft by the author. The highest assay returned 0.01 ounce gold per ton.

Edina Gold Prospect

The Edina Gold Prospect is located 7.5 km southeast of the Town of Wawa in the southeastern corner of McMurray Township. R. Henderson of Elliot Lake holds 30 unpatented claims east of Leroy Lake which includes the Edina Prospect.

The original work by Edina Gold Syndicate exposed quartz veins in 8 trenches, in the fall of 1936. Edina reported assays from quartz veins between 0.13 and 0.73 ounce gold per ton.

Examination of some of the old trenches reveal that the "quartz veins" described by Edina are in the author's opinion recrystallized chert, part of an iron formation. Massive pyrrhotite, bornite, and disseminated pyrite were seen in 2 of the trenches. Recent sampling by 2 consulting firms failed to reproduce the values obtained by Edina.

Bingham-Holliday Showings

The Bingham-Holliday Showings are located in southeastern Leclaire Township. The original work by B. Holliday done in the early 1930s consists of 5 trenches and 4 pits. The property is made up of 4 patented and 2 unpatented claims on the northeastern side of Bingham Lake.

The north showing consists of 4 trenches, 3 partly covered by overburden. Outcrops close to the trenches consist of sheared inter-

mediate to felsic metavolcanic rocks. The trench that exposes rock is 23.5 m long with a 6 by 6 m pit at the northern end. At the southern end of the trench a sheared quartz porphyry, with quartz eyes 1 mm in size is exposed. Two metres to the north, the quartz eyes are absent and carbonate occurs as stringers and thin seams parallel to schistosity which strikes 104° and dips 80° northeast. A sericite schist containing 3% magnetite occurs at this location in the trench. The pit at the end of the trench contains many fragments of quartz. The vein was not found in place; however the fragments consist of massive white quartz containing galena, pyrite, and fluorite. Grab samples of the quartz fragments assayed 0.01 ounce gold per ton and up to 2.19 ounces silver per ton (Geoscience Laboratories, Ontario Geological Survey, Toronto).

The south showing is approximately 350 m south of the north showing. This showing is made up of 4 pits and 1 trench but only 2 of the pits expose bedrock. The largest of the pits is 7 by 6 m and exposes a massive white quartz vein striking 110° and dipping 78° southwest. Pyrite and galena (6%) occur in the vein and pyrite is also disseminated throughout the host rocks. The host rocks are amphibole schist and feldspar porphyry. Schistosity strikes 120° and dips 82° west and the schist contains stringers of carbonate. A second smaller pit lies 36 m southeast of the first pit and exposes a quartz vein. Disseminated pyrite and minor galena were observed. Approximately 6 m west of this pit there is an outcropping of granite.

Grab samples taken by the authors from the large pit assayed trace gold and up to 0.59 ounce silver per ton. A selected grab sample from the smaller pit assayed 0.03 ounce gold per ton and 5.25 ounces silver per ton. All assays were performed by the Geoscience Laboratories, Ontario Geological Survey, Toronto.

Boliden Prospect

The Boliden Prospect is located in southwestern Chabanel Township, approximately 2.5 km northwest of The Algoma Steel Corporation Limited's MacLeod Mine. M. Clement of Wawa holds the property. Trenching and pitting on the property was done by the Boliden Syndicate in 1936.

A trench located at the northwestern end of Legarde Lake is 12.9 m long and exposes a sericite schist containing abundant pyrite and carbonate. In the trench there are 6 sulphide rich zones that contain up to 35% pyrite giving the schist a rusty appearance. The zone strikes 070° and due to the rusty appearance, it can be traced continually on surface for 200 m. The pyrite zones are most likely sulphide facies iron formation. Several siliceous, or cherty horizons are also present.

A second set of trenches occur 250 m east of the trench described above. Four trenches occur at this location but only 2 expose bedrock. The trenches expose sericite schist and sheared quartz porphyry. Schistosity strikes 066° and dips 75° northwest. The trench furthest to the east contains pyritic zones similar to the first trench investigated, suggesting that this may be the same unit. If this interpretation is correct, the sericitic unit would have a present strike length of approximately 400 m.

Samples taken by the authors of the pyritic zones assayed 0.01 ounce gold per ton whereas the cherty horizons assayed 0.02 ounce gold per ton and up to 0.18 ounce silver per ton. A small pit blasted into a carbonate unit outside the schistose zone assayed 0.20 ounce gold per ton and 0.26 ounce silver per ton (Geoscience Laboratories, Ontario Geological Survey, Toronto).

Norwalk Mine

The Norwalk Mine is located 7 km south of Wawa in the northeastern corner of Rabazo Township. Canabec Explorations Limited controls the property and during 1979 and 1980 carried out an explora-

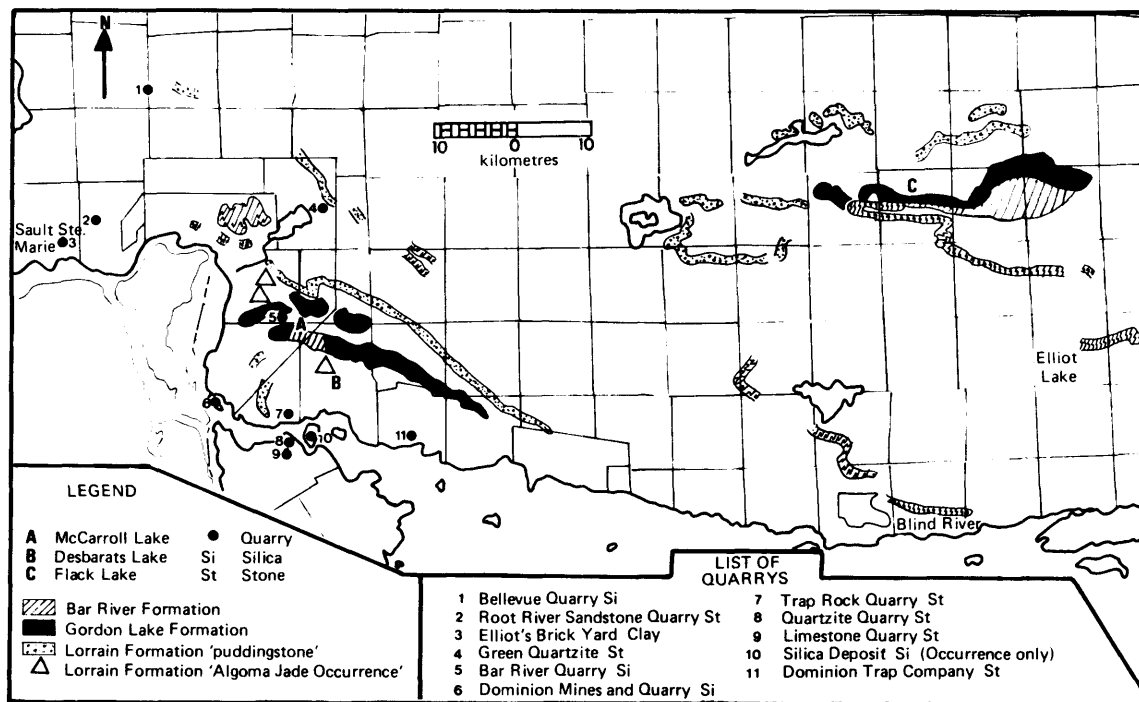


Figure 8. Industrial minerals and building and ornamental stone resources in the Sault Ste. Marie area.

tion program consisting of mechanical stripping, geology, and diamond drilling.

A total of 60 ounces of gold were milled from 820 tons of ore in 1904 and 1910 by the Manxman Gold Mining Company.

The quartz vein on which the decline was sunk averages 0.33 m wide in outcrop but in the shaft it is approximately 2 m wide. The vein strikes 115° and dips 88° north. Pyrite, up to 2% is the only mineralization. The quartz is massive and white and there are approximately 10 smaller glassy quartz veinlets which are parallel or subparallel to the main vein. The host rock is a homogeneous granodiorite, part of the Centennial granodiorite. All assays returned trace gold and silver.

CURRENT RESEARCH IN THE WAWA AREA

Lisowyk, A.—Silicification at the Magpie Mine, Leclair Township, B.Sc., University of Western Ontario, London, Ontario.

Lockwood, M.—Chloritoid Alteration in the Goudreau Area, Abotossaway and Augonie Townships, M.Sc., Carleton University, Ottawa, Ontario.

McGill, G.—Detailed Structural Studies, Chabanel Township, University of Massachusetts.

Shrady, C.—Detailed Structural Studies, Chabanel Township, Ph.D. thesis, University of Massachusetts.

Sylvester, P.—Trace Element Studies - Jubilee Stock McMurray, Research Associate Nasa, Houston, Texas.

Toal, T.—Tourmaline Alteration, Musquash Township, B.Sc., Carleton University, Ottawa, Ontario.

SAULT STE. MARIE INDUSTRIAL MINERALS

This project, funded by the Ontario Ministry of Northern Affairs, began in June 1985, with the aim of stimulating interest in industrial minerals and building and ornamental stone in the Sault Ste. Marie area (Figure 8). The initial phase of the project consisted of a literature search, followed by field

work. Thin-section study, chemical analyses, and preparation of cut and polished sample slabs of suitable rocks are presently underway. An Open File Report, containing the results of the study, will be published in 1985.

Since there are several attractive stones unique to this area, work in 1984 concentrated on potential for building and ornamental stone.

In the area under investigation there has been past production of silica (quartzite) from several quarries, traprock (diabase) from a rather large operation at Bruce Mines, clay for brick and tile manufacture, and sandstone for building purposes. At the present time, there is minor use of stone in the area, mostly for small craft items such as clocks, bookends, and jewelry, directed toward the tourist trade.

Within the Huronian Supergroup, selected outcrops of the Gordon Lake, Lorrain, Bar River, and Espanola Formations were investigated over an east-west distance of about 236 km, from Goulais Bay

to Elliot Lake. The area has been mapped geologically by provincial and federal geological surveys.

The Gordon Lake Formation is a highly siliceous, chert-like siltstone having a variety of colours and sedimentary structures. Much of the formation is a drab grey-green sequence of alternating beds of chert and siltstone, both of which weather to a creamy white to tan colour; however near McCarroll Lake and Flack Lake colourful sections occur, ranging from maroon, purple, red, peach, olive-green, and brown. Samples showing rip-up clasts of chert and slump structures have an attractive appearance in polished slabs. Beds range in thickness from 1 to 18 cm. Although the Gordon Lake Formation is highly fractured at the surface, there is evidence that fracturing may diminish at depth, as examination of drill core has shown little jointing or fractures.

The Lorrain Formation is comprised of 6 members as mapped by Frarey (1977). The white quartzite member contains several emerald green sections known locally as "Algoma Jade". The green colour is due to the presence of a chromium-bearing mica. In sufficient quantities the stone might be a source of terrazzo chips or an attractive ornamental stone since it takes a fine polish. The only previously documented deposit is located in Kehoe Township; 3 additional occurrences were examined during this years field work.

The jasper conglomerate member of the Lorrain Formation is known locally as "puddingstone". Pebbles of quartz and jasper are supported by a matrix of medium- to fine-grained white to grey quartz grains. Pebble sizes vary from a few millimetres to 8 cm. White, red, black, peach, and brown pebbles give the rock a striking appearance and it takes a high glossy polish. The "puddingstone" occurs in beds and lenses with thicknesses ranging from a few centimetres up to 3 m. The "puddingstone" of the Dunn's Valley area generally has a higher content of jasper pebbles than that

of the Flack Lake area. This member has potential as an ornamental stone.

The purple siltstone member of the Lorrain Formation polishes well and is very attractive. This unit is best observed in the Desbarats area, however it's full subsurface extent is not fully defined. The colour is due to a hematitic matrix and varies from purple to maroon. The upper member of the Lorrain is an orthoquartzite (white quartzite member) which has given very promising silica values and might be a future source of silica.

The Bar River Formation is a unit of orthoquartzite which occurs around McCarroll Lake and the Flack Lake area. Near Flack Lake the Bar River Formation contains a friable zone with a variable thickness of 0.5 to 2 m. The length of the zone is approximately 28 m. This material is easily broken apart with the hands and has given preliminary assays well within industry standards as a potential silica deposit.

The Bruce Limestone Member of the Espanola Formation consists of thin alternating beds of siliceous grey limestone and argillite. The beds are commonly contorted, giving the stone an attractive appearance. Bed thicknesses vary from a few millimetres in the limestone-argillite sequence to 2.5 m in the massive limestone sequence. Pyrite is present in small quantities. The rock is highly fractured where observed but could be a source of terrazzo chips and ornamental stone. With proper lapping technique the stone could take a fine polish.

A number of past producing quarries were examined. These locations are shown on Figure 8. At the present time no quarries are being operated on a full time basis in the Sault Ste. Marie Mining Division.

ONTARIO GEOLOGICAL SURVEY ACTIVITIES

E. Grunsky continued a 1:50 000 scale synoptic study of the Batchewana metavolcanic-metasedimentary belt and surrounding

granitic terrain during 1984. Most of the field work was carried out in the eastern part of the belt and over the surrounding felsic plutons and gneiss domains.

R. Sage continued the Ontario Geological Survey program to provide up-to-date geological maps of the Michipicoten metavolcanic-metasedimentary belt at a scale of 1:15 840.

G. Siragusa completed mapping of the White Lake area north-east of Hemlo. Preliminary maps will be published at a scale of 1:15 840.

D.G.F. Long continued a study to evaluate sedimentological controls on paleoplacer gold deposits in the Huronian Supergroup. Sampling and field observations were carried out between Elliot Lake and Sault Ste. Marie.

T. Muir continued a detailed stratigraphic study of the Hemlo area.

J.A.C. Fortescue carried out research studies on regional lake water and sediment geochemistry in the Montreal River area north of Sault Ste. Marie. Field trials were made to evaluate the potential of remote sensing of some components of lake water geochemistry with emphasis on the acid rain problem.

R.S. Geddes completed surficial mapping of the White Lake and Cedar Lake 1:50 000 topographic sheets in the Hemlo area.

A summary of the results of these and other field projects of the Ontario Geological Survey are published in the Summary of Field Work 1984, by the Ontario Geological Survey (Miscellaneous Paper 119).

PUBLICATIONS AND THESIS ADDED TO THE SAULT STE. MARIE RESIDENT GEOLOGIST LIBRARY, 1984

Kimberley, M.M., Grandstaff, D.E., and Tanaka, R.T.

1984: Topographic Control on Precambrian Weathering in the Elliot Lake Uranium District, Canada; Journal of the

TABLE 3. MAPS AND REPORTS PERTAINING TO THE SAULT STE. MARIE RESIDENT GEOLOGIST AREA PUBLISHED DURING 1984 BY THE ONTARIO GEOLOGICAL SURVEY, MINISTRY OF NATURAL RESOURCES

Ontario Geological Survey Reports MDC 25	Preliminary Maps - Geological Series P.2607 P.2701 P.2702	Geological Data Inventory Folios GDIF 131 GDIF 132 GDIF 134 GDIF 139 GDIF 140 GDIF 172 GDIF 173 GDIF 174	Coloured Maps Map 2479 Map 2480
Open File Reports OFR 5403 OFR 5414 OFR 5436 OFR 5483		Aggregate Resources Publications ARIP 91	Geochemical Series Maps Map 80 713
			Miscellaneous Papers MP 118 MP 119

- Geological Society of London, Volume 141, p.229-233.
- Mossman, D.J., and Harron, G.A.
1984: Witwatersrand-type Paleoplacer Gold in the Huronian Supergroup of Ontario, Canada; *Geoscience Canada*, Volume 11, Number 1, p.33.
- Murray, F.H., Brown, J.R., Fyfe, W.S., and Kronberg, B.I.
1984: Immobilization of U-Th-Ra in Mine Wastes by Phosphate Mineralization; *Canadian Mineralogist*, Volume 21, p.607-610.
- Robinson, A., and Spooner, E.T.C.
1984: Can the Elliot Lake Uraninite-bearing Quartz Pebble Conglomerates be Used to Place Limits on the Oxygen Content of the Early Proterozoic Atmosphere?; *Journal of the Geological Society of London*, Volume 141, p.221-228.
- 1984: Postdepositional Modification of Uraninite-bearing Quartz-Pebble Conglomerates from the Quirke Ore Zone, Elliot Lake, Ontario; *Economic Geology*, Volume 79, p.297-321.
- Saint-Martin, M.
1984: The Petrology and Geochemistry of Uraniferous Chloritized Rocks at Panel Mine, Elliot Lake, Ontario; unpublished B.Sc. Thesis, University of Ottawa, 83p.
- Studemeister, Paul A.
1984: An Archean Volcanic-Exhalative System Adjacent to a Trondhjemite Stock near Wawa, Ontario; *Precambrian Research*, Volume 24, p.85-98.
- Turek, A., Smith, P.E., and Van Schmus
1984: U-Pb Zircon Ages and the Evolution of the Michipicoten Plutonic-Volcanic Terrane of the Superior Province, Ontario; *Canadian Journal of Earth Sciences*, Volume 21, p.457-464.
- Zolnai, A.I., Price, R.A., and Helmsstaedt, H.
1984: Regional Cross-section of the Southern Province Adjacent to Lake Huron, Ontario: Implications for the Tectonic Significance of the Murray Fault Zone; *Canadian Journal of Earth Science*, Volume 21, p.447-456.
- Northern Affairs, Mineral Resources Circular 13.
- Frarey, M.J.
1977: Geology of the Huronian Belt between Sault Ste. Marie and Blind River, Ontario; Geological Survey of Canada, Memoir 383, 87p. Accompanied by 4 geological maps, scale 1:50 000.
- Giblin, P.E., Leahy, E.J., and Robertson, J.A.
1979: Sault Ste. Marie - Elliot Lake Area; Ontario Geological Survey, Map 2419. Compilation Series, scale 1:253 440 or 1 inch to 4 miles.
- OGS-GSC
1979: Regional Lake Sediment and Water Geochemical Reconnaissance Data, Eastern Shore Lake Superior, Ontario (NTS 42C, 42F/S) Algoma and Thunder Bay Districts; Ontario Geological Survey, Open File Report 5267, 83p. accompanied by Maps 8000-80015, scale 1:250 000.

REFERENCES

- Card, K.D.
1979: Regional Geological Synthesis, Central Superior Province; p.87-90 in *Current Research*, Part A, Geological Survey of Canada Paper 79-1A.
- Ferguson, S.A., Groen, H.A., and Haynes, R.
1971: Gold Deposits of Ontario: Part 1 - Districts of Algoma, Cochrane, Kenora, Rainy River, and Thunder Bay; Ontario Department of Mines and

Sudbury Resident Geologist Area, Northeastern Region

J.M. Martins

Acting Resident Geologist, Ontario Ministry of Natural Resources, Sudbury

INTRODUCTION

During 1984 the Sudbury Resident Geologist Office was staffed by R. Adlington, Resource Geologist; P.E. Giblin, Regional Mineral Resources/Lands and Waters Coordinator; C.C. Marriott, Resource Geologist; J.M. Martins, Acting Resident Geologist; and Y.M. Paquette, Secretary.

Exploration continued to be directed primarily towards gold deposits, with a level of activity similar to that of 1983.

Mining activity was, as usual, dominated by the nickel - copper - precious metals operations of Inco Limited and Falconbridge Limited centred on the Sudbury Structure. In addition Westfield Minerals Limited started production from their Scadding Gold Mine property, the first gold producer in the Sudbury area since 1941. Manitoulin Dolomite Limited continued production of dolomite for aggregate from a quarry on Manitoulin Island. The Badgeley Island silica operation of Indusmin Limited was also active during the year.

RESIDENT GEOLOGIST'S ACTIVITIES

R. Adlington continued compilation of the Geological Data Inventory Folio Series which summarizes known assessment and exploration data on a township basis. A total of 53 folios have been produced to date of which 51 have been published. Three people employed under a joint Federal-Provincial Works Program during the year assisted in the production of 1 folio. Additional duties involved the indexing and filing of a quantity of mine plans recently acquired by this office.

J.M. Martins completed mapping Snider Township at a scale of 1:15 840. In addition, a section of the Murray granite-norite contact in McKim Township was mapped at a scale of 1:250. The Sudbury Section of the Sudbury-Elliot Lake Guide Book was written for the 1984 The Geological Association of Canada-Mineralogical Associ-

ation of Canada (GAC-MAC) Joint Annual Meeting and field trips.

The staff were also involved in numerous mine and exploration project visits, and examinations of mineral occurrences. As part of their normal duties the staff responded to many requests for information from industry, government agencies, and the public. A total of 290 people from Canadian and American Universities, government agencies, and the mineral industry were given lectures and taken on geological tours of the Sudbury area.

MINING ACTIVITY

Nickel, copper, and precious metals were produced from 16 mines operated by Inco Limited and Falconbridge Limited within the Sudbury area. Westfield Minerals Limited began producing gold from its Scadding Township property in mid-1984. Other commodities from the Sudbury area included silica, dolomite, decorative stone, sand, and gravel.

NICKEL-COPPER-PRECIOUS METALS

During 1984 Falconbridge Limited produced ore from the East, Falconbridge, Fraser, Lockerby, North, and Strathcona Mines. Ore from North Mine and some from Fraser Mine is hoisted through the Fecunis Lake shaft. Major rock bursts in June left areas of Falconbridge Mine unsafe and the company decided to terminate operations at this mine. Ore from East Mine will continue to be trammed to No. 5 shaft for hoisting. The Falconbridge Complex accounted for 10% of the company's production, and the shortfall created by the closure will be picked up by reopening Onaping Mine, on standby since 1982. Onaping Mine has reserves of 15 million tons (The Northern Miner, August 2, 1984) in 2 orebodies. It is expected that 1 of the ore zones, the Craig, will become a separate mine by the late 1980s. Operations at Strathcona,

Fraser, and Lockerby Mines will also be expanded to maintain production levels.

A subsidiary of Falconbridge Limited has set up a partnership which will secure raw materials for processing either at the Sudbury smelter, or at Falconbridge's refinery in Norway. Falconbridge Trading Associates will deal initially in scrap and residue containing nickel, copper, precious metals, cobalt, tungsten, and molybdenum.

During the year Falconbridge Limited closed its metallurgical laboratories in Richmond Hill, and relocated them in Sudbury and at the Lakefield Research Division in Southern Ontario. The Sudbury operations will carry on metallurgical research programs. In spite of continued depression in the nickel market, cutbacks and streamlining have resulted in a return to profitability for Falconbridge Limited.

Inco Limited produced ore from Copper Cliff South, Copper Cliff North, Creighton, Frood, Garson, Levack, Little Stobie, McCreedy West, and Stobie Mines. In addition, minor production from Clarabelle open pit continued as part of a research program on mining methods. Inco Limited is also mining part of the Fecunis Lake orebody. The ore is hoisted to the surface through the Levack shaft.

Rock bursting, which occurred shortly after the Falconbridge Mine tremors, caused damage in the No. 5 shaft area of Creighton Mine. Mining operations, suspended during a 4-week shutdown, were not affected.

Inco Limited returned an operating profit for the second and third quarters of 1984. Improvements in productivity and increasing use of the vertical retreat mining method has reduced overall costs, although metal markets remain listless.

GOLD

In mid-1984 Westfield Minerals Limited started producing from its small open-pit gold mine in Scadding Township. The on-site 200

TABLE 1. MAPS AND REPORTS PERTAINING TO THE SUDBURY RESIDENT GEOLOGIST AREA PUBLISHED DURING 1984 BY THE ONTARIO GEOLOGICAL SURVEY, MINISTRY OF NATURAL RESOURCES

Open File Reports	Geological Data Inventory Folios	Aggregate Resources Publication	Geological Survey of Canada Open File Reports
OFR 5416	GDIF 144	ARIP 70	1089
OFR 5461	GDIF 145	Coloured Maps	1090
OFR 5470	GDIF 146	2468	
OFR 5480	GDIF 147	2491	
OFR 5484	GDIF 148	Mineral Resources Branch Publications	
OFR 5507	GDIF 149	MP 77 1981-83	
OFR 5510	GDIF 150	Supplement	
OFR 5525	GDIF 151	MDC 25	
OFR 5526	GDIF 152	MP 117	
OFR 5426	GDIF 153	MP 119	
	GDIF 154	MPBP 18	
	GDIF 155	Special Volume 1	
	GDIF 156	GI 9	
	GDIF 161		
	GDIF 163		
	GDIF 164		

tons per day mill initially processed ore from the east-west zone which had reserves of approximately 30 000 tons. After this, other zones on the property were developed and to date the mine is still producing although operations will shut down for the winter season. The gold is concentrated in a chloritic breccia zone related to the Espanola-Serpent Formation interface. The average grade has been reported as 0.24 ounce gold per ton.

INDUSTRIAL MINERALS

Indusmin Limited continued production of silica from the company's quarry on Badgeley Island in Georgian Bay. Annual production averages 500 000 tons. The silica is used in the manufacture of glass, and is quarried from high purity orthoquartzites of the Bar River Formation. After on-site crushing and screening, the fines are shipped to Midland, Ontario for processing.

Manitoulin Dolomite Limited continued operation of its quarry at the western end of Manitoulin Island. Dolostone of the Amabel Formation is crushed on site and shipped to southwestern Ontario for use as aggregate.

Warren Industrial Feldspar Company Limited is examining an area of gabbro anorthosite in Henry Township for use as building stone. The anorthosite, named "Nipissing Granite" by the company, has been test-blasted and a market feasibility study is underway.

Previously quarried and stockpiled black anorthosite was shipped in small amounts from Dana Township. The anorthosite is used as decorative stone, mainly monumental.

Sand and gravel were produced from numerous quarries in the vicinity of Sudbury and North Bay.

ONTARIO GEOLOGICAL SURVEY ACTIVITIES

Publications released in 1984 by the Ontario Geological Survey that pertain to this area are listed in Table 1.

A.C. Colvine of the Mineral Deposits Section continued a Huronian metallogenic study in the north part of the Sudbury area with emphasis on paleoplacer gold (see A, Figure 1). This study included an evaluation of sedimentological controls on placer gold

undertaken with D.G.F. Long of Laurentian University.

S. Szoke and the staff of the Aggregate Assessment Office (Engineering and Terrain Geology Section) undertook an aggregate resource inventory of the North Bay area (see B, Figure 1). Field work was also carried out in townships in the vicinity of Espanola (see C, Figure 2).

EXPLORATION ACTIVITIES

Exploration activity in the area remained at a level similar to that of 1983. The total number of claims recorded to December 15, 1984 was 1440. Figure 4 summarizes staking activity for the past 12 years as recorded in the Sudbury Mining Recorder's Office.

Apart from normal development work carried out by the nickel producers of the Sudbury area, most exploration was centred on the search for, and evaluation of, gold deposits in the Huronian Supergroup of the Southern Province. In 1984, there was a slight revival of interest in base and precious metal deposits associated with Archean "greenstone" terrains.

The joint venture team of Flag Resources Limited and Golden Bri-

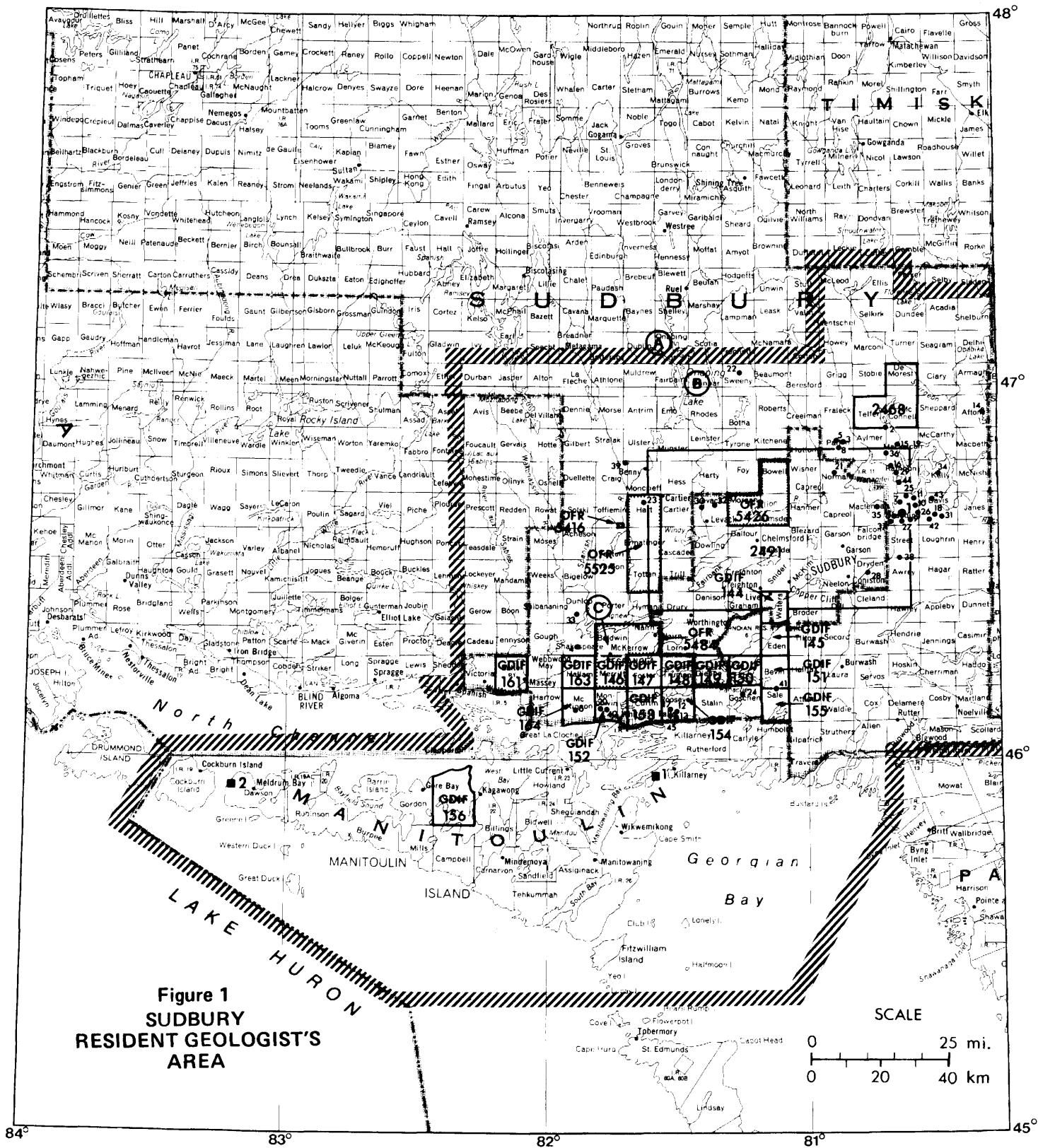
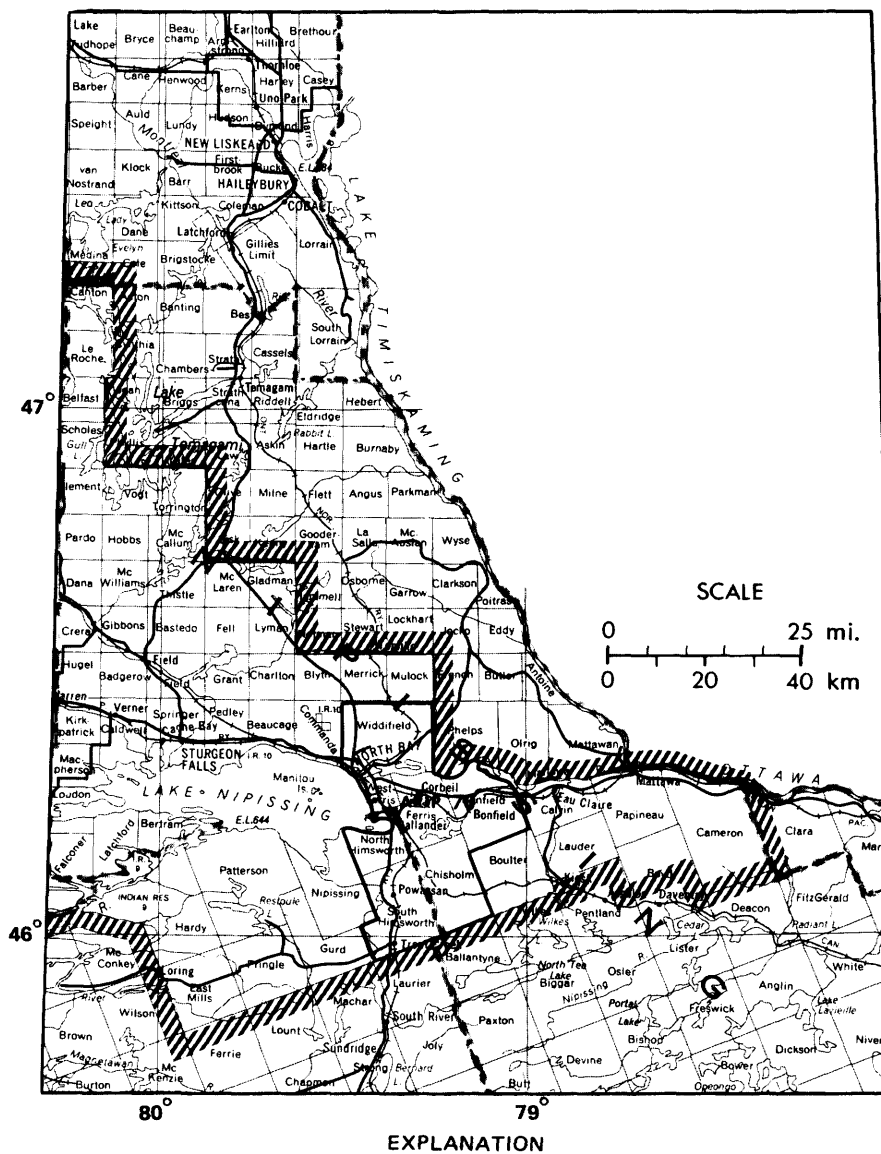


Figure 1
SUDBURY
RESIDENT GEOLOGIST'S
AREA

Figure 2
SUDBURY RESIDENT GEOLOGIST'S AREA



- EXPLANATION**
- Exploration Activity, 1984 (keyed to Table 2)
 - Ⓐ Location of OGS field party, 1984
 - Producing Mine
 - 1. Scadding Gold Mine Au
 - Producing Quarries
 - 1. Indusmin Ltd. silica
 - 2. Manitoulin Dolomite Ltd. . . . dolomite
 - ▨ Map or report issued by the OGS, 1984
 - GDIF - Geological Data Inventory Folio
 - OFR - Open File Report
 - 2468 - Coloured Map
 - ARIP - Aggregate Resources Inventory Paper
 - ▨ Boundary of Resident Geologist's Area

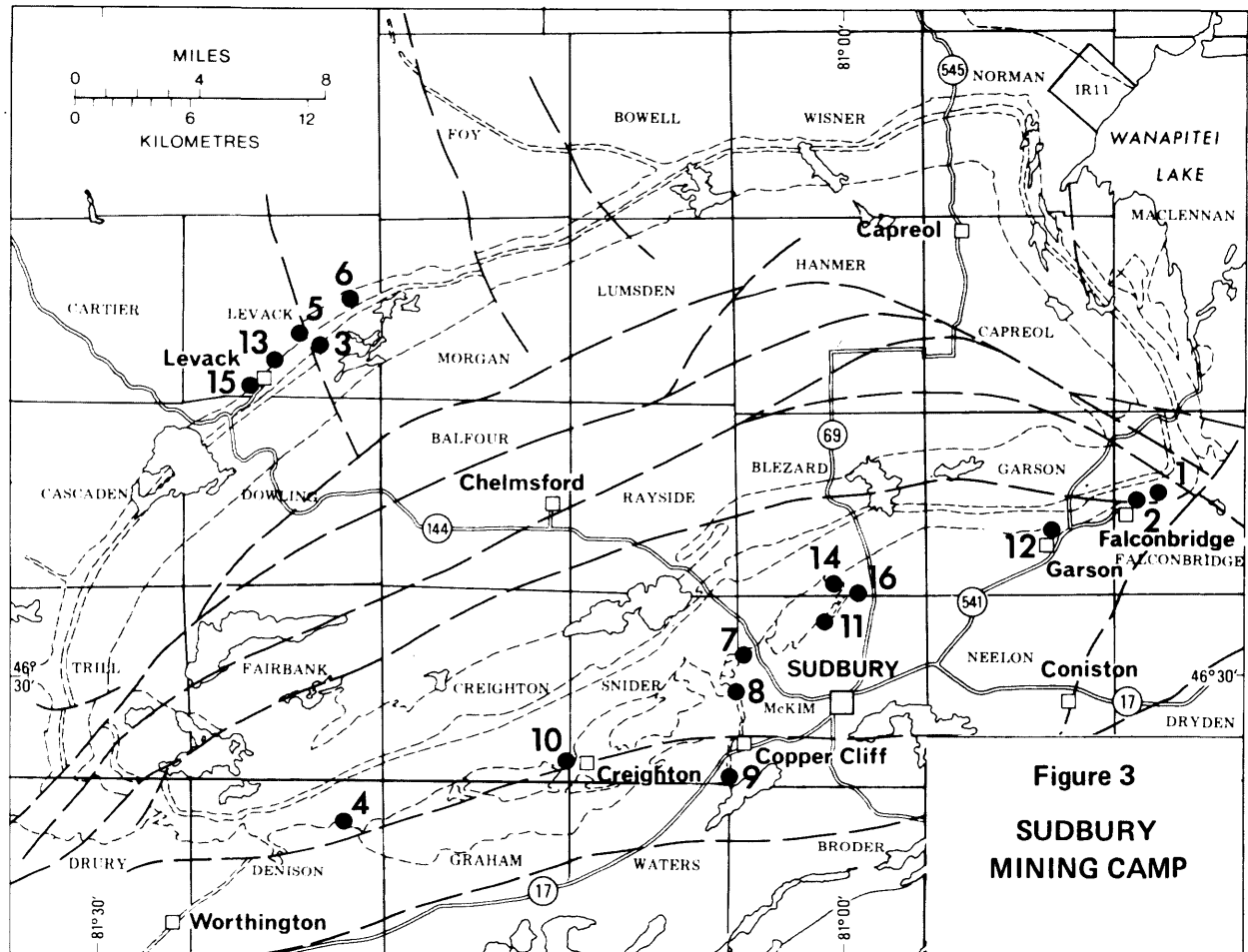


Figure 3
SUDBURY
MINING CAMP

EXPLANATION

- | | |
|--|--|
| ● Producing Mines, 1984 | Inco Ltd. Ni, Cu, Pt, Se, Te, Co, Au, Ag, Fe |
| Falconbridge Ltd. Ni, Cu, Pt, Co, Au, Ag | |
| 1. East Mine | 7. Clarabelle Open Pit |
| 2. Falconbridge Mine | 8. Copper Cliff North Mine |
| 3. Fraser Mine | 9. Copper Cliff South Mine |
| 4. Lockerby Mine | 10. Creighton Mine |
| 5. North Mine | 11. Froid Mine |
| 6. Strathcona Mine | 12. Garson Mine |
| | 13. Levack Mine |
| | 14. Little Stobie Mine |
| | 15. McCreedy West Mine |
| | 16. Stobie Mine |

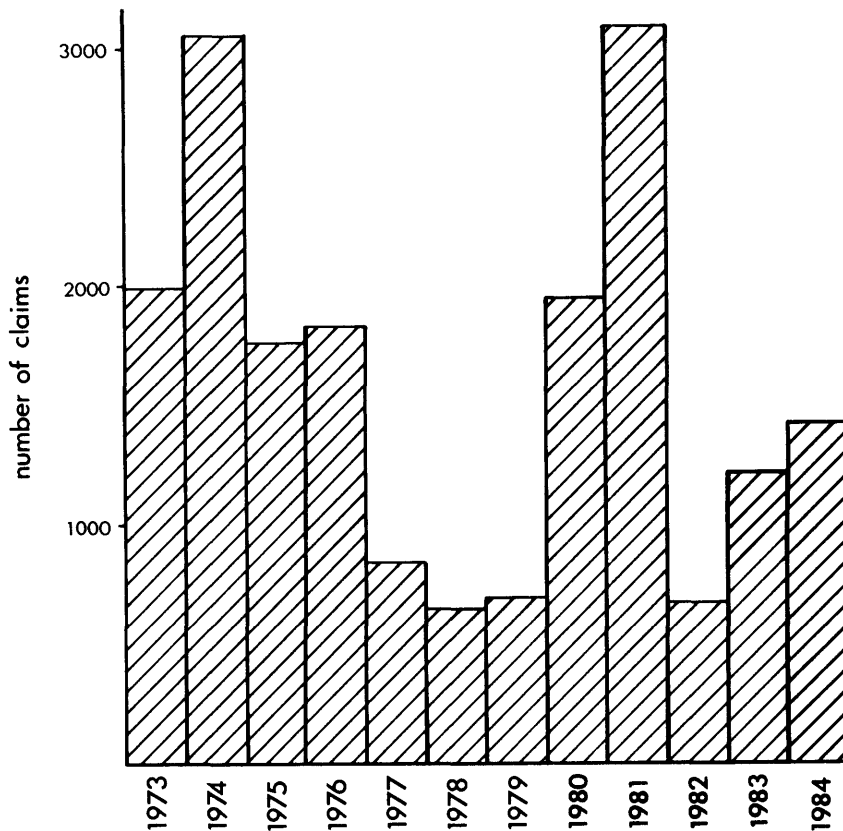


Figure 4. Claim staking activity. Sudbury Mining Recorder's Office.

ar Mines Limited carried out grid drilling on its Wolf Lake gold property in Mackelcan Township as a follow-up to an induced polarization (IP) survey conducted earlier in the year. Several gold-bearing zones were established, with a major structure indicated under the waters of Wolf Lake. The mineralization is associated with quartz breccia bodies in Lorrain Formation quartzite. During the year, the Wolf Lake property was taken over by Hecla Mining Company which is carrying out further geological and geophysical exploration work and a drilling program in the Wolf Lake and Jess Lake zones.

The Flag Resources and Golden Briar joint venture has acquired a Pt-Ni-Cu showing on the east shore of Lake Wanapitei in Rathbun Township. The showing is in Nipissing diabase near the contact with Gowganda metasedimentary

rocks. Initial exploration will include a series of vertical diamond drillholes and down-hole geophysics, with emphasis on the Nipissing-type intrusion.

Exploration activity in Scadding Township, location of Westfield Minerals Limited open pit gold producer, continued in 1984. Arthurian Resources Limited undertook a 2000-foot diamond drilling program on a property to the west of the Scadding Gold Mine. This was a follow-up to an earlier VLF-EM (very low frequency-electromagnetic) survey. South of Scadding Gold Mine gold values were reported in quartz-chlorite zones intersected by New Arcadia Explorations Limited during a 3000-foot drilling program. Arsenopyrite was the dominant sulphide mineralization with minor galena and sphalerite.

Other exploration programs in Scadding Township include dia-

mond drilling by Citizens Resources Limited; drilling, geochemical and geological surveys by Southgate Resources Limited; and a VLF-EM survey by W. Davidson. Southgate Resources Limited, has also carried out a geological survey over a claim group in Street and Awrey Townships. This block of claims straddles the Grenville Front tectonic zone and includes an altered mafic intrusive which may be a metamorphosed Nipissing diabase body.

To the west, helicopter VLF-EM and magnetometer surveys were flown over a portion of the boundary between Scadding and MacLennan Townships underlain by Nipissing diabase intruding Huronian metasedimentary rocks. Nipissing diabase was also the target of an EM survey by T. Sheppard to test the contact with Mississag; Formation quartzites in central MacLennan Township.

North of Scadding Township, New Augarita Porcupine Mines Limited carried out an exploration program on a claim group in Rathbun Township, in the vicinity of the old Crystal Gold Mine which produced minor amounts of ore at the turn of the century. Preliminary VLF-EM and IP surveys were followed up by geological work and diamond drilling.

R. Viitala undertook a magnetometer survey on his Rathbun Township gold property south of the old Mondoux Mine location where good gold values were reported at the turn of the century. A follow-up drilling program was planned for the property.

An area of Gowganda conglomerate at the boundary between Scadding and Davis Townships known to carry visible gold in quartz veins was the target of a helicopter VLF-EM survey by B. Mildenburger.

Within Davis Township a gold showing associated with Nipissing diabase was diamond drilled by Guiding Resources Limited. Individuals have carried out pitting and trenching in the same township.

TABLE 2

EXPLORATION ACTIVITY DURING THE YEAR.

The following is a list of companies and individuals known to have conducted exploration work within the Sudbury Resident Geologist's area in 1984, exclusive of exploration work for nickel deposits related to the Sudbury Igneous Complex. Previously unreported work from 1982 and 1983 is included. The numbers correspond to the numbered areas on Figures 1 and 2.

Number on Figure	Individual or Company	Activity
1	Arthurian Resources Ltd.	Drilling and geophysical survey, gold prospect, Scadding Township
2	Ateba Mines Ltd.	Airborne radiometric survey, Aylmer, Mackelcan, McConnell and Telfer Townships
3	Barry, H. V.	Trenching, Parkin Township
4	Blue, P. G.	Assaying, Shakespeare Township
5	Brady, J.	Magnetometer and EM surveys, gold prospect, Parkin Township
6	Brown, P. A. R.	VLF-EM and geological surveys, gold prospect, McKinnon Township
7	Brown, P. A. R.	VLF-EM survey, gold prospect, Scadding Township
8	Canico Ltd.	Drilling, Parkin Township
9	Citizens Resources Ltd.	Drilling, gold prospect, Scadding Township
10	Collin, I.	Airborne VLF-EM and magnetometer surveys, gold prospect, Scadding and Maclellan Townships
11	Davidson, W.	VLF-EM survey, gold prospect, Scadding Township
12	Dekeyzer, M.	Geophysical survey, gold prospect, Roosevelt Township
13	Elliot, A.	Geophysical survey, gold prospect, Roosevelt Township
14	Emerald Lake Resources Inc.	Drilling and geological survey, gold prospect, Afton Township
15	Flag Resources Ltd. and Golden Briar Mines Ltd.	Drilling, gold prospect, Mackelcan Township
16	Flag Resources Ltd. and Golden Briar Mines Ltd.	Exploration, platinum prospect, Rathbun Township
17	Grant, J. W.	VLF-EM and magnetometer surveys, gold prospect, Roosevelt Township
18	Guiding Resources Ltd.	Drilling, gold prospect, Davis Township
19	Hecla Mining Company of Canada	Drilling, gold prospect, Mackelcan Township
20	Hunter, B.	Magnetometer survey, gold prospect, Mongowin Township
21	Jaatinen, I.	Trenching, assaying, Norman Township
22	Jedburgh Resources Ltd.	VLF-EM survey, Sweeny Township
23	Jedburgh Resources Ltd.	Geochemical survey, base and precious metal prospect, Hart Township
24	Lac Minerals Ltd.	Geological and airborne VLF-EM, magnetometer surveys, Caen, Goschen Sale and Stalin Townships
25	Lee, J. B.	EM survey, gold prospect, Scadding Township
26	Mildenburger, B.	Airborne VLF-EM survey, gold prospect, Scadding and Davis Townships
27	New Arcadia Explorations Ltd.	Drilling, gold prospect, Scadding Township
28	New Arcadia Explorations Ltd.	Geological survey, Dryden Township
29	New Augarita Porcupine Mines Ltd.	Drilling, geophysical and geological surveys, gold prospect, Rathbun Township
30	Northgate Exploration Ltd.	Geological, geochemical and geophysical surveys, Levack Township
31	Palkovits, M.	Magnetometer and EM surveys, gold prospect, Davis Township
32	Penman, J. O.	Magnetometer and EM surveys, Levack Township
33	Rio Algom Exploration Inc.	Geological and geophysical surveys, Dunlop Township
34	Robinson, R. C.	VLF-EM survey, Kelly Township
35	Sheppard, T.	EM survey, gold prospect, Maclellan Township
36	Sheppard, T.	Magnetometer survey, gold prospect, Aylmer and Mackelcan Townships
37	Southgate Resources Ltd.	Drilling, geological and geochemical surveys, gold prospect, Scadding Township
38	Southgate Resources Ltd.	Geological survey, Street and Awrey Townships
39	Stralak Resources Inc.	Drilling, base metal prospect, Craig and Ulster Townships
40	Stringer, E. and Stringer, R.	Trenching, geophysical surveys, Mongowin Township
41	Sulpetro Minerals Ltd.	Geological survey, Bevin and Sale Townships

TABLE 2 Continued

Number on Figure	Individual or Company	Activity
42	Tomasini, M. A.	Geophysical and geochemical surveys, gold prospect, Davis Township
43	Vanlith, G.	Trenching, gold prospect, Davis Township
44	Viitala, R.	Magnetometer survey, gold prospect, Rathbun Township
45	White, J.	Trenching, gold prospect, Roosevelt Township

Emerald Lake Resources Incorporated acquired a 100% working interest during the year in the Golden Rose Mine, Afton Township. Gold was produced between 1937 and 1941 from quartz-carbonate veins in iron formation. Assay results from a 7000-foot drilling program have been encouraging. Hole GR-24, drilled several hundred feet from previous intersections, returned 89 feet averaging 0.237 ounce gold per ton (uncut), including a 1.5-foot length assaying 10.03 ounces gold per ton. A feasibility study is underway toward the start of production at 200 to 400 tons per day by mid-1985. Initial open pit operations could lead to underground development.

The Howrey Creek gold zone south of Espanola continues to attract attention. Stringer Explorations Limited, holder of the McMillan Gold Mine in Mongowin Township, carried out geophysical surveys and trenching during 1984. The mine produced over 10 000 ounces of gold in the 1930s from quartz veins in Gowganda Formation. Limited testing in the area leaves room for a considerable exploration program, it is estimated that there could be a potential 500 000 tons grading 0.20 ounce gold per ton or better on the existing undeveloped portion of the strike length. Other showings on strike with the McMillan property also being tested are the Jo-Ami occurrence to the east and the Evangeline Lake showing to the west. New Amsterdam Incorporated recently acquired the Majestic Mine in the same area. Here, a shaft was sunk in the 1920s on a quartz vein mineralized with chalcopyrite, pyrite, and arsenopyrite.

The east end of the Howrey Creek gold belt, truncated by the expanded boundary of Killarney

Provincial Park, was explored by magnetometer and self potential surveys during 1984. Art Elliot Explorations carried out the surveys in Roosevelt Township over Gowganda Formation intruded by Nipissing diabase—the typical site for gold mineralization in this area.

Several townships around the southeast end of Lake Penage were actively staked, mostly by Lac Minerals Limited. Initial geological and geophysical surveys were undertaken in Caen, Stalin, Sale, and Goschen Townships. Sulpetro Minerals Limited carried out a geological survey on its claim group in Sale and Bevin Townships.

During 1984 there was a renewal of interest in the Benny "greenstone" belt 56 km northwest of Sudbury. Stralak Resources Incorporated diamond drilled its property which straddles the boundary between Craig and Ulster Township. The "Stralak deposits" are stratabound volcanogenic sulphides comprising disseminated pyrite, pyrrhoite, sphalerite, chalcopyrite, and galena which occur in 2 zones of relatively high grade mineralization. The host rock is comprised of tuffs, metasedimentary rocks and mafic metavolcanic rocks. Noranda Incorporated has recently acquired a large number of claims in Moncrieff, Hess, Craig, Ulster, and Munster Townships.

South of the Benny belt Edinburgh Resources Limited carried out a geochemical survey on a claim group in Hart Township. The property is located on a Huronian outlier intruded by Nipissing diabase. Co-Pb-Zn-Ni (Au-Ag-Bi-Cu) mineralization occurs associated with a magnetite zone in limestone. Development work was carried out on this property in the early part of the cen-

tury by The Iron Mask Cobalt Silver Mines Company Limited.

RECENT PUBLICATIONS AND THESES

Debicki, R.
1983: Limnogeochemistry of Lake Memesagamesing, Parry Sound District, Ontario, Canada; Unpublished M.Sc. Thesis, Laurentian University, 137p.

Ding, T.P., and Schwartz, H.P.
1984: Oxygen Isotopic and Chemical Compositions of Rocks of the Sudbury Basin, Ontario; Canadian Journal of Earth Sciences, Volume 21, p.305-318.

Ermanovics, I., Gibb, R.A., Soonawala, N.M., and Pearson, R.
1982: Preliminary Results of Geoscience Surveys at the East Bull Lake Research Area (RA7) Near Massey, Ontario; Atomic Energy of Canada Limited, TR-207.

Kehinde-Phillips, O.O., Rousell, D.H., Djamgouz, O.T., and Nikolic, S.

1984: Experimental Investigation of the Oxidation and Consolidation of Sulphide Aggregates and the Application to Underground Muck-piles, Lockerby Mine, Sudbury, Ontario; The Canadian Institute of Mining and Metallurgy (CIM), Bulletin, Volume 77, p.52-59.

Kurtz, R.D., and Niblett, E.R.
1984: A Magnetotelluric Survey Over the East Bull Lake Gabbro-Anorthosite Complex; Atomic Energy of Canada Limited, TR-236.

Leech, R.E.J., and Cooper, A.J.
1982: Preliminary Terrain Assessment of Three Potential Research Areas in Northern Ontario; Atomic Energy of Canada Limited, TR-196.

TABLE 3

ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.

SUDBURY REGION

AEM - Airborne Electromagnetic Survey
 A Mag - Airborne Magnetometer Survey
 DDH - Diamond - Drill
 EM - Electromagnetic Survey
 Geochem - Geochemical Survey
 HLEM - Horizontal Electromagnetic Survey
 IP - Induced Polarization Survey
 Mag - Magnetometer Survey
 Met - Metallurgical
 Rad - Radiometric Survey
 SA - Sampling, Assays
 SP - Self Potential
 Tr - Trenching
 STR - Soil Trenching
 VLF - Very Low Frequency

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number
Curtin	41 I/4	Elliot, A. T.		Assess	Mag,EM	1984	2.5712
Davis	41 I/10	Brady, John	Au	Assess	Tr	1983	
	41 I/10	Brady, John, Brady, Marie	Au	Assess	Tr	1983, 1984	
	41 I/10	Brady, Marie	Au	Assess	Tr	1983	
	41 I/10	Brady, Marie, Van Lith, George	Au	Assess	Tr	1983, 1984	
	41 I/10	Canadian Nickel Company Limited		Assess	GL	1983	2.5058
	41 I/10	Leschishin, Edward	Au	Assess	Tr	1983	
Dunlop	41 I/5	Rio Algom Exploration Ltd.	Cu	Assess	EM,Mag	1984	2.6546
Ermatinger	41 I/12	Green, R.		Assess	DDH 3-270'	1983	
Foster	41 I/4	Sulpetro Minerals Limited	W,Mo	Assess	DDH 2-137.9'	1983	
Goschen	41 I/3	Lac Minerals Limited	Au	Assess	GL	1984	2.6006
Henry	41 I/9	Leblanc, A.		Assess	DDH 1-106',SA	1983	2.6103
Hess	41 I/12	Jasperson, John K.		Assess	SA,SP,EM,Mag, VLF,GL	1982	2.5893
	41 I/12	Jasperson, John K.		Assess	GL,EM,Mag	1982	2.5319
Hutton	41 I/14	Grant, Wilfred		Assess	Tr	1984	
	41 I/14	Leschishin, Olga		Assess	Tr	1983	
	41 I/14	Roy, A., Roy, R.J., Appleby, L.		Assess	Tr	1983, 1984	

TABLE 3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number
Mackelcan	41 I/15	Flag Resources Limited	Au	Assess	DDH 27-11,148'	1983	
MacLennan	41 I/10	Canadian Nickel Limited		Assess	AEM, A Mag	1981	2.4636
	41 I/10	Charlton, F. C.		Assess	GL	1982	2.5383
	41 I/10	Sheppard, T.	Au	Assess	GL	1982	2.5060
	41 I/10	Sheppard, T.	Au	Assess	GL	1983	2.5062
	41 I/10	Sheppard, T.	Au	Assess	SA	1983	2.5061
McConnell	41 I/15	Ateba Mines Ltd.		Assess	A Rad	1984	2.5998
Mongowin	41 I/4	Stringer, E.	Au	Assess	VLF	1984	2.6534
	41 I/4	Stringer Explorations Ltd.	Au	Assess	Tr	1984	
Norman	41 I/15	Heshka, Wm.		Assess	Tr	1983	
Parkin	41 I/15	Barry, H. V.		Assess	Tr	1983, 1984	
	41 I/15	Brady, John	Au	Assess	SA	1983	2.6369
	41 I/15	Brady, John	Au	Assess	Tr, SA	1983, 1984	2.6315
	41 I/15	Brady, John	Au	Assess	SA	1983	2.6420
	41 I/15	Brady, John	Au	Assess	SA	1984	2.6421
	41 I/15	Brady, Marie Van Lith, George	Au	Assess	Tr	1983	
	41 I/15	Burns, Isaac		Assess	Tr	1984	
	41 I/15	Larson, Rudolf		Assess	Tr	1984	
	41 I/15	Leschishin, E.		Assess	GL	1983	2.5792
	41 I/15	McAdams, W.		Assess	Tr	1984	
	41 I/15	Nearctic Resources	Au	Assess	DDH 8-317.9'	1983	
Rathbun	41 I/15	New Augarita Porcupine Mines Limited	Au	Assess	Tr, GL	1984	2.7147
	41 I/15	New Augarita Porcupine Mines Limited	Au	Assess	Mag, IP	1984	2.6662
	41 I/15	Viitala, Reino L.	Au	Assess	SA	1982	2.4882
	41 I/15	Viitala, Reino L.	Au	Assess	EM, Tr, VLF	1983	2.5443
	41 I/15	Viitala, Reino L.	Au	Assess	Mag	1983	2.5797

TABLE 3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number
Roosevelt	41 I/4	Dekeyzer, Martin, Campbell, Gord		Assess	Mag,Sp	1984	2.7002
	41 I/4	Elliot, A. T.		Assess	VLF	1984	2.5712
	41 I/4	Elliot, A. T.		Assess	EM,GL	1984	2.6100
	41 I/4	Elliot, A. T.		Assess	Mag, SP	1984	2.5713, 2.7003
	41 I/4	White, James		Assess	Tr	1984	
Scadding	41 I/10	Ateba Mines Inc.	Au	Assess	VLF,EM	1983	2.5946
	41 I/10	Lee, James B.		Assess	EM	1983	2.3779
	41 I/10	Haultain Resources Limited	Au	Assess	UG,DDH 5-1439'	1983	
	41 I/10	Haultain Resources Limited	Au	Assess	GL	1983	2.5893
	41 I/10	Lee, Jim	Au	Assess	Tr,DDH 4-1677'	1983	
	41 I/10	Lee, Jim	Au	Assess	GL,EM,Mag,SP	1984	2.5685
Scadding, Street	41 I/10	Ateba Mines Inc.	Au	Assess	VLF-EM	1984	2.5946
Shakespeare	41 I/5	Blue, P. G.		Assess	Tr	1984	
	41 I/5	Galbraith, John	Au	Assess	DDH 1-106.1'	1982	
Street	41 I/10	Watt, D. R. McLean, P. C.		Assess	GL	1982	2.5290
	41 I/10	Watt, D. R. McLean, P. C.		Assess	Tr	1983	

- Mossman, D.J., and Harron, G.A.
1983: Origin and Distribution of Gold in the Huronian Supergroup, Canada - The Case for Witwatersrand-type Paleoplacers; Precambrian Research, Volume 20, p.543-584.
- 1984: Witwatersrand-type Paleoplacer Gold in the Huronian Supergroup of Ontario, Canada; Geoscience Canada, Volume 11, p.33-40.
- Mulligan, R.
1984: Geology of Canadian Tungsten Occurrences; Geological Survey of Canada, Economic Geology Report 32, 121p.
- Robertson, J.A., Martins, J.M., and Giblin, P.E.G.
1984: Geology of the Sudbury and Elliot Lake Mining Areas; Field Trip 3. Geological Association of Canada - Mineralogical Association of Canada (GAC-MAC). Joint Annual Meeting, London, Ontario, 64p.
- Rosinger, E.L.J., and Dixon, R.S.
1982: East Bull Lake Research Area; p.43-44 *in* Fourth Annual Report of the Canadian Nuclear Fuel Waste Management Program, Atomic Energy of Canada Limited.
- Rowell, W.F.
1984: Platinum Group Elements and Gold in the Wanapitei Nipissing-type Intrusion, Northeastern Ontario; Unpublished M.Sc. Thesis, University of Western Ontario, 86p.
- Russell, D.J., and Telford, P.G.
1983: Revisions to the Stratigraphy of the Upper Ordovician Collingwood Beds of Ontario - a Potential Oil Shale; Canadian Journal of Earth Sciences, Volume 20, p.1780-1790.
- Schandl, E.
1982: The Feldspar Mineralogy of the Sudbury Complex; Unpublished M.Sc. Thesis, McGill University, 147p.
- Scribbins, B.T., Rae, D.R., and Naldrett, A.J.
1984: Mafic and Ultramafic Inclusions in the Sublayer of the Sudbury Igneous Complex; Canadian Mineralogist, Volume 22, p.67-75.
- Young, G.M.
1984: Proterozoic Plate Tectonics in Canada with Emphasis on Evidence for a Late Proterozoic Rifting Event; Precambrian Research, Volume 25, p.233-256.
- Zolnai, A.I., Price, R.A., and Helmstaedt, H.
1984: Regional Cross Section of the Southern Province Adjacent to Lake Huron, Ontario: Implications for the Tectonic Significance of the Murray Fault Zone; Canadian Journal of Earth Sciences, Volume 21, p.447-456.

Huntsville Resident Geologist Area, Algonquin Region

David J. Villard¹ and Mary Garland²

¹Resident Geologist, ²Contract Geologist, Ontario Ministry of Natural Resources, Huntsville

INTRODUCTION

During 1984, industrial minerals and gold were again the focus of activity by the exploration companies and prospectors, as well as the Resident Geologist. Claim staking decreased in 1984, although exploration activity was comparable to that in 1983. Interest was shown in gold, graphite, calcium carbonate, silicon, gemstones, base metals, and building stone.

RESIDENT GEOLOGIST'S ACTIVITIES

The Algonquin Region, for mineral management purposes, is divided into 2 areas of responsibility. The Huntsville Resident Geologist is responsible for the northwest half of the Region as shown on Figure 1.

Presently, staff in the Huntsville office include: Jack van der Meer, Mineral Resources and Lands Co-ordinator; David Villard, Resident Geologist; Kathy Martin, Secretary; and Mary Garland, full-time contract Geologist. Ian Porter and Mike Murr were employed on the Experience '84 program to assist in our evaluation of building stone. Jill Van Luit worked on contract for several months as an Aggregate Geologist.

As in previous years, much of the Resident Geologist's time was spent on consultative duties. Numerous prospector's properties were visited and in excess of 250 requests (telephone and visits) for information were handled by this office.

Industrial mineral, base metals, and gold were the commodities for which information was most requested. Over 50 properties or occurrences in the Algonquin Region were visited during 1984 with emphasis placed on examining properties currently being explored, as well as those associated with the region's gold, graphite, and building stone projects.

Mary Garland continued her study of the graphite potential of the Central Gneiss Belt. To date, this project has resulted in detailed

mapping on 3 properties, as well as a trip to a plant operated by Vesuvius Crucible Company in the United States. A talk summarizing her work to date was presented at the Ontario Geological Survey Geoscience Research Seminar in December.

The evaluation of the gold potential of the Central Gneiss Belt continued as time allowed. Field work concentrated on the possible association of gold with the known graphite deposits. An Open File Report was published in 1984 summarizing results of an inventory of known and suspected gold occurrences carried out in 1982 and 1983 (see Table 1).

Jill Van Luit completed a planning study with respect to aggregate utilization within the District Municipality of Muskoka. Results of this work should become available early in 1985.

In December 1984, a Special Employment Program was arranged with the Crowe Valley Conservation Authority, who acted as project sponsor. This project was designed to stimulate interest in the exploration for selected industrial minerals within the Algonquin Region and will involve an in-office compilation of available literature for building stone, graphite, and marble.

Several talks and field trips were given for various client groups including junior rangers, public schools, and provincial park visitors.

Diamond-drill core from 3 graphite properties (in Butt, Ryerson, and Laurier Townships) was donated to the Ontario Ministry of Natural Resources and is currently stored in the Bancroft Core Library.

GRAPHITE PROJECT

In 1984, there were 5 areas of interest for graphite: 2 in Ryerson Township, 1 in Butt Township, 1 in Laurier Township, and 1 in Maria Township.

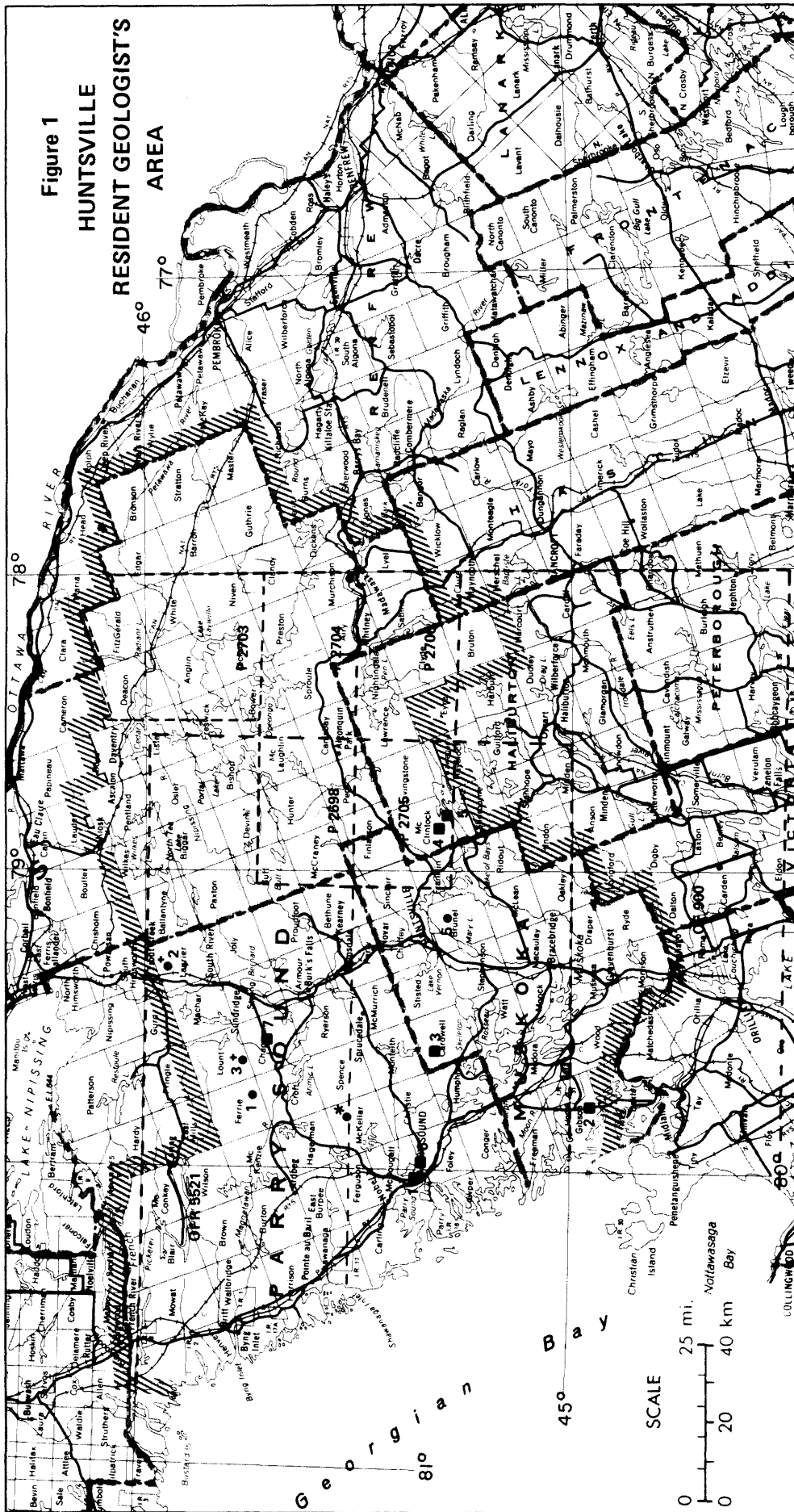
The Ryerson Township graphite horizon stretches from the nor-

thwestern corner of the township, near Midlothian, to the southeast. It is possible that it may also be a continuous horizon striking across Highway 11 to Three Mile Lake, a distance of 20 km. The graphite properties in Ryerson Township are located just south of the Midlothian Road on the northwestern end of the horizon, and just north of the Royston Road in the southeastern part of the township. In both cases the mineral rights are owned by the landowners. Agreements have been made with Copconda-York Resources Incorporated on the northern property and Graphite Corporation of Canada on the southern property. The graphite is crystalline flake with an average grade of 2-3% by weight, average widths vary from 50 to 100 m. Feasibility studies have been carried out on both properties.

The graphite horizon in Laurier Township stretches from Sausage Lake south to the Camp Dare access road, a distance of about 6 km. Exposure in the northern end yields widths from 10 to 100 m. The original property consisted of 3 leased claims on the northern shore of Sausage Lake; it is owned by Sam Manella and was originally worked for gold. Work in 1984 concentrated on examining the graphite horizon for its gold potential.

The Butt Township, or Graphite Lake property, was staked in 1919 for gold, then 1947 for graphite. In 1976, Noranda Mines Limited mapped part of the graphite zone south from Graphite Lake. In 1981-1982, the graphite horizon on the east side of Graphite Lake, and extending to the southwest, was sampled and drilled by Vesuvius Crucible Company of Pittsburgh, who found the grade of 2-4% below their 4% by weight cut-off. Detailed mapping of the unit in a 400 by 800 m rectangle south and adjacent to Graphite Lake was carried out by the Resident Geologist office in 1984. Four claims staked by Jack McVittie were optioned by Graphite Corporation of Canada

Figure 1
HUNTSVILLE
RESIDENT GEOLOGIST'S
AREA



■ Producing Quarries

- 1. Mill Lake Quarry building stone
- 2. M. T.C. construction aggregate
- 3. Cardwell Twp. building stone
- 4. L. Lock. building stone
- 5. O. Goidschus. building stone
- 6. Fowler Construction construction aggregate
- 7. Jim Donald amazonite

* Assessment Work Filed, 1984
(keyed to Table 3)

● Exploration Activity, 1984
(keyed to Table 2)

† Claim staking, 1984

▨ Boundary of Resident Geologist's Area

--- Map or Report issued by the Ontario
Survey of Geology, or Geological
Survey of Canada, 1984 (some excluded)

TABLE 1. MAPS AND REPORTS PERTAINING TO THE HUNTSVILLE RESIDENT GEOLOGIST AREA PUBLISHED DURING 1984 BY THE ONTARIO GEOLOGICAL SURVEY, MINISTRY OF NATURAL RESOURCES

Open File Reports	Preliminary Maps - Geological Series	Miscellaneous Paper	Geological Survey of Canada Open File Reports
OFR 5488 OFR 5515 OFR 5521	P.2698 P.2703 P.2704 P.2705 P.2706	MP 117	Open File 900 Open File 947

who intend to put the property into production as soon as funding can be arranged.

The Maria Township graphite horizon is a shallow dipping unit trending northeast for at least 2 km, and possibly 6 km. The graphite flake is relatively coarse with an average flake size of 3-4 mm and a grade of 4% by weight. The shallow dip of the unit makes width estimates impossible without drilling.

AGGREGATE RESOURCES

In 1982, aggregate resources within the District Municipality of Muskoka were mapped and an Open File Report published. This project was funded jointly by the Ministry of Natural Resources and the District Municipality of Muskoka.

In 1984, the Algonquin Region undertook an aggregate planning study of the District Municipality of Muskoka to better enable the Ministry of Natural Resources to provide valuable input into the planning processes of the municipality. The study estimated the demand for sand and gravel within each municipality, related this demand to estimates of supply, and finally, identified and ranked deposits.

The municipality was examined according to a set of criteria which allowed a rating system to be developed. The criteria included: internal demand versus supply, external demand, total demand with a cushion factor (5x demand) versus supply, existing pits, type of demand, distribution of demand, spatial distribution of supply, road type, and relevant land-use con-

straints. The level of significance for aggregate production whether it be local, regional, or provincial was identified for the municipality to clarify the Ministry's role in the planning process.

The report, which is to be released to the Municipality this year, will aid in protecting those deposits identified as being important in meeting future demands from incompatible land-uses.

Proposed future work entails an extensive testing program within the District Municipality of Muskoka to enhance the existing qualitative and quantitative aggregate data.

GOLD PROJECT

The project to evaluate the gold potential of the Central Gneiss Belt, initiated in 1981, continued as time allowed. An Open File Report was released in 1984 detailing work completed to the end of 1983.

Work in 1984 centred around the possible association of gold with the graphite deposits in Butt and Laurier Townships, and was concentrated on the Laurier Township deposit. This deposit exhibits several features that may make it attractive in the search for gold; a graphite (30% carbon) enriched shear zone, conformable and cross-cutting quartz veining, the presence of disseminated pyrite in places, sulphide-enriched shear zones, and a host rock for the graphite that is thought to be a "dirty quartzite".

Work in 1985 will concentrate again on the possible association of gold and graphite, as well as a de-

tailed examination of other selected occurrences.

OTHER GEOLOGICAL ACTIVITIES

ONTARIO GEOLOGICAL SURVEY

M.J. Ford from the Engineering and Terrain Geology Section commenced work on a guidebook for surficial geological features within Algonquin Park. It is anticipated that this guidebook will also include some very general information on bedrock geology.

GEOLOGICAL SURVEY OF CANADA

Ken Ford of the Radiation Geophysics Section continued his research project on the Allan Lake Carbonatite in the northeast corner of Algonquin Park. To date the work has involved an airborne gamma ray spectrometer survey; in situ gamma ray spectrometry, ground magnetometer and gradiometer profiling, lake sediment and lake water sampling, surface till sampling and boulder collecting; and a biogeochemical study which included an airborne multi-detector electro-optical imaging scanner and a leaf tissue sampling program. It is anticipated that additional work will be carried out in 1985, that may include some subsurface sampling.

Leo Nadeau continued his doctorate thesis geological mapping in the Huntsville area.

Results of 2 geochemical surveys carried out since 1980 were released in 1985. In 1980, the Geological Survey of Canada began a program of systematic till sampling on the Frontenac Arch

and adjacent areas of southeastern Ontario. In the reports, the initial results of analyses for heavy metals are presented. The reports released as Open File 899 and Open File 900 respectively cover southeastern Ontario for NTS (31C N/2, 31F) and NTS (31D N/2, 31E S/2, 41H O/8). Helicopter supported lake sediment and water samples were collected at an average density of 1 sample per 13 km² throughout the 38 054 km² area. A total of 34 variables were measured in the sediment and 20 variables in the water. Results are plotted at a scale of 1:250 000, with individual maps for each variable. The results of the 2 surveys should prove helpful to the exploration geologist, particularly in the Central Gneiss Belt where the data base is limited.

EXPLORATION ACTIVITY

As of December 14, 1984, a total of 20 claims were staked in the area, a noticeable decrease from the 71 staked in 1983. Claim staking is not necessarily a true indication of exploration activity, as a significant proportion of the activity in 1984 was carried out on patented land or was of a reconnaissance nature, involving minimal staking.

Exploration activity (see Figure 1, Tables 2, 3) was related to interests in gold, graphite, copper, zinc, calcium carbonate, silica, building stone, and gemstones.

One of the major drawbacks to exploration in this area is the almost complete lack of a geological data base and until there is detailed mapping available or a mine found, exploration activity will probably continue to remain low.

GOLD

Exploration for gold was centred around those graphite deposits thought to have some potential association with the yellow metal. 'Interesting' values were reported to the authors by the holder of a property in Laurier Township. Additional prospecting is planned for 1985.

Several prospectors continued their search for gold, mainly in the area between Huntsville and Parry Sound and to the north. Much of this work centres around the possible association of gold with pyrite and chalcopyrite mineralization.

GRAPHITE

Exploration for graphite was minimal in 1984, with activity centred around properties in Laurier and Butt Townships. Graphite Corporation of Canada plans to put the Butt Township deposit into production as soon as funding can be arranged. Initial work may involve a pilot plant in order to test how easily the flake can be separated.

BASE METALS

Several prospectors continued their evaluation of occurrences throughout the area.

QUARTZ

Activity was again minimal, with the deposits in McClintock and Murchison Townships undergoing continued evaluations.

MINING ACTIVITY

Numerous quarries, most notably the Mill Lake Quarry at Parry Sound, produced flagstone for use primarily as building stone. The Mill Lake Quarry produces several products including a very attractive 1/2 inch flagstone that is easy to install on interior walls.

An amazonite quarry in Chapman Township, northeast of Magnetawan, is being developed as a mineral collecting site. The amazonite occurs as crystals, up to 30 cm in size, in a zoned pegmatite.

A peat bog north of Parry Sound is being developed as a source of fuel peat. The peat is marketed in briquette form and is mainly sold locally for use in barbecues and campfires.

MINERAL EDUCATION PROGRAM

During the year, regional geological staff visited 4 Provincial Parks

— Killbear (twice), Grundy (twice), Arrowhead (twice), and Oastler Lake — to give an introductory talk on minerals and geology. This was followed by a field trip within the parks. Staff also visited 3 junior ranger camps in the Bracebridge and Parry Sound areas for a day-long session on minerals. Mineral related talks were given to classes in several elementary schools.

REFERENCES AND RECENT PUBLICATIONS

- Carter, T.R.
1984: Metallogeny of the Grenville Province, Southeastern Ontario; Ontario Geological Survey, Open File Report 5515, 422p., 58 figures, 35 tables, and 14 photos.
- Hanmer, S.K.
1984: Structure of the Junction of three Tectonic Slices; Ontario Gneiss Segment, Grenville Province; p.109-120 in Current Research, Part B, Geological Survey of Canada, Paper 84-1B.
- Hanmer, S.K., and Ciesielski, A.
1984: A Structural Reconnaissance of the Northeast Boundary of the Central Metasedimentary Belt, Grenville Province, Ontario and Quebec; p.121-131 in Current Research, Part B, Geological Survey of Canada, Paper 84-1B.
- Monenco Ontario Limited
1984: Peat and Peatland Evaluation of the Parry Sound Area; Ontario Geological Survey, Open File Report 5488, 5 Volumes, 194p., 2 tables, 2 figures and numerous maps.
- Villard, D.J., Keevil, R., and Hogg, A.
1984: The Gold Potential of the Huntsville-Parry Sound Area of Ontario; Ontario Geological Survey, Open File Report 5521, 58p., 39 figures and 2 maps in back pocket.

EXPLORATION ACTIVITY DURING THE YEAR.

TABLE 2

Number on Figure	Individual or Company	Activity
1	Jones, E.	Trenching, prospecting, Ferrie Township
2	Ackerley, G.	Trenching, diamond drilling, Laurier Township
3	Jones, E.	Trenching, prospecting, Lount Township
4	Stickley	Property evaluation, Murchison Township
5	Irving, W.	Diamond drilling, Brunel Township

ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.

TABLE 3

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Parry Sound Dist. McKellar Township	31E/12	Marble - McKellar	marble	Other	DDH - 231.7 m. (759')	Dec./80	--	(COMMODITY FILES) McKellar Twp. Con. IX, X, XI, Lots 5, 6 & 7
Parry Sound Dist. McKellar Township	31E/12	Edward Blanchard	Marble	Assess	Stripping and Trenching	Jan. 16-21/84	--	McKellar No. 6 (Assess.)
Parry Sound Dist. Ryerson Township	31E/11	Graphite - Ryerson (CONFIDENTIAL)	Graphite	Other	Several Reports on Property	1982, 1983	--	(COMMODITY FILES) Ryerson Twp. Con. V, Lots 11, 12 & 13 Con. VI, Lot 6
Renfrew County Lyndoch Township	31F/6	Zinc - Lyndoch (CONFIDENTIAL)	Zinc	Other	Geology and Geochemistry Report	June/83	--	(COMMODITY FILES) Lyndoch Twp. Con. XIV, Lots 13, 14 & 15
Renfrew County Maria Township	31L/1	Graphite - Maria	Graphite	Other	VLF Electromag. Survey and Beneficiation	Nov. 1-26/82 Feb. 7/83	--	(COMMODITY FILES) Maria Twp. Con. A, Lots 63 & 64 Con. B, Lots 63 & 64 Con. B, Lots 50-53 Con. 12 & 13, Lots 8-13
Renfrew County Maria Township	31L/1	Edward Blanchard	Graphite	Assess	Stripping and Trenching	Dec. 3-20/83	--	Maria No. 2 (Assess.)

Bancroft Resident Geologist Area, Algonquin Region

Hans D. Meyn

Resident Geologist, Ontario Ministry of Natural Resources, Bancroft

INTRODUCTION

The Bancroft Resident Geologist Office is responsible for the Minden, Bancroft, and Pembroke Districts, which are part of the Algonquin Region of the Ontario Ministry of Natural Resources. The area is shown in Figure 1. Clara, Maria, and Head Townships were added to the Bancroft Resident Geologist Area in 1984.

The office is staffed by Hans D. Meyn, Resident Geologist, Harald Wolf, Resource Geologist in charge of the drill core library, and Karen Fell, secretary. Patricia Flagler, summer student, assisted in the office and field for several weeks.

RESIDENT GEOLOGIST'S ACTIVITIES

The Resident Geologist continued to devote some time to familiarization with the geology and mineral deposits of the area. Several known, currently inactive, mineral occurrences were visited, and new properties undergoing exploration were visited in the company of the owner or operator. The operating mines were also visited.

The Resident Geologist also participated in several field trips, most of them given by persons doing geological work in the area either for the provincial or federal governments or a university.

Mineral collecting (rockhounding) is an important part of the economy of the Bancroft area and the Resident Geologist was involved with the Chamber of Commerce in supporting mineral collecting in the Bancroft area.

As part of that effort, the Ontario Ministry of Natural Resources, Algonquin Region, again this year, sponsored a booth at the Bancroft GemBoree and the Wilberforce Rockhound Fair, at which mineral and geologically oriented publications issued by the Ministry were on sale. As in previous years, the Ministry of Natural Resources sponsored D.H. Gorman, Professor of Mineralogy, University of Toronto, at these 2 events to identify

rocks and minerals for the rockhounds.

In August, the Resident Geologist gave a tour and lecture at Silent Lake Provincial Park, and during the autumn weeks H. Wolf led a geological discussion group at the local library based on the TV Ontario videotapes called "Understanding the Earth".

DRILL CORE LIBRARY

In March of 1984 the just completed drill core library became available for use. Under the supervision of Harald Wolf, about 35 000 m of core were collected and filed in the new facility. Another 10 000 m are stored outside awaiting processing. The core now in the library represents 447 drill-holes from 23 properties representing Cu-Ni-Co, iron, zinc, uranium, graphite, nepheline syenite, and quartz mineralization.

Data pertaining to the drill core is stored on a microcomputer. This information includes the company name, company drillhole number, year of completion, township, drillhole length, amount of core stored, and whether assays, chemical analyses, thin sections, or polished sections are available. A number of search programs have been written to manipulate the data, thus making it possible to list all drillholes from a specific area by certain company name or other criteria.

As the drill core library is situated in the Ontario Ministry of Natural Resources compound at Bancroft, about 100 m from the Resident Geologist Office, complete assessment files are kept in the drill core library building. Eventually the documents in the assessment files will be marked to indicate what core or samples are available in the drill core library and how they relate to the assessment files.

OTHER GEOLOGICAL ACTIVITIES

ALGONQUIN REGION, ONTARIO MINISTRY OF NATURAL RESOURCES

The northern part of the Algonquin Region is the responsibility of D.J. Villard, Resident Geologist, Huntsville (*see* Report of the Huntsville Resident Geologist, this volume).

LESLIE M. FROST NATURAL RESOURCES CENTRE

J. Stocking, Lands and Minerals Specialist, is currently (November 84) seconded to the Ontario Geological Survey where he is secretary to the Interministerial Committee on Peat. R. Keevil is acting Lands and Minerals Specialist during the former's absence; J. Etches is currently Mineral Resource Assistant.

The Frost Centre had another good year. About 4000 visitors participated in tours and lectures in the mineral resources field. The aggregate assessment report prepared for the Frost Centre has been forwarded to the Ontario Geological Survey for publication as an Open File Report. The staff of the Frost Centre gave lectures at 3 junior ranger camps and 1 provincial park. As well, the Frost Centre staff had a poster display at the annual Open House of the Ontario Geological Survey, December 4-6, 1984.

ONTARIO GEOLOGICAL SURVEY

Maps and reports pertaining to the Bancroft Resident Geologist area and issued by the Ontario Geological Survey are shown in Figure 1 and listed in Table 1. Additional references to new information of geological interest in the general area are included in the list of selected references. Also shown in Figure 1 is the location of 1984 fieldwork by the Ontario Geological Survey. The Geological Data Inventory Folios (GDIFs) published this year for this area are not shown in Figure 1 in order to avoid clutter. In 1984, GDIFs for

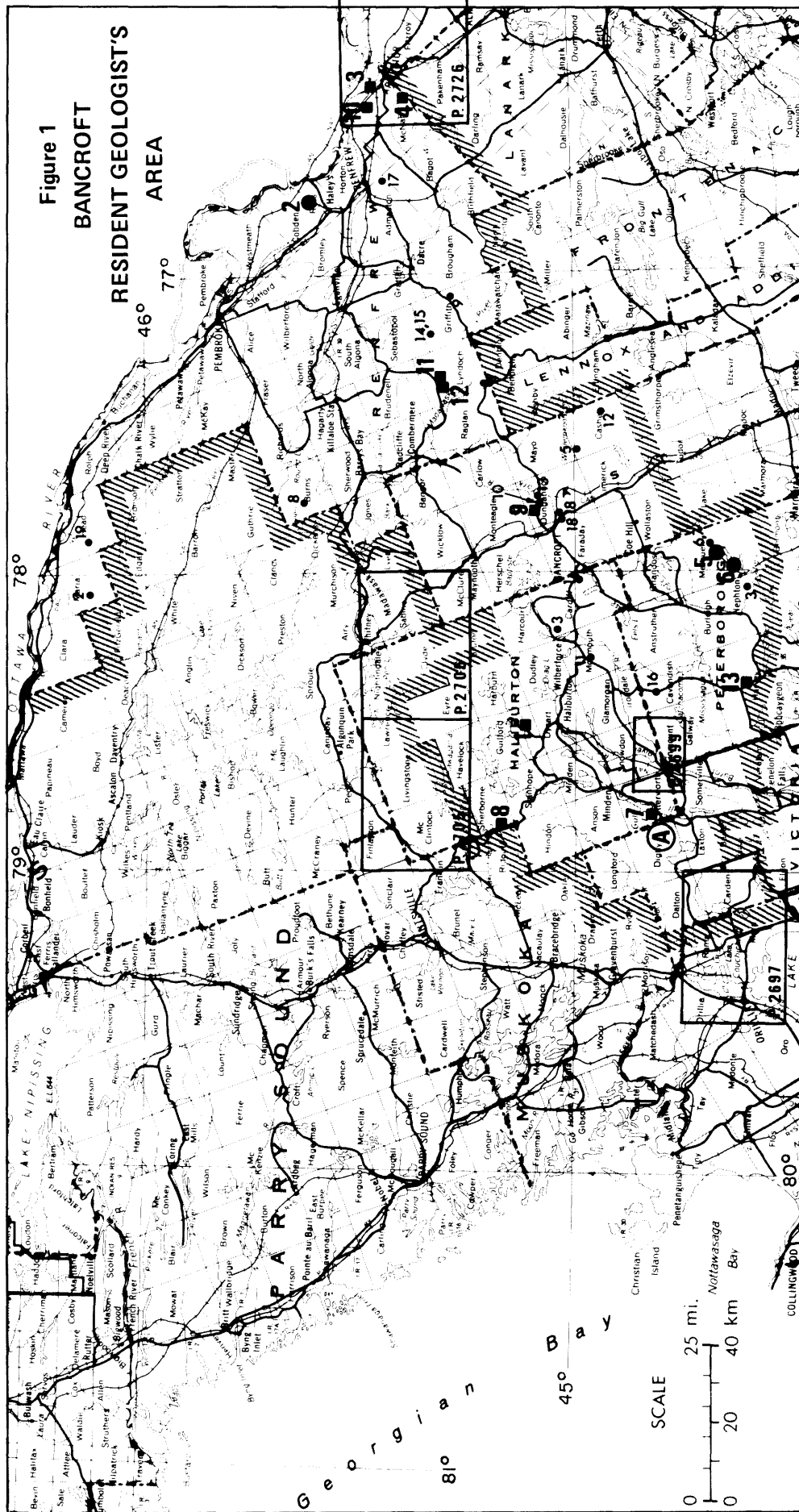


Figure 1
BANCROFT
RESIDENT GEOLOGIST'S
AREA

- Exploration Activity, 1984 (keyed to Table 2)
- Map or Report issued by the Ontario Geological Survey in 1984 (keyed to Table 1)
- P - Preliminary Map
- ▨ Boundary of Resident Geologist's Area
- Producing Mines (Open Pit)
 - 2. Chromasco. A division of Timminco Ltd. Mg, Ca, Sr
 - 5. IMC Chemical Group (Canada) Ltd. neph.syenite
 - 6. Indusmin Ltd. neph.syenite
- Producing Quarries
 - 1. Bolender's Ltd. crushed dolomite
 - 3. Dochart Clay Products clay sand
 - 4. Hoffman Concrete Products Ltd. crushed stone
 - 7. MacDonald. flagstone
 - 8. McKey lapidary stone
 - 9. Princess Sodalite Mine mineral specimens
 - 10. Smith Construction Ltd. crushed stone
 - 11. Wal-Gem Lapidary mineral specimens
 - 12. Wal-Gem Lapidary rose quartz
 - 13. A.D. Webster crushed stone, flagstone
- A Location of OGS Field Parties, 1984
Precambrian Mapping. R.M. Easton

TABLE 1. MAPS AND REPORTS PERTAINING TO THE BANCROFT RESIDENT GEOLOGIST AREA PUBLISHED DURING 1984 BY THE ONTARIO GEOLOGICAL SURVEY, MINISTRY OF NATURAL RESOURCES

Open File Reports	Geological Data Inventory Folios	Mineral Resources Branch Publications	Miscellaneous Publications
OFR 5509	GDIF 124	IMBP 5	Rocks and Mineral
OFR 5515	GDIF 125	Video Census Series No. 3	Information 1984 - Booklet
Preliminary Maps - Geological Series	GDIF 135	Miscellaneous Reports	The Ontario Drill Core Storage Program - Booklet
P.2697	GDIF 168	MP 119	
P.2699	GDIF 169		
P.2705	GDIF 170		
P.2706	GDIF 171		
P.2726	GDIF 178		
	GDIF 179		
	GDIF 180		
	GDIF 181		
	GDIF 182		

the following 12 townships were published: Anstruther, Bagot, Blithfield, Burleigh, Cardiff, Faraday, Limerick, Lyndoch, Monmouth, Monteagle, Raglan, and Wollaston (Ontario Geological Survey 1984b to 1984m).

A field party under the leadership of R.M. Easton continued detailed mapping (1:15 840 or 1 inch to 1/4 mile) in the Minden area with the Digby-Lutterworth sheet (Easton and Van Kranendonk 1984).

J.S. Springer of the Mineral Deposits Section continued her studies of the metallic and industrial minerals in the Grenville Province.

The aggregate assessment group carried out fieldwork in Harvey and Belmont Townships in preparation for Aggregate Resource Inventory Papers for these 2 townships (Ontario Geological Survey 1984a).

GEOLOGICAL SURVEY OF CANADA

S. Hanmer spent several weeks in the Haliburton area on structural analysis of the northwestern boundary of the Central Metasedimentary Belt (Hanmer and Ciesielski 1984; see also Hanmer 1984a, 1984b).

W.W. Shilts continued his studies of Pleistocene history and

geochemistry on the Canadian Shield (Shilts 1984).

ROYAL ONTARIO MUSEUM

S.B. Lumbers continued his study in the Haliburton-Bancroft area of the northwestern boundary of the Central Metasedimentary Belt.

M. Back and R. Falls commenced a study of the mineralogy of Monmouth and Glamorgan Townships.

UNIVERSITIES

R. Thivierge, University of Ottawa is completing a M.Sc. thesis on the Centreville-Combermere area.

L. Heaman, McMaster University, Hamilton, is in the process of writing up his Ph.D thesis on isotopes and trace elements in the Chandos Township area (Heaman *et al.* 1982).

B.B.H. Lo, R.N. Edwards, and S. Cheesman, University of Toronto, are testing and developing instrumentation of Cross-hole Magnetometric Resistivity (Lo *et al.* 1984).

U. Brand and J. Terasmae, Brock University, St. Catharines, are continuing their study of the source rock geochemistry of Pleistocene tills of Southern Ontario with emphasis on the Dummer Moraine (Brand and Terasmae 1984).

Steve Dunn, University of Wisconsin, has commenced a Ph.D study of stable isotopes of some of the gabbroic bodies of the Bancroft area.

Tsai-Wai Wu, University of Western Ontario, London, has completed his Ph.D thesis on the geochemistry of some granitoids of the Grenville Province (Wu 1984).

EXPLORATION ACTIVITY

The location of properties which were staked and those on which exploration work is known to have been done in 1984 are listed in Table 2 and shown in Figure 1, keyed to Table 2. Assessment work reports received in this office are listed in Table 3.

The area saw considerable activity for building stone to supply the new marble processing plant of Karnuk Marble Industries Incorporated in Cornwall. A granite finishing line is expected to be in service there in 1985. Three former marble quarries south of Bancroft in Faraday and Dungannon Townships were staked for this company.

Staking occurred in Burleigh, Cashel, and Griffith Townships for marble to be used as building stone and/or mineral filler.

One claim was staked in Burns Township for high purity silica. The former J.G. Gole Quarry in Murchison Township, Nipissing

EXPLORATION ACTIVITY DURING THE YEAR.

TABLE 2

Number on Figure	Individual or Company	Activity
1	Asbury, B.C.	Claim Staking (1), Cardiff Twp.
2	Blanchard, E.J.	Claim Staking (16), Maria Twp.
3	Byer, J.L.	Claim Staking (7), Burleigh Twp.; (2) Cardiff Twp.
4	Crawford, R.J.	Claim Staking (3), Lyndoch Twp.
5	Dubblestein, A.	Claim Staking (1), Cashel Twp.
6	Glanfield, M.	Claim Staking (1), Methuen Twp.
7	Goble, B.	Claim Staking (2), Methuen Twp.
8	Hamilton, L.	Claim Staking (1), Burns Twp.
9	Hartley, C.J.	Claim Staking (4), Griffith Twp.
10	Jayfran Enterprises Ltd.	Mapping, Drilling, Dungannon Twp.
11	McFadyen, D.A.	Claim Staking (1), Monmouth Twp.
12	McMurray, D.	Claim Staking (2), Cashel Twp. Stripping, Cashel Twp.
13	Morse, R.H.	Claim Staking (1), Dungannon Twp.
14	Paulus, G.E.	Claim Staking (1), Griffith Twp.
15	Pearse, H.K.	Claim Staking (1), Griffith Twp.
16	Quesnel, S.E.	Claim Staking (1), Cavendish Twp.
17	Sulpetro Minerals Ltd.	Drilling, Admaston Twp.
18	Verschuren, C.P.	Claim Staking (1), Faraday Twp.; (2) Dungannon Twp.
19	Vuylsteke, J.	Claim Staking (2), Head Twp.

District, is also being re-examined for its high purity silica potential.

Sulpetro Minerals Limited did some drilling in a continuing program to evaluate their zinc property (Renprior/Cadieux) in Admaston Township.

E.J. Blanchard continued with an evaluation of the graphite potential in parts of Maria Township.

Jayfran Enterprises Limited examined their property in Dungannon Township for its uranium and nepheline syenite potential by mapping and drilling.

D. McMurray is attempting to bring a soapstone occurrence into production in Cashel Township. He intends to test market some material during 1985.

R.J. Crawford is continuing with his exploration for base metals in southwestern Lyndoch Township.

D.A. McFadyen staked a claim in Monmouth Township for the production of mineral specimens.

MINING ACTIVITY

The location of the operating mines and quarries is shown in Figure 1.

The same body of nepheline syenite in Methuen Township is being mined by Indusmin Limited near Nephton and by International Minerals & Chemical Corporation (Canada) Limited near Blue Mountain. Both companies produce a wide range of products for the glass, ceramic, fibreglass, and filler industries. Both companies were working at less than capacity in 1984.

Chromasco, a division of Timminco Limited, near Haley Station, Ross Township, produces magnesium metal in its reduction plant, from dolomite mined in 2 pits on the property. Based on demand, calcium and strontium metal is also produced, but from raw material purchased off site. Having recovered from the effects of the recent recession the company operated at capacity during 1984.

Crushed stone for aggregate is produced from the 2 quarries in McNab Township. Crushed stone and flagstone is produced on demand from the A.D. Webster Quarry in Harvey Township, and flagstone was produced on demand from the MacDonald Quarry in Lutterworth Township. Lapidary stone is produced from a small quarry in Sherborne Township.

White dolomite is produced at the quarry of Bolender's Limited, Guilford Township, for poultry grit, golf sand, exposed concrete facing, and white bricks. "Leda clay" and local sand are mined by Dochart Clay Products for their line of pottery ware. Rose quartz chips are produced on a demand basis from the West Quarry of Wal-Gem Lapidary in Lyndoch Township, and mineral specimens are produced from both the East and West Quarries. Sodalite for the lapidary trade and mineral collectors is produced on a demand basis at the Princess Sodalite Mine, Dungannon Township, just outside of Bancroft.

TABLE 3

ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.

Abbreviations Used:

DD	- Diamond Drilling (where shown, the numbers following "D" indicate the number of holes drilled and the total length drilled respectively).	Rad	- Radiometric Survey
		VLF-EM	- Very Low Frequency Electromagnetic Survey
		HL-EM	- Horizontal Loop Electromagnetic Survey
Geophys.	- Geophysical Survey	STR	- Stripping
		Mech	- Mechanical
GL	- Geological Survey	Benef.	- Beneficiation
		Mo	- Molybdenum
Mag	- Magnetometer Survey	BM	- Base Metals

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Haliburton Co. Glamorgan Twp.	31D/15 31D/16	Offset Oil & Gas Resources Inc.	Copper Mo	Geophys. GL	Mag, Rad, VLF-EM Mapping	1983	2.5721	Glamorgan 26
Hastings Co. Cashel Twp.	31C/14	David McMurray	Soapstone	Drill Logs Mech Manual	DD(17-1000.5') * power STR washing core specimens	1982 1983 1984	-	Cashel 6
Peterborough Co. Methuen Twp.	31C/12	Canadian Nickel Co.	Ilmenite	Drill Logs	DD(4-364.54m.) DD(2-151.18m.)	1983	-	Methuen 30
Renfrew Co. Bagot Twp.	31F/7	Sulpetro Minerals Ltd.	BM	Geophys. GL	HL-EM Mapping	1983	2.6116	Bagot 10
Renfrew Co. Brougham Twp.	31F/7	B.Nixon Apple (Coronation Resources)	graphite	Geophys. GL	VLF-EM linecutting assaying core logging*	1982	2.5580	Brougham 13
Renfrew Co. Griffith Twp.	31F/6	Gary H.K. Pearse	mineral filler dolomite	Geophys. GL	VLF-EM Mapping Sampling	1982	2.5373	Griffith 3
Renfrew Co. Griffith Twp.	31F/6	Gary H.K. Pearse	graphite	Geophys. GL	VLF-EM Mapping Sampling	1982	2.5401	Griffith 4
Renfrew Co. Griffith Twp.	31F/6	Gary H.K. Pearse	mineral filler dolomite	Assay & Benef. Studies	Sampling	1984	2.7114	Griffith 5
Renfrew Co. Lyndoch Twp.	31F/3	Russell J. Crawford	BM	Mech Manual	power STR	1983	-	Lyndoch 27

* - Drill Core from this property in whole or in part is stored at the Bancroft Drill Core Library.

RECOMMENDATIONS

The Bancroft area is close to the markets of Ontario, Quebec, and the northeastern United States. Adequate road, rail, and water transportation routes exist, good access is normal, and adequate labour pool, and other features of a stable, well developed infrastructure are in place. A deposit of adequate size and consistent grade should be able to compete in this market.

Potential exists in the area for graphite, talc, high purity calcium, high purity silica, and building stone. Mica as filler is still some-

what of a new industry, but the potential market is seen to be excellent. North American markets also exist for coarse "book" mica (muscovite or phlogopite) which, in the past, has been produced locally from pegmatite deposits.

In Ontario, Quebec, and New York State, several mines have operated, or are still operating, based on sphalerite associated with carbonate metasedimentary rocks. Potential for such deposits exists through much of Eastern Ontario.

The Minden - Bancroft - Pembroke area has numerous pegmatite occurrences and, in the

past, several mines were developed on these pegmatites. Pegmatites containing mica, silica, calcite, potassic feldspar, radioactive minerals, and rare earth minerals are known. Based on several co-products, it may be possible to bring one, or several adjacent ones, into production.

SELECTED REFERENCES

Bartlett, J.R.
1983: Stratigraphy, Physical Volcanology, and Geochemistry of the Belmont Lake Metavolcanic Complex, Southeastern Ontario; Unpublished M.Sc.

- Thesis, Carleton University, 218p.
- Brand, N., and Terasmae, J.
1984: Source Rock Geochemistry of Pleistocene Till of Southern Ontario; Grant 131, p.65-71 in Geoscience Research Grant Program, Summary of Research 1983-1984, edited by V.G. Milne, Ontario Geological Survey, Miscellaneous Paper 121, 252p.
- Carter, T.R.
1984: Metallogeny of the Grenville Province, Southeastern Ontario; Ontario Geological Survey, Open File Report 5515, 422p., 58 figures, 35 tables, and 14 photos.
- Easton, R.M., and Van Kranendonk, M.
1984: Digby-Lutterworth Area, Haliburton and Victoria Counties; p.75-81 in Summary of Field Work, 1984, Ontario Geological Survey, edited by John Wood, Owen L. White, R.B. Barlow, and A.C. Colvine, Ontario Geological Survey, Miscellaneous Paper 119, 309p.
- Easton, R.M., and Bartlett, J.R.
1984: Precambrian Geology of the Howland Area, Haliburton and Peterborough Counties (31 D/15); Ontario Geological Survey, Map P.2699, Geological Series - Preliminary Map, scale 1:15 840. Geology 1983.
- Finamore, P.F., and Bajc, A.J.
1984: Quaternary Geology of the Orillia Area, Southern Ontario (31 D/11); Ontario Geological Survey, Map P.2697, Geological Series - Preliminary Map, scale 1:50 000. Geology 1981, 1982.
- Ford, M.J., and Bajc, A.J.
1984: Quaternary Geology of the Whitney Area, Nipissing District and Haliburton and Hastings Counties; Ontario Geological Survey, Map P.2706, Geological Series - Preliminary Map, scale 1:50 000. Geology 1983.
- Geddes, R.S., and McClenaghan, M.B.
1984: Quaternary Geology of the Kawagama Lake Area, Nipissing and Muskoka Districts and Haliburton County; Ontario Geological Survey, Map P.2705, Geological Series - Preliminary Map, Scale 1:50 000. Geology 1983.
- Gleeson, C.F., Rampton, V.N., Thomas, R.D., and Paradis, S.
1984: Development and Adaption of Geochemical Techniques to Gold Exploration in Glacial Drift; Grant 065, p.129-149 in Exploration Technology Development Program of the Board of Industrial Leadership and Development, Summary of Research 1983-1984, edited by V.G. Milne and R.B. Barlow, Ontario Geological Survey, Miscellaneous Paper 120, 176p. Accompanied by 1 chart (coloured).
- Grant, T.W., and Kingston, P.W.
1984: Geology and Geochemistry of Grenville Marble in South-eastern Ontario; Ontario Geological Survey, Open File Report 5509, 297p., 4 tables, 27 figures, 4 photos, and 1 map in back pocket.
- Guillet, G.R., and Kriens, J.
1984: Ontario and the Mineral Filler Industry; Ontario Ministry of Natural Resources, Mineral Resources Branch, Industrial Mineral Background Paper 5, 175p.
- Hanmer, S.K.
1984a: Structure of the Junction of Three Tectonic Slices: Ontario Gneiss Segment, Grenville Province; p.109-120 in Current Research, Part B, Geological Survey of Canada, Paper 84-1B, 427p.
1984b: The Potential Use of Planar and Elliptical Structures as Indicators of Strain Regime and Kinematics of Tectonic Flow; p.133-142 in Current Research, Part B, Geological Survey of Canada, Paper 84-1B, 427p.
- Hanmer, S.K., and Ciesielski, A.
1984: A Structural Reconnaissance of the Northwest Boundary of the Central Metasedimentary Belt, Grenville Province, Ontario and Quebec; p.121-131 in Current Research, Part B, Geological Survey of Canada, Paper 84-1B, 427p.
- Heaman, L.M., Shieh, Yuch-Ning, McNutt, R.H., and Shaw, D.M.
1982: Isotopic and Trace Element Study of the Loon Lake Pluton, Grenville Province, Ontario; Canadian Journal of Earth Sciences, Volume 19, Number 5, p.1045-1054.
- Indares, A., and Martignole, J.
1984: Evolution of P-T Conditions During a High-Grade Metamorphic Event in the Maniwaki Area (Grenville Province); Canadian Journal of Earth Sciences, Volume 21, p.853-863.
- Lo, B.B.H., Edwards, R.N., and Cheesman, S.
1984: Ontario Field Tests and Instrumentation of Cross Hole Magnetometric Resistivity; Grant 145, p.117-127 in Geoscience Research Grant Program, Summary of Research 1983-1984, edited by V.G. Milne, Ontario Geological Survey, Miscellaneous Paper 121, 252p.
- Ontario Geological Survey
1984a: Aggregate Resources Inventory Program; p.104-109 in Summary of Field Work 1984, Ontario Geological Survey, edited by John Wood, Owen L. White, R.B. Barlow, and A.C. Colvine, Ontario Geological Survey, Miscellaneous Paper 119, 309p.
1984b: Anstruther Township, Peterborough County (31 D/16); Ontario Geological Survey, Geological Data Inventory Folio 168, compiled by staff of the Resident Geologist's Office, Bancroft, 68p. and 2 maps, scale 1:31 680.
1984c: Bagot Township, Renfrew County (31 F/2,7); Ontario Geological Survey, Geological Data Inventory Folio 171, compiled by the staff of the Resident Geologist's Office, Bancroft, 38p. and 2 maps, scale 1:31 680.
1984d: Blithfield Township, Renfrew County (31 F/2,7); On-

- tario Geological Survey, Geological Data Inventory Folio 170, compiled by the staff of the Resident Geologist's Office, Bancroft, 28p. and 2 maps, scale 1:31 680.
- 1984e: Burleigh Township, Peterborough County (31 D/9,16); Ontario Geological Survey, Geological Data Inventory Folio 182, compiled by the staff of the Resident Geologist's Office, Bancroft, 30p. and 2 maps, scale 1:31 680.
- 1984f: Cardiff Township, Haliburton County (31 E/1, 31 D/16, 31 C/13); Ontario Geological Survey, Geological Data Inventory Folio 124, compiled by the staff of the Resident Geologist's Office, Bancroft, 134p. and 3 maps, scale 1:31 680.
- 1984g: Faraday Township, Hastings County (31 C/13, 31 F/4, 31 E/1); Ontario Geological Survey, Geological Data Inventory Folio 125, compiled by the staff of the Resident Geologist's Office, Bancroft, 72p. and 3 maps, scale 1:31 680.
- 1984h: Limerick Township, Hastings County (31 C/13); Ontario Geological Survey, Geological Data Inventory Folio 180, compiled by the staff of the Resident Geologist's Office, Bancroft, 26p. and 2 maps, scale 1:31 680.
- 1984i: Lyndoch Township, Renfrew County (31 F/3,6); Ontario Geological Survey, Geological Data Inventory Folio 135, compiled by the staff of the Resident Geologist's Office, Bancroft, 36p. and 2 maps, scale 1:31 680.
- 1984j: Monmouth Township, Haliburton County (31 D/16, 31 E/1); Ontario Geological Survey, Geological Data Inventory Folio 179, compiled by the staff of the Resident Geologist's Office, Bancroft, 110p. and 3 maps, scale 1:31 680.
- 1984k: Monteagle Township, Hastings County (31 F/4,5); Ontario Geological Survey, Geological Data Inventory Folio 169, compiled by the staff of the Resident Geologist's Office, Bancroft, 60p. and 2 maps, scale 1:31 680.
- 1984l: Raglan Township, Renfrew County (31 F/3,4,5,6); Ontario Geological Survey, Geological Data Inventory Folio 178, compiled by the staff of the Resident Geologist's Office, Bancroft, 42p. and 2 maps, scale 1:31 680.
- 1984m: Wollaston Township, Hastings County (31 C/13); Ontario Geological Survey, Geological Data Inventory Folio 181, compiled by the staff of the Resident Geologist's Office, Bancroft, 32p. and 2 maps, scale 1:31 680.
- 1984n: The Ontario Drill Core Storage Program; Ontario Geological Survey, Booklet, 10p.
- 1984o: Rocks and Minerals Information, 1984; Ontario Geological Survey, Booklet, 25p.
- Shilts, W.W.
1984: Sonar Evidence for Post-glacial Tectonic Instability of the Canadian Shield and Appalachians; p.567-579 *in* Current Research, Part A, Geological Survey of Canada, Paper 84-1A, 666p.
- Weatherston, G.L.
1984: 1983 Ontario Mineral Score; Ontario Ministry of Natural Resources, Video Census Series, Number 3, 242p.
- Williams, D.A., Wolf, R.R., and Rae, A.M.
1984: Paleozoic Geology of the Arnprior-Quyon Area, Southern Ontario; Ontario Geological Survey, Map P.2726, Geological Series - Preliminary Map, scale 1:50 000. Geology 1982.
- Wu, T.W.
1984: Geochemistry and Petrogenesis of Some Granitoids in the Grenville of Ontario, and their Tectonic Implications; Unpublished Ph.D. Thesis, University of Western Ontario, London, 623p.

Eastern Resident Geologist Area, Eastern Region

P.W. Kingston¹ and V.C. Papertzian²

¹Resident Geologist, ²Project Geologist, Ontario Ministry of Natural Resources, Tweed

INTRODUCTION

During 1984, exploration for industrial minerals and base metals was the main form of activity by mining companies, prospectors, staff of the Resident Geologist office, and the Ontario Geological Survey. Emphasis this year was on gold, fine-grained muscovite mica, sillimanite, graphite, building stone (granite and marble), and vermiculite.

RESIDENT GEOLOGIST'S ACTIVITIES

The office of the Resident Geologist for the Eastern Region is located in Tweed and is staffed by P.W. Kingston, Resident Geologist; L.G.D. Thompson, Geophysicist; and 2 full-time contract geological staff. The contract staff consists of V.C. Papertzian, Core Library Geologist; and W.M. Kelly, Assistant Core Library Geologist.

The office of the Regional Mineral Resources Coordinator is located in Kempenville and is staffed by T.W. Fletcher, Regional Mineral Resources Coordinator; Y.F. Young, Mineral Resources Specialist; S. van Haften, Resource Geologist, and 4 contract and part-time staff who include R. Trotter, D. Brand, K. Klassen, and G. Gorrell. G. Gorrell has since left the Ministry. Five Experience '84 students were hired to work on various geological projects in the region.

Most geological activities are managed by the Resident Geologist in Tweed, and all geotechnical, aggregate assessment, mineral education, and Provincial Parks projects are managed by the Regional Mineral Resources Coordinator in Kempenville.

As in previous years, much of the Resident Geologist's time was involved in providing a consultive technical service to companies and individuals engaged in mineral exploration and mining development in the Eastern Region. Selected mineral properties in the region were visited during the year either because of their importance to

Ministry programs, or because of interest in, or work by, mining and exploration companies. Emphasis was placed on examining properties currently under development, especially those involving industrial minerals. Other activities included conducting and attending geological field trips and tours.

In May and June of 1983, a special employment program (Mining Sector Work Program) was set up, with the Township of Barrie acting as project sponsor. This project employed 3 geologists who field checked 12 and sampled 10 gold occurrences in Barrie Township. One report was published in the Spring of 1984 entitled "A Summary of Gold Prospects in Barrie Township", edited by V.C. Papertzian.

Another Section 38 work program was started on September 10, 1984. The main objectives of this program are as follows:

1. to compile 15 Geological Data Inventory Folios for the Crowe River Valley area
2. to sample rocks in various locations to determine mineral content, pH level, and geology
3. to move approximately 26 000 m of core samples to the Eastern Ontario Mining Division Core Library located in Tweed
4. to index core samples on a computer
5. to prepare maps to show hydrological and mineral highlights of significant areas.

This program is expected to continue until the end of March 1985.

FIELD TRIPS

In mid-January, in Ottawa, the Current Activities Forum of the Geological Survey of Canada was attended by W.T. Grant, P.W. Kingston, V.C. Papertzian, and C.P. Verschuren.

At the end of March, 3 hours were spent flying to and photographing abandoned and working mines within Eastern Region. Mines and prospects that were not

readily accessible by ground transportation were visited in this way.

P.W. Kingston attended a 4-day Industrial Minerals Symposium held in Toronto in late May.

In mid-June a 2-day Mines Technical meeting was conducted in Kingston. Progress reports on the various programs and the core library were tabled at this meeting by P.W. Kingston and W.M. Kelly.

The opening of the core library opening at Timmins, in late June, was attended by P.W. Kingston and V.C. Papertzian.

Dave Williams conducted a field trip on the Paleozoic limestones in the Picton area in late July. Geological staff from both Kempenville and Tweed attended.

A Federal/Provincial Industrial Minerals meeting was held in Ottawa in early October. P.W. Kingston represented Eastern Region at this 2-day conference.

An Inter-Regional Mines meeting between Eastern and Algonquin Regions was held in Renfrew in mid-October. This was a 2-day meeting in which geological programs as well as core library programs were discussed. The first day of this meeting was devoted entirely to field trips. Visits were made to the Steep Rock Quarry at Tatlock, the Renprior Zinc Occurrence at Renfrew, and Chromasco's magnesium plant at Haley.

A 1 day field trip was organized in Cornwall, at the Karnuk marble plant at the end of October. Geologists from Eastern, Central, Algonquin, and Southwestern Regions attended.

Early in November 1984, P.W. Kingston and V.C. Papertzian visited the Petroleum Resources Laboratory located in London, for 1 day.

PROPERTY EXAMINATIONS

The Cordova Mine was visited a number of times during the Summer of 1984 by P.W. Kingston and V.C. Papertzian. No further exploration activity has occurred on this

property since the previous summer.

A number of field visits were made to the Ore Chimney Gold Mine property. P.W. Kingston assisted K. Wait from Aggen Incorporated (Beneficiating Services) in collecting a 100 pound (45 kg) bulk sample from the dumps. No further work has been conducted on the property since it was de-watered to the 150-foot level in the Summer of 1983.

P.W. Kingston attended the official opening of Canada Talc Incorporated's new crushing and grinding facility in Marmora in late October 1984.

The Hollandia Lead Mine in Madoc Township was also visited in the Fall of 1984. Fire bricks that lined their furnace in the early 1900s were collected for metallurgical research on refractories. This research is being carried out jointly with the Technical University of Nova Scotia, Metallurgical Engineering Department.

P.W. Kingston, along with E. Gallow of Copconda-York Resources Incorporated of Unionville visited the former Joy Manufacturing Company Limited granite quarry in Madoc Township, presently owned by J. Beer of Madoc.

P.W. Kingston and V.C. Papertzian accompanied representatives from Keystone Explorations Limited and Colautti Construction Limited to both the Fardom Marble Quarry in Hungerford Township and the Fairmont Granite Quarry in Belmont Township. Both of these visits were conducted in late Fall.

P.W. Kingston and V.C. Papertzian visited the Long Lake Zinc Mine property owned by Lynx-Canada Explorations Limited in Olden Township in late May. A magnetometer survey was carried out at this time over selected areas of the property.

P.W. Kingston accompanied representatives from Watts, Griffis, and McOuat Limited to the Kozumi Mica site near Kaladar.

In early May, an Energy, Mines and Resources Canada, seis-

mic field trip was attended by L. Thompson, P.W. Kingston, and G. Gorrell. The area visited was several miles northeast of Casselman, near Lemieux, the site of major landslides during the last century.

In early April a diamond drilling program was set up in conjunction with Sir Sandford Fleming College. The Tweed office spotted 6 diamond-drill holes near Madoc and north of Marysville. This program failed to realize its objectives due to equipment failure.

A number of field visits were made to the Deloro Property now under management by the Ontario Ministry of the Environment. The Turtle shaft, recently excavated by backhoe, was examined because water, constantly draining from this shaft into the Moira River, is consistently high in arsenic content.

The Hearthstone Anthophyllite Quarry in Elzevir Township was examined briefly this Fall. A number of blocks were shipped from the property to the United States. These were then cut up and used as decorative stone on wood stoves. Operations ceased this fall due to excessive fractures in the blocks quarried. There is considerable doubt whether the fracturing is inherent in the rock or was caused by the injudicious use of explosives in the quarry operation.

A brief field visit was carried out on the Burnstown Celestite Property by W. Kelly, P.W. Kingston, and V.C. Papertzian.

A joint project commenced this summer between Eastern Region, the Ontario Geological Survey, and the Canada Centre for Remote Sensing, in the development of an airborne luminescence-fluorescence prospecting technique for barite and fluorite. Barite-fluorite vein samples, collected in Eastern Ontario 2 summers ago, were sent to the Ontario Geological Survey for examination using this latest equipment. The project is ongoing at the time of writing and results appear promising.

MINING ACTIVITY

Producing mines and stone quarries in Eastern Ontario are shown in Figure 1. The 3 current cement producers, Canada Cement Lafarge Limited, Lake Ontario Cement Company Limited, and St. Lawrence Cement Incorporated were in production throughout 1984.

Stoklosar Marble Quarries Limited continued production of marble specialty products and terrazzo chips. The company significantly increased production this year, especially in green chips.

Steep Rock Resources Incorporated, Calcite Division, continued quarrying operations at their quarry at Tatlock. Their processing plant immediately west of Perth was also in operation at or near full capacity throughout 1984.

As reported in the Steep Rock Resources Incorporated third quarterly report for the 9 months ended September 30, 1984, Calcite Division sales increased 26% from year to date 1983 and calcite earnings from operations were up 25%. Production rates from the expanded fine-grind facilities were improved substantially and further improvements are anticipated. Sales during the preceeding 12 months totaled \$4.3 million.

Canada Talc Incorporated continued production of talc and dolomite at their mine in Huntingdon Township. The company continued work on its new 2 million ton dolomite ore body west of the headframe. The initial blast broke 40 000 tons of talcose dolomite to be used in making Dolfil® filler.

The talc open pit started to the south of the mine shaft in 1983 is in operation. Approximately 40 000 tons of material has been mined, crushed, and stockpiled to be used as auto body patch.

A third talc mine in Elzevir Township is in preparation. Government approvals have been obtained and the area is stripped ready for blasting. This new material will be used for lower grade fillers.

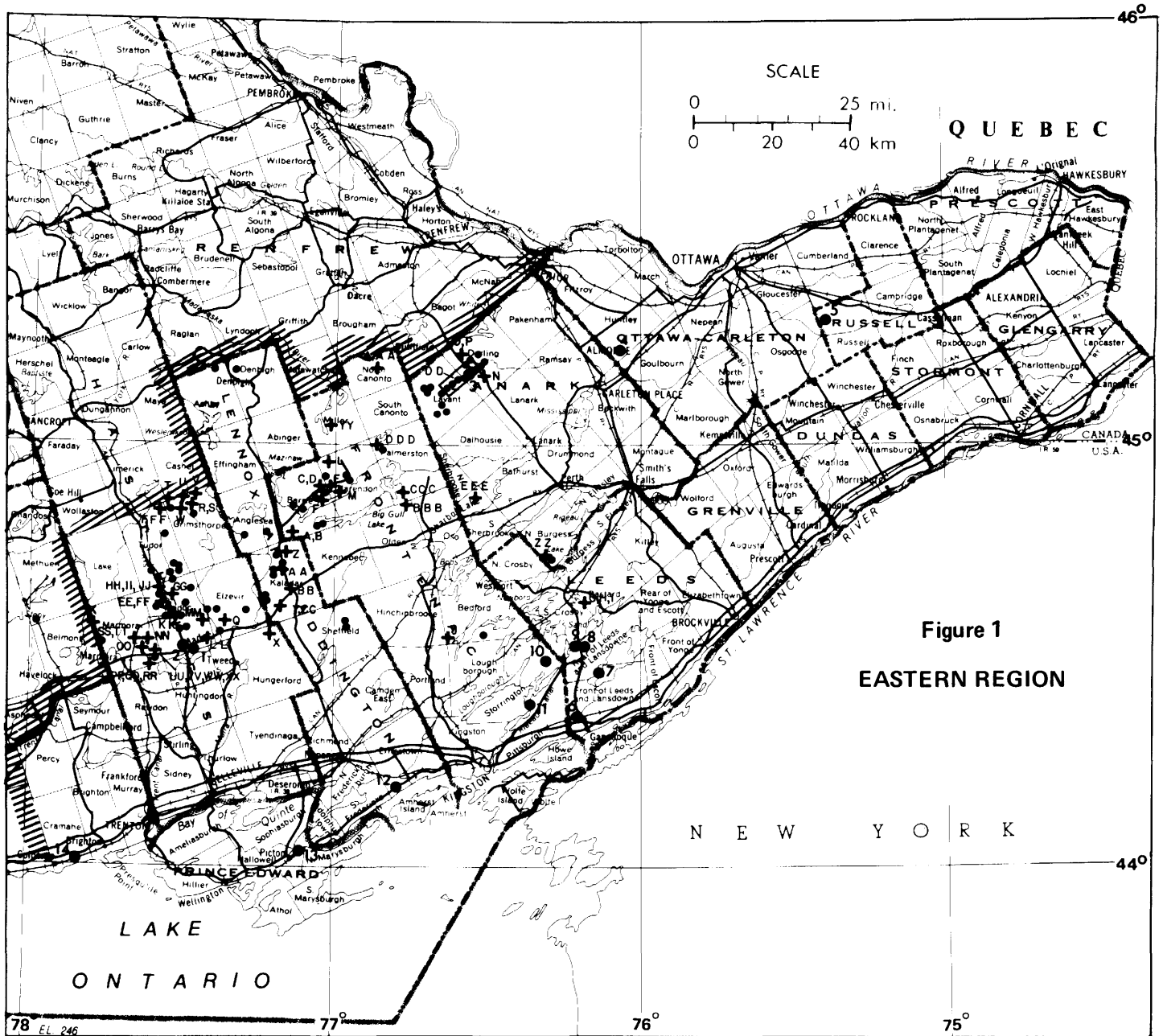


Figure 1
EASTERN REGION

EXPLANATION

● Producing Mines (except clay and aggregate extraction operations)

- 1. Canada Talc Industries Ltd. talc and marble
- 2. Stoklosar Ltd. marble
- 3. Steep Rock Ltd. calcium carbonate
- 4. MacMillan Quarry flagstone
- 5. Domtar Quarry shale for brick
- 6. B. Mulcair armour stone
- 7. F. Weisner decorative sandstone
- 8. W.R. Barnes Co. Ltd. decorative stone
- 9. Rideau Granite Inc. monument stone
- 10. Fairmont Granite monument stone

- 11. N. Sloan decorative stone
- 12. Canada Cement Lafarge Ltd. limestone, cement
- 13. Lake Ontario Cement Co. Ltd. limestone, cement
- 14. St. Lawrence Cement Co. Ltd.,
Ogden Point Quarry limestone, cement

TT+ Assessment work filed in 1984 (keyed to Table 1)

● Claim staking, 1984

//// Boundary of Resident Geologist's Area

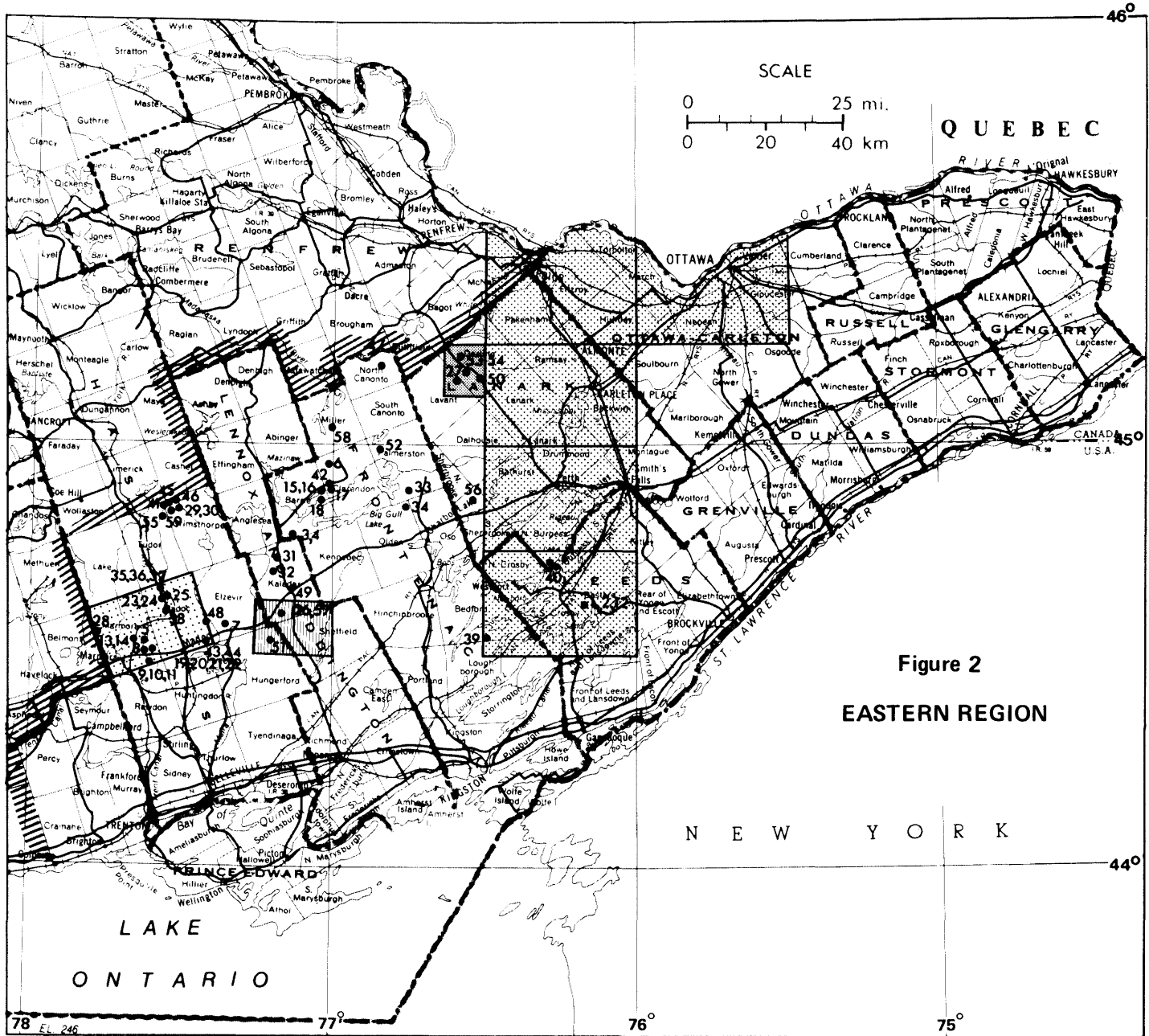


Figure 2
EASTERN REGION

EXPLANATION

- | | | | |
|---|--|---|---|
|  | Paleozoic Rx Mapping (Williams 1984) |  | J.S. Springer - Madoc/Marmora Gold Study Area |
|  | C.F. Gleeson et al Geochemical Drift Exploration |  | Exploration Activity, 1984 (Keyed to Table 2) |
|  | E.G. Bright - Mellon Lake Area |  | Boundary of Resident Geologist's Area |

In November 1984, the company opened a new 100 000 ton-per-year talc and dolomite processing plant. This \$2.8 million fine-grind facility will produce 44, 20, and 10-micron size talc and dolomite products for the paint and paper industry. The plant is located on a portion of the former Marmoraton Iron Mines plant site purchased by Canada Talc Incorporated.

The granite quarry in Belmont Township, operated by Fairmont Granite Limited, has been abandoned. When the quarry was visited in early November, preparations were being made to remove the crane which had been installed a year previously. The development of the quarry does not appear to have followed the natural fracture patterns in the rock. Quarry operations were suspended due to excessive fracturing of the blocks and the inability to consistently recover 25 ton or larger blocks. Karnuk Marble Limited recently drilled an adjacent granite property to the north but the rock displays fracturing too excessive to permit successful development.

Fairmont Granite Limited stripped an area measuring approximately 140 by 180 feet (43 by 55 m) of its Battersea Quarry. One third of this area has been drilled off using a quarry bar. The main quarry measures 50 by 70 feet (15 by 21 m) and is approximately 20 to 25 feet (6 to 7.6 m) deep. Quarry operations have been suspended for the winter. Two mobile cranes are now on this site. It would appear that this quarry is capable of producing good dimension stone.

Quarry operations at the Hearthstone Anthophyllite Quarry have been terminated. The quarry face around which considerable stripping has been done, measures approximately 150 feet (46 m) long by 20 feet (6 m) deep. Many fractures are noticeable in the face of the quarry; these may be due in part to the excessive use of explosives to quarry the blocks of anthophyllite. The quantity of material shipped from this property is unknown at this time.

Karnuk Marble Company Limited of Cornwall completed cutting and polishing tests on a number of marble blocks from quarries located in both Eastern and Algonquin Regions. Blocks from a marble quarry at Plevna, as well as from one south of Bancroft proved to be satisfactory. The marble from Plevna is white in colour, while that from Bancroft is mottled brown and white. A block of black limestone from a sand and gravel pit located 3.2 km north of Cornwall has also been successfully cut and polished. To date, no granite blocks that are acceptable to the company have been quarried in the region.

W.R. Barnes Company Limited silica operation in Storrington Township has increased in size from the previous year. A small test pit in white coloured Potsdam sandstone has been enlarged and the area within 100 feet (30 m) on all sides has been stripped. To the east, a second quarry owned by the company is in operation. Here, red coloured Potsdam sandstone, is crushed into 6-inch, 2-inch, and fines and stockpiled in the quarry. The crushing has been contracted out to W.J. McKendry and Son of Glenburnie.

The Rideau Granite Incorporated quarry is located in the Rear of Leeds and Landsdowne Township. The red granite, used for monument stone, is quarried exclusively by the plug and feather method. The quarry measures approximately 120 square feet (37 m²) and is 50 deep (15.2 m) at the northern end. Less than 5 tons was shipped in 1983.

Immediately east of the Rideau Granite Incorporated properties, W.R. Barnes Company Limited owns a decorative stone quarry. The stone is crushed to 1/2-inch size and stockpiled on site. In the past the granite was quarried for blocks, but this proved unsuccessful due to fractures within the rock. The ridge, in which this quarry is located, is approximately 400 m long. A number of attempts at quarrying have been made along this ridge.

EXPLORATION ACTIVITY

In 1984 approximately 386 new claims were recorded in Eastern Ontario, an increase of 120 claims over 1983. This increase is partly the result of exploration for talc, mica, sillimanite, marble, building stone, and gold (Tables 1, 2).

Figure 1 shows the area of claim staking activity during the year as well as assessment work filed. Claim staking activity increased by 32%, while claim cancellations increased to 372 compared to 122 last year in Eastern Region (see Figure 3). Figure 2 shows the location of properties on which exploration work has been carried out.

Much of the exploration work undertaken in Eastern Ontario is on private land, therefore the companies are under no obligation to report their activities. Many of the companies, however, have cooperated in keeping the Ontario Ministry of Natural Resources informed of their activities. In many cases, companies have voluntarily supplied information on a confidential basis. It is, therefore not possible to report on all of the exploration activity in Eastern Region.

GOLD

E & B Canada Resources Limited (acquired by Imperial Metals Corporation) of Vancouver did not carry out any additional diamond drilling at the Addington Mine property (Golden Fleece Deposit), since the Winter of 1983 when Senlac Resources Incorporated drilled several additional thousand feet. A total of 27 000 feet (8230 m) of diamond drilling has been completed on the property. To date the results have been encouraging.

No further exploration work has been carried out on the Ore Chimney Gold Mine property since it was dewatered to the 150-foot level last Summer. A number of mining concerns have examined the property but as yet no further work has been carried out.

ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.

TABLE 1

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
#								
A Barrie	31/C/14	S. J. Bartlett	Au	Assess.	GL	1981	2.5031	-
B Barrie	31/C/14	S. Bartlett	-	"	Mag. survey	1984	-	84-42
C Barrie	31/C/14	D. A. Hardie	Pb,zn,au, ag	"	VLF, Mag, Manual work	1983	-	84-8
D Barrie	31/C/14	D. A. Hardie	Pb,zn,au, ag	"	DD3-304	1983	-	84-9
E Barrie and Clarendon	31/C/24	D. A. Hardie and Grandad Resources	-	"	Mag, VLF-EM, DD10	1984	-	84-24
F Barrie	31/C/14	D. A. Hardie	-	"	VLF-EM, Mag	1984	2.6759	84-15
G Bastard	31/C/9	Angelstone Limited	Silica	"	DD	1981	63.4008	-
H Bastard	31/C/9	Angelstone Limited	-	"	DD, Feasability study	-	63.4025	-
I Bastard	31/C/9	Elgin Silica	Silica	"	DD	1968-83	63.4146	-
J Bedford	31/C/10	N.R.D. Limited	Feld, si	"	Mapping, sampling	1982	2.5304	-
K Belmont and Marmora	31/C.1	Laisir Gold	-	"	-	-	63.4102	-
L Clarendon	31/C/15	J.L.Byer & R.Young	-	"	DD	1984	-	84-46
M Clarendon	31/C/14	G. Pearse	Muscovite	"	Geophys., GL, Geochem.	1981-82	2.5311	82-45
N Darling	31/F/2	Steep Rock Resources	-	"	DD2	1984	-	84-14
O Darling	31/F/2	Terra Surveyors & Geoterrex	Py, po, mag, gf	"	Mapping, GL	1983	2.5669	-
P Darling	31/F/2	Terra Surveys Ltd.	-	"	Test grid, Geo-phys, Geochem.	1982	2.5327	-
Q Elzevir	31/C/11	Canada Talc	Talc	"	Application P/Q	1984	-	-
R Grimsthorpe	31/C/13	R. W. Lawrence	-	"	GL	1983	-	83-53
S Grimsthorpe	31/C/13	R. W. Lawrence	-	"	Photo-GL report	1983	-	83-54
T Grimsthorpe	31/C/13	John Paterson	-	"	Geochem.	1982	-	84-22
U Grimsthorpe	31/C/13	Pike Resources	-	"	Mag, VLF-EM	1984	-	84-27
V Grimsthorpe	31/C/13	Pike Resources	-	"	Mag, VLF-EM	1984	-	84-28
W Grimsthorpe	31/C/13	555246 Ontario Limited	-	"	Mag, EM	1984	-	84-25
X Hungerford	31/C/11	Steep Rock Resources	-	"	GL	1984	-	84-52
Y Kaladar and Sheffield	31/C/11	Koizumi Group	Mica	"	DD4	1981-82	63.4106	-
Z Kaladar	31/C/11	C.Longmuir&R.Young	-	"	DD1	1984	-	-
AA Kaladar	31/C/11	C.Longmuir&R.Young	-	"	DD1	1984	-	-
BB Kaladar	31/C/11	Steep Rock Resources	-	"	DD7-1084	1983	-	83-48
CC Kaladar	31/C/11	R.Young&G.R.Guillet	-	"	DD2-403	1984	-	84-36
DD Lavant&Darling	31/F/2	Lac Minerals	-	"	Airborne EM, Mag, VLF	1984	2.7216	84-41
EE Madoc	31/C/12	A. D. Houston	-	"	ST4, Tr	1983	-	84-7
FF Madoc	31/C/12	A. D. Houston	-	"	Pits, Tr	1983&84	-	84-6
GG Madoc	31/C/12	A. D. Houston	-	"	Rock drilling	1984	-	84-5
HH Madoc	31/C/12	Mono Gold Mines Inc.	-	"	Mag, EM	1984	-	84-29
II Madoc	31/C/12	Mono Gold Mines Inc.	-	"	GL	1984	-	84-50
JJ Madoc	31/C/12	Mono Gold Mines Inc.	-	"	Mag, GL	1984	-	84-53
KK Madoc	31/C/12	R. G. Nash	-	"	DD2	1984	-	84-23
LL Madoc	31/C/11	Gary Pearse	-	"	Mag	1984	2.6683	84-13
MM Madoc	31/C/11	A. Sager	-	"	DD1-258	1983	-	84-4
NN Marmora	31/C/12	Robert Bredberg	-	"	Manual work	1983&84	-	84-40
OO Marmora	-	Deloro Mine	-	Plan	Plan of surface plant	1979	63.4109	-
PP Marmora	31/C/5	Robert Ekstrom	-	Assess.	DD	1984	-	84-33
QQ Marmora	31/C/5	Robert Ekstrom	-	-	Core submitted	1984	-	84-37

....continued

TABLE 1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
RR Marmora	31/C/5	Robert Ekstrom	Au,asp,qv	Assess.	VLF-EM, Mag	1983	2.5910	83-33
SS Marmora	31/C/12	Goldbrook Explorations	-	"	DD	1983&84	-	84-51
TT Marmora	31/C/12	Goldbrook Explorations	-	"	EM, SP, Mag survey, Geophys	-	2.6794	84-17, 84-19 84-20, 84-21
UU Marmora	31/C/5 31/C/12	J. R. Harrington	-	"	Thin section prep. & examination	1982&83	2.6098	84-39
VV Marmora	31/C/5 31/C/12	J. Harrington	-	"	Thin section prep. & examination	1980&83	2.6098	84-39
WW Marmora	31/C/5 31/C/12	J. Harrington	-	"	Geophys, VLF-EM DD2	1983	2.6097	-
XX Marmora	31/C/5 31/C/12	J. Harrington	-	"	Rad	1984	-	84-49
YY Miller	31/F/3	Walter Yzerdraat	-	"	Mag, EM, Rad	1982	63.4112	-
ZZ North Burgess	31/C/8	Orrwell Energy	-	"	Geophys, EM, GL	1984	2.5809	83-28
AAA North Canonto	31/F/2	Wayne Pilatzke	-	"	Tr	1984	-	84-45
BBB Olden	31/C/15	A.J.M. Metals Ltd.	-	"	GL, Rad	1983	2.6026	83-45
CCC Palmerston	31/C/15	A.J.M. Metals Ltd.	Uranium	"	Power Str	1983	-	83-49
DDD Palmerston	31/C/15	Sulpetro Minerals	-	"	Mag, VLF, EM	1984	2.7073	84-38
EEE South Sherbrooke	31/C/15	Gerard E. Wood	-	"	GL survey	1984	2.7093	84-43
FFF Tudor	31/C/13	Tina Lawrence Mgt.	-	"	Mag, VLF-EM	-	-	84-26

*# These letters refer to Figure #1

More than 170 claims have been staked in Lavant and Darling Townships by Lac Minerals Limited. Airborne electromagnetic and magnetometer surveys have been conducted over these claims. The company is prospecting for precious metals.

In Belmont Township, in the Ministry of Natural Resources Central Region, Lasir Gold Incorporated is pursuing the development of the former Cordova Mine. (see report of the Regional Geologist, Central Region, this volume).

BASE METALS

Sulpetro Minerals Limited, who actively explored a number of zinc properties in the Grenville Province, recently entered into a joint venture agreement with another mining company on these properties.

MICA

A muscovite property near Kaladar did not experience any renewed activity this year. The owner of the deposit, the Koizumi Group, is seeking a partner to operate the Kaladar Property.

Steep Rock Resources Incorporated actively explored a mica property in Hungerford Township.

W.R. Barnes Company Limited carried out exploration work on a mica property adjacent to the Steep Rock property.

GRAPHITE

Due to the positive response of the mining sector to exploration for graphite, no further new work on graphite has been carried out by the Resident Geologist Office. All properties with any promise are held in good standing by the companies involved.

Black Gregor Explorations Limited carried out several thousand feet of diamond drilling on the Globe Graphite Mine Property. Some of the core has been donated to the Eastern Region Core Library. Surface mapping on this property has revealed several new outcrops of high grade graphite.

INDUSTRIAL MINERALS PROGRAM

The Industrial Minerals Deposit Testing Program is a joint Government of Ontario and Government of Canada program, which is part of the Canada-Ontario, Eastern

Ontario Subsidiary Agreement. The program seeks to identify, catalogue, and direct attention to the "industrial mineral potential" of southeastern Ontario. A combined program of geological, geophysical, and mineral potential studies, mineral economics, and commodity appraisals has been undertaken by the regional geological staff to encourage the private sector to explore for industrial minerals in high potential target areas. Activities under this program are summarized below. This program ended on March 31, 1984.

CARBONATE ROCKS

The purpose of the calcium carbonate survey was 3-fold: (1) to identify areas of high calcium marble suitable as an industrial mineral source; (2) to assess the variability of marbles; and (3) to determine the Ca/Mg ratio for each marble belt as a guide to industrial mineral and base metal mineralization. Approximately 1860 samples were collected from lithologically homogeneous units; these samples were chemically analyzed for 20 elements by the Geoscience Laboratories, Ontario Geological Survey, Toronto. An Open File Report, "Chemistry of Grenville Car-

EXPLORATION ACTIVITY DURING THE YEAR.

TABLE 2

Number on Figure	Individual or Company	Activity
1	Angelstone Limited	Diamond drilling, Bastard Township.
2	Angelstone Limited	Diamond drilling, feasibility study, Bastard Township.
3	S. J. Bartlett	Geological, Barrie Township.
4	S. J. Bartlett	Magnetometer survey, Barrie Township.
5	Robert Bredberg	Manual work, Marmora Township.
6	J. L. Byer and C. Roger Young	Diamond drilling, Clarendon Township.
7	Canada Talc Industries Limited	Application for pit/quarry, Elzevir Township.
8	Deloro Mine	Plan of surface plant, Marmora Township.
9	Robert Ekstrom	Diamond drilling, Marmora Township.
10	Robert Ekstrom	Core samples submitted, Marmora Township.
11	Robert Ekstrom	Geophysics, Marmora Township.
12	Elgin Silica	Diamond drilling, Bastard Township.
13	Goldbrook Explorations	Diamond drilling, Marmora Township.
14	Goldbrook Explorations	Geophysics, Marmora Township.
15	D. A. Hardie	Geophysics, manual work, Barrie Township.
16	D. A. Hardie	Diamond drilling, Barrie Township.
17	D. A. Hardie and Grandad Resources	Diamond drilling, geophysics, Barrie and Clarendon Townships.
18	D. A. Hardie	Geophysics, Barrie Township.
19	James Harrington	Thin section preparation and examination, Marmora Township.
20	James Harrington	Thin section preparation and examination, Marmora Township.
21	James Harrington	Geophysics, diamond drilling, Marmora Township.
22	James Harrington	Geophysics, Marmora Township.
23	A. D. Houston	Stripping and trenching, Madoc Township.
24	A. D. Houston	Pits and trenches, Madoc Township.
25	A. D. Houston	Rock drilling, Madoc Township.
26	Koizumi Group	Diamond drilling, Kaladar and Sheffield Townships.
27	Lac Minerals	Airborne geophysics, Lavant and Darling Townships.
28	Laisir Gold Incorporated	Feasibility study, Belmont and Marmora Townships.
29	R. W. Lawrence	Geology, Grimsthorpe Township.
30	R. W. Lawrence	Photo geological report, Grimsthorpe Township.
31	C. Longmuir and Roger Young	Diamond drilling, Kaladar Township.
32	C. Longmuir and Roger Young	Diamond drilling, Kaladar Township.
33	A. J. M. Metals Limited	Power stripping, Palmerston Township.
34	A. J. M. Metals Limited	Geology and geophysics, Olden Township.
35	Mono Gold Mines Incorporated	Geophysics, Madoc Township.
36	Mono Gold Mines Incorporated	Geology, Madoc Township.
37	Mono Gold Mines Incorporated	Geophysics, geology, Madoc Township.
38	Robert G. Nash	Diamond drilling, Madoc Township.
39	M. R. D. Limited	Geological mapping, sampling, Bedford Township.
40	Orrwell Energy Corporation Limited	Geophysics, geology, North Burgess Township.
41	John Paterson	Geochemistry, Grimsthorpe Township.
42	G. Pearse	Geophysics, geochemistry, geology, Clarendon Township.
43	G. Pearse	Geophysics, Madoc Township.
44	G. Pearse	Geophysics, Madoc Township.
45	Pike Resources	Geophysics, Grimsthorpe Township.
46	Pike Resources	Geophysics, Grimsthorpe Township.
47	Wayne Pilatzke	Trenching, North Canonto Township.
48	A. Sager	Diamond drilling, Madoc Township.
49	Steep Rock Resources Incorporated	Diamond drilling, Kaladar Township.
50	Steep Rock Resources Incorporated	Diamond drilling, Darling Township.
51	Steep Rock Resources Incorporated	Geology, Hungerford Township.
52	Sulpetro Minerals Limited	Geophysics, Palmerston Township.
53	Terra Surveyors and Geoterrex	Geology, Darling Township.
54	Terra Surveyors Limited	Geophysics, geochemistry, Darling Township.
55	Tina Lawrence Management	Geophysics, Tudor Township.
56	Gerard E. Wood	Geology, South Sherbrooke Township.

.....continued

TABLE 2 Continued

Number on Figure	Individual or Company	Activity
57	Roger Young and G. R. Guillet	Diamond drilling, Kalada Township.
58	Walter Yzerdraat	Geophysics, Miller Township.
59	555246 Ontario Limited	Geophysics, Grimsthorpe Township

bonate Rocks (Part 1)", was released in the Spring of 1982 (Papertzan and Kingston 1982a).

Examination of the chemical data for the 1860 samples allowed the selection of 70 sites where CaO exceeded 54%, and $\text{SiO}_2 + \text{Al}_2\text{O}_3$ was <1%. Rock of this composition is chemically suitable for the filler, lime, and whitening industry, and is low in abrasiveness as required for use as fillers. The 70 sites were carefully mapped at a scale of 1:3600 (1 inch to 300 feet) to assess the possible tonnage potential, geological continuity, and chemical consistency over a wider area. An Open File Report, entitled "Appendix to Chemistry of Grenville Carbonate Rocks (Part 2)" was released in 1982 giving trace

element data for 600 of the samples (Papertzan and Kingston 1982b).

Statistical analysis was carried out on all 1912 geochemical analyses to determine elemental associations as well as anomalous levels for use in exploration work. Individual maps of the 72 areas of high potential as well as the statistical analyses was published in mid-1984 in the form of an Ontario Geological Survey Open File Report (Grant and Kingston 1984). This report provided data on the quality and distribution of marble deposits throughout the area, as well as a comprehensive database upon which several companies have already organized extensive geological field programs.

Company responses to the release of data was excellent. At least 4 companies carried out exploration, staking, and drilling programs as a direct result of this project.

In December 1983, at the Ontario Geological Survey Geoscience Research Seminar W. Grant and P.W. Kingston presented a poster display of mapping, statistical data, and chemical analyses designed to promote marble development opportunities.

BARITE-FLUORITE VEINS

An Open File Report on post-Ordovician veins containing calcite, fluorite, barite, celestite, galena, sphalerite, and chalcopryrite is in preparation by D.A. Williams.

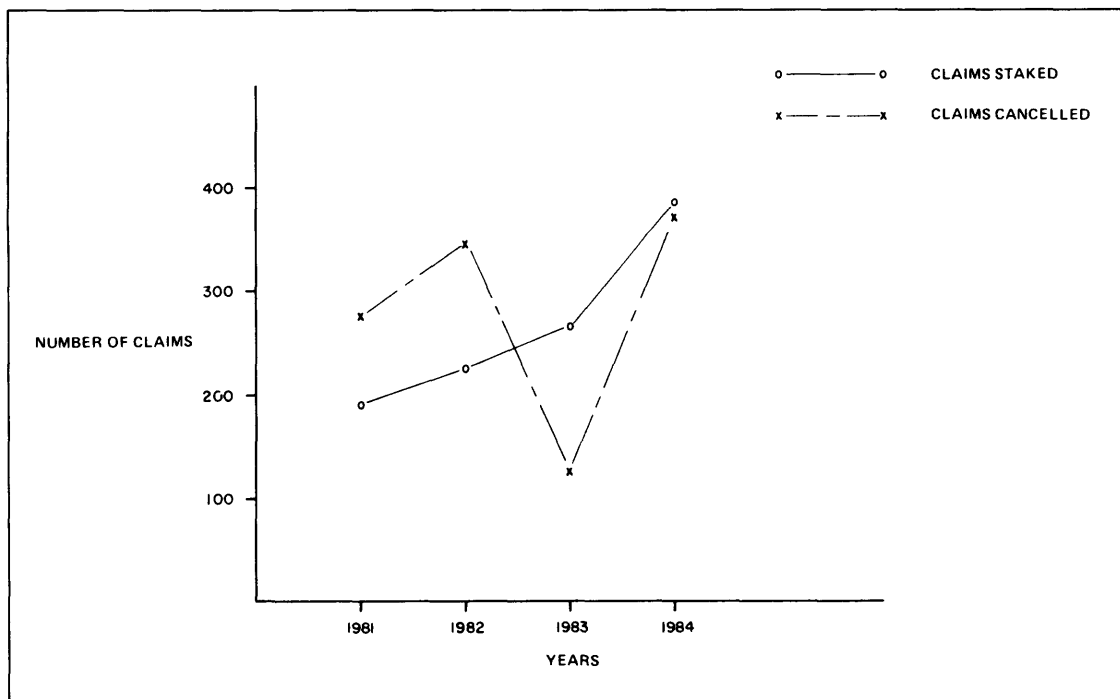


Figure 3. Claims staking and cancellation activity in Eastern Ontario.

Known vein deposits in the Westport, Perth, Carleton Place, and Arnprior-Quyon map areas have been described by Williams and Wolf (1984a, 1984b, 1984c) and Williams, Wolf, and Rae (1984); faults (particularly fault junctions) are important controls for vein localization, and are shown on the maps.

AGGREGATE RESOURCES

Assessments of bedrock aggregate resources of the Eastern Region were initiated this year.

The studies involve compilation of surficial geology and bedrock geology maps with water well records, air photo interpretation, and information collected during field work to determine areas of near-surface bedrock suitable for crushed stone production. First drafts of bedrock aggregate resources maps and reports were prepared for the Counties of Frontenac, Hastings, Lanark, Lennox-Addington, Prince Edward, and Renfrew.

ONTARIO GEOLOGICAL SURVEY ACTIVITIES

Field parties from the Mineral Deposits, Precambrian, and Engineering and Terrain Geology Sections of the Ontario Geological Survey were active in Eastern Region during the 1984 season (Figure 2).

Paleozoic geology maps of part of the Ottawa-St. Lawrence Lowland were published in November 1984. The map areas consist of the following: Ottawa (Williams, Rae, and Wolf 1984); Westport (Williams and Wolf 1984a); Perth (Williams and Wolf 1984b); Carleton Place (Williams and Wolf 1984c); and Arnprior-Quyon (Williams, Wolf, and Rae 1984). Publication of Paleozoic geology maps for the following map areas is planned for 1985: Russell-Thurso, Hawkesbury-Lachute, Alexandria-Vaudreuil, Cornwall-Huntingdon, Winchester, and Morrisburg. A final report on the Paleozoic geology of the Ottawa-St. Lawrence Lowland is in preparation by D.A. Williams.

E.G. Bright (1984) mapped the Mellon Lake area near Tweed at a scale of 1:15 840 or 1 inch to 1/4 mile. This map sheet covers the Claire River Synform.

M.A. Vos (1984) continued industrial mineral studies in Ontario, focusing this year on leucocratic granites in the Westport, Deloro, and Three Duck Lake areas in southeastern Ontario. This study examines these granites as potential sources of ceramic raw materials (feldspar, quartz).

J.S. Springer (1984) continued studies of metallic and industrial minerals in the Grenville Province, in particular gold in the pre-Paleozoic unconformity near Madoc.

C.F. Gleason *et al.* (1984) carried out a shallow overburden sampling program in the Lavant-Darling area to determine the most effective sample media and sampling pattern to utilize in outlining areas of gold mineralization at a regional scale and pinpointing the location of the gold mineralization at a detailed scale. This area is now the subject of a broad-based exploration program by a major company.

GEOLOGICAL MAPPING, EASTERN REGION

The Geology and Mineral Deposits Map of the Kingston Area, compilation sheet (NTS 31C), is now in press. The map is to be published as a preliminary map (scale 1:125 000) in early 1985.

A vermiculite mapping project in conjunction with the Crowe Valley Conservation Authority commenced in late 1984. A map and report will be published in mid-1985. A poster display by Kelly, Papertzian, and Kingston (1984) summarizing this project was exhibited at the Ontario Geological Survey Geoscience Research Seminar and Open House in Toronto.

DRILL CORE LIBRARY

Construction of the core storage facility, located approximately 2 miles north of Tweed, began in

late October 1983, and was completed early in the Spring of 1984. Funding was provided through the Government of Ontario Board of Industrial Leadership and Development (BILD). The core building in Tweed was designed to store approximately 150 000 feet (45 720 m) of core. At present the total footage stored at the complex is 154 710 feet (47 155 m). The extra core is housed in a temporary building and in the yard of the complex. Contributors of core are listed in the accompanying table.

MINERAL EDUCATION PROGRAM

A geology talk and slide show was presented in Belleville for the Quinte Gem and Mineral Club. Publications were sold and distributed at an Ontario Ministry of Natural Resources display at the Ottawa Lapsmith Club Gem Show.

GEOTECHNICAL ENGINEERING PROGRAM

The Regional Mines Coordinator and his staff continued the geotechnical program. This program included mapping of landslide-prone areas, promoting public awareness of landslides and landslide hazard lands, providing consultations for specific sites, and liaison with and planning input to municipalities and conservation authorities. Field trips and information meetings were organized for clerk-treasurers and building inspectors in Prescott and Russell Counties.

An unpublished report, "Terrain Analysis of the South Nation River from Casselman to Lemieux" (Gorrell 1984) was prepared by the South Nation River Conservation Authority, with Ontario Ministry of Natural Resources involvement. This study used integrated geology, geophysics, and engineering to analyze terrain in the earthflow-prone area of marine and estuarine sediments between Casselman and Lemieux. The report recommended reduction of construction setbacks in part of the area, but specified that drained triaxial tests will be required.

Company/Individual	Footage Collected	Commodity	Township
Cordova Gold Mines	9375	Ag, Au	Belmont
Ultimate Energy & Resources	1625	Ag, Au	Anglesea
C.R. Young	175	Mica, Fe	Various Tps.
Selco Inc.	850	Zn	Clarendon
Preussag Canada Ltd	4900	Bld. st., Ca	Belmont
N. Wilson	5500	Zn	Darling
Marmoraton Mining Co. Ltd.	12 400	Fe	Marmora
Lynx-Canada Explorations Ltd.	54 600	Zn	Olden
W.S. Moore Iron Mines	19 200	Fe	Various Tps.
H.R. Lloyd	875	Ag, Au	Madoc
G. Sager	5675	Ag, Au	Madoc
C.R. Young & J. Byers	450	Feldspar	Kaladar
Kaladar Aimko Limited	425	Mica	Kaladar
Grandad Resources Ltd.	3300	Cu, Pb, Zn, Au, Ag	Barrie
Port Elmsley Graphite	150	Graphite	North Elmsley
Ackerman Gold Mines	140	Ag, Au	Marmora
Steep Rock Resources Inc.	300	Talc	Elzevir
Simco Property	5000	Fe	Wood House
Ontario Hydro	14 370	Geotech	Hope
Dynamar Energy Incorporated	500	Fe	North Crosby
Black Gregor Explorations Ltd.	2000	Graphite	North Elmsley
Fairfield Projects Limited	500	Uranium	Palmerston
Total Footage	142 310		

Core remaining to be picked up = 61 100 feet this fall. Total known vandalized core is 61 600 feet.

A major study of slopes along the Ottawa River from Rockland east to l'Original was initiated in the Fall of 1984 (see Figure 4). The objective of this study is to establish engineered construction setbacks for use in planning residential development. The study is jointly funded by the Ontario Ministry of Municipal Affairs and Housing, the Ontario Ministry of Natural Resources, and the United Counties of Prescott and Russell, and will continue into 1985.

SEISMIC SURVEY

L.G.D. Thompson

Regional Geophysicist, Eastern Region, Ontario Ministry of Natural Resources, Tweed.

INTRODUCTION

During the Spring and Summer of 1984, seismic depth-to-bedrock measurements were made at 53 locations (51 measurement sites and 2 test sites) in a critical 35 square mile (90 km²) landslide area surrounding the South Nation River

north of Casselman. The seismic survey was done to provide information on the thickness of the sand and clay above the bedrock and the role the bedrock topography might play in triggering landslides. This work is part of an overall project by the Eastern Regional Office to investigate the cause of the landslides and to identify critical high potential landslide areas. Historically, this area has had a number of very large landslides, more than any other area in Ontario. The most recent slide involving 70 acres occurred in 1971, with a subsequent small flow slide in 1977.

The measurement of depths-to-bedrock ranging from about 20 feet (6 m) to about 165 feet (50 m) using only a Nimbus ES-125 single channel seismograph required special survey techniques. The depth measurements were successfully achieved by the use of a more powerful seismic energy source than a hammer and plate and also a seismic reflection technique developed by the author. The new energy source permitted the refrac-

tion method to be used for depths from about 40 feet (12 m) to over 100 feet (30 m). The reflection technique with the new energy source permitted more rapid surveying with short seismic lines for depths greater than about 60 feet (18 m). The results are given in Imperial measure due to the type of seismic equipment used for the survey.

In the Spring of 1984, seismic reflection profiles with shots at 10-foot (3 m) intervals were also completed by staff of the Resource Geophysics and Geochemistry Division, Geological Survey of Canada, along a north-south farm lane just east of the last landslide of 1971, and along Concession 2 Road west from the lane almost to the South Nation River (see Figure 5). The final results of these profiles are not available for this report. However, preliminary data indicated that bedrock dips more or less uniformly from a depth of about 55 feet (16.5 m) at the junction of the farm lane and Concession 2 Road to about 130 feet (40 m) at the northern end of the lane.

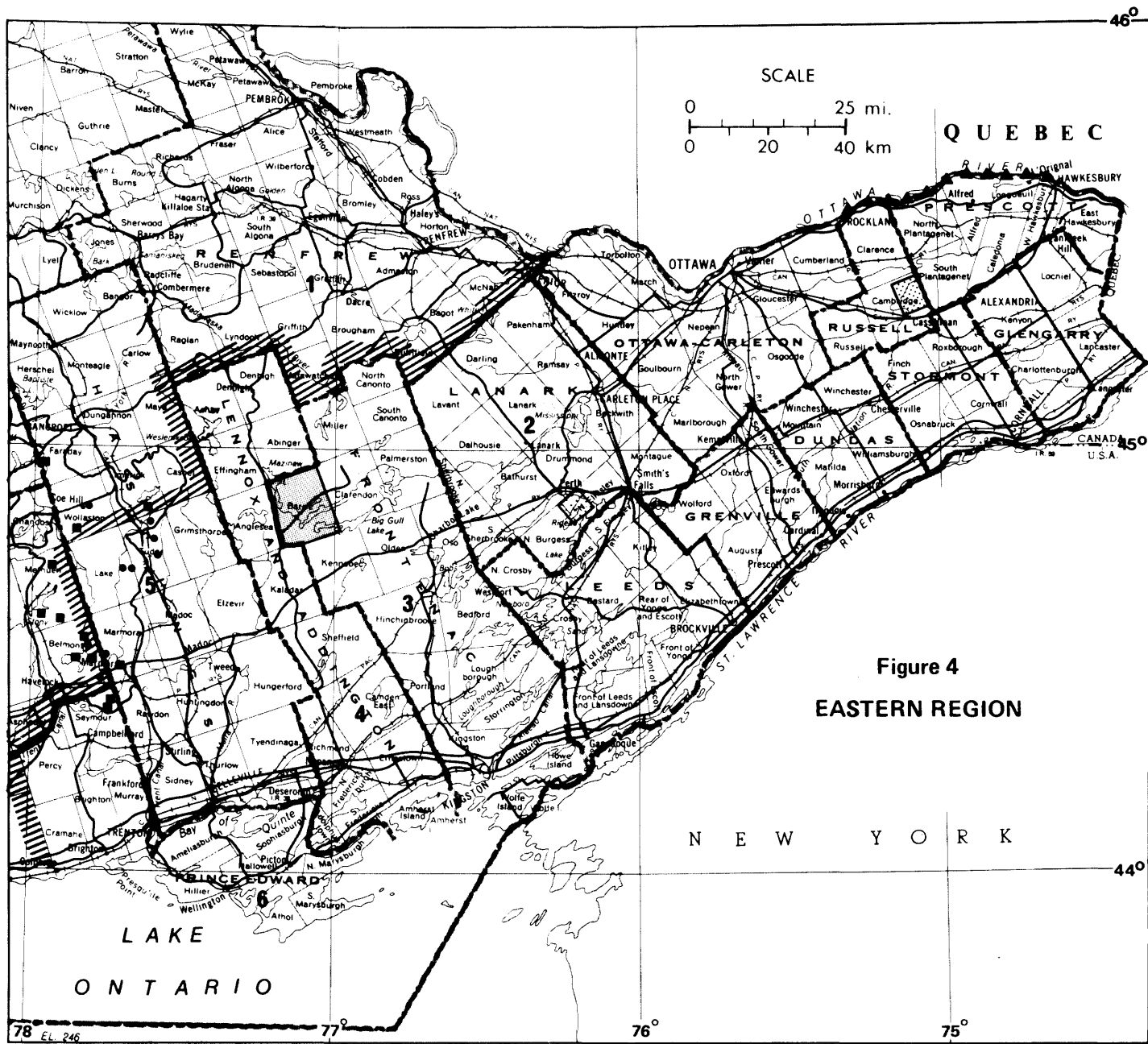










Figure 4
EASTERN REGION

EXPLANATION

-  Summary of Gold Prospects in Barrie Township
-  Geophysical Survey Areas
-  Area of Vermiculite Mapping
-  Boundary of Resident Geologist's Area
-  Setback Study - Ottawa River
-  Crowe Valley Conservation Authority Watershed Boundary
-  Dam Sites Mapped
-  Magnetite Deposits Studied

Going west along Concession 2 Road from the lane, the bedrock dips more steeply toward the South Nation River. Test Sites 1 and 2 were selected on the Geological Survey of Canada profile along the farm lane for comparison purposes. Site 1 was at the southern end of the lane where the depth was about 60 feet (18 m) and both refraction and reflection methods could be used. Site 2 was near the northern end of the lane where the depth was 100 feet (30 m) or more and the reflection technique could be tested.

In addition, a test hole was drilled to bedrock by Eastern Region staff at the location of Test Site 2 of this survey on the same farm lane where the Geological Survey of Canada reflection profile was done (see Figure 5). The drill encountered refusal at a depth of 108 feet (33 m) in compacted till but is believed to have been at or very close to the bedrock surface.

SEISMIC ENERGY SOURCE

The seismic energy source used for this survey was a copy of a device originally designed and developed by the staff of the Terrain Geophysics Section, Resource Geophysics and Geochemistry Division, Geological Survey of Canada. The model fabricated by the author includes some design modifications for simpler construction and easier operation and maintenance. The device fires 12 gauge slugs into the bottom of a 3-foot (1 m) deep hole. It provides a shock wave with at least 6 times the energy of a heavy hammer and plate source. It also provides a higher frequency spectrum more applicable to reflection work.

SURVEY METHOD

The survey method uses a single shot point and the geophone is stepped out at 10-foot (3 m) intervals. Many shots can be fired into a single hole drilled with a hand auger without serious decrease in energy. Usually only one shot is required for reflection lines or short refraction lines. For long re-

fraction lines, it is advisable and was sometimes necessary to use 1 or 2 additional fresh holes to give maximum shock wave energy at the greater distances. Since the shot point is 3 feet (1 m) below the surface, it is usually in or close to the water table and/or a high velocity clay (about 4700 feet per second). Thus no energy is lost going through the upper low velocity surface topsoil layer.

For efficient surveying, the geophone must necessarily be placed on the surface. In areas of clay or no grass cover, such as in the bottom of a road ditch, the geophone could easily be embedded firmly in the ground. In areas of loose sand or grass cover, a hole was dug and the sod removed. The geophone was then firmly embedded in the underlying moist material. By this procedure, the problems associated with surface-planted geophones were reduced or minimized.

SEISMIC REFRACTION LINES

Early work consisting of Test Site 1 and lines C-1 to C-11 was done by the conventional refraction method while awaiting new equipment required for reflection work. The lines were shot in both forward and reverse directions to account for any significant dip of the bedrock surface. Reflection lines C-24, C-37, and C-38 were also done by refraction to determine bedrock velocities. C-51 was a refraction line only. At line C-9, bedrock was too deep for the refraction method and the line was repeated later by reflection.

The advantage and purpose of refraction measurements is that bedrock velocities are obtained to help identify the type of bedrock. Over most of the survey area, the bedrock velocity was found to be unusually high (about 21 000 feet per second on the average). To verify this velocity, a refraction line was run over an outcrop area of Lindsay Formation limestone just east of the survey area. This site, identified as Test Site 3, is on Concession 17 Road of South Plantagenet Township about 3.2

miles east of the western township boundary. The measured velocity confirmed the 21 000 feet per second value and that the area is, in fact, underlain by Lindsay Formation limestone.

REFLECTION TECHNIQUE

The reflection technique has recently been developed to a high degree of perfection for continuous reflection profiling by Hunter *et al.* (1982) using a Nimbus multichannel engineering seismograph, high frequency 100 Hertz geophones, and a microcomputer. Without the benefit of such sophisticated equipment, reflection work with a single channel seismograph is very difficult and has not met with much success by previous experimenters. However, the single channel reflection technique developed by the author did prove satisfactory for mapping the bedrock topography.

The author's reflection technique is a compromise method both in equipment and survey technique for making spot depth-to-bedrock measurements. The equipment used is a Nimbus ES-125 single channel seismograph, a Nimbus ESK-100 recorder, standard 50 Hertz geophones, and the new energy source. Basically, an expanding spread of source to geophone offsets is used following reflection methods described by Dobrin (1960) and Huntet (1972). More particularly, the technique more appropriately makes use of an "optimum window" of offsets described by Hunter *et al.* (1982).

The reflection technique requires both the identification of reflection signals and the visual correlation of a reflection signal from trace to trace (a recorded geophone signal). With shallow refraction seismographs it is difficult to detect reflections at short offsets due to interference from other refraction and surface waves. At large offsets, reflections undergo a phase change that could cause an error in the measured arrival time. The "optimum window" identifies the minimum and maximum offsets where the reflections have little or no interference from later arriving

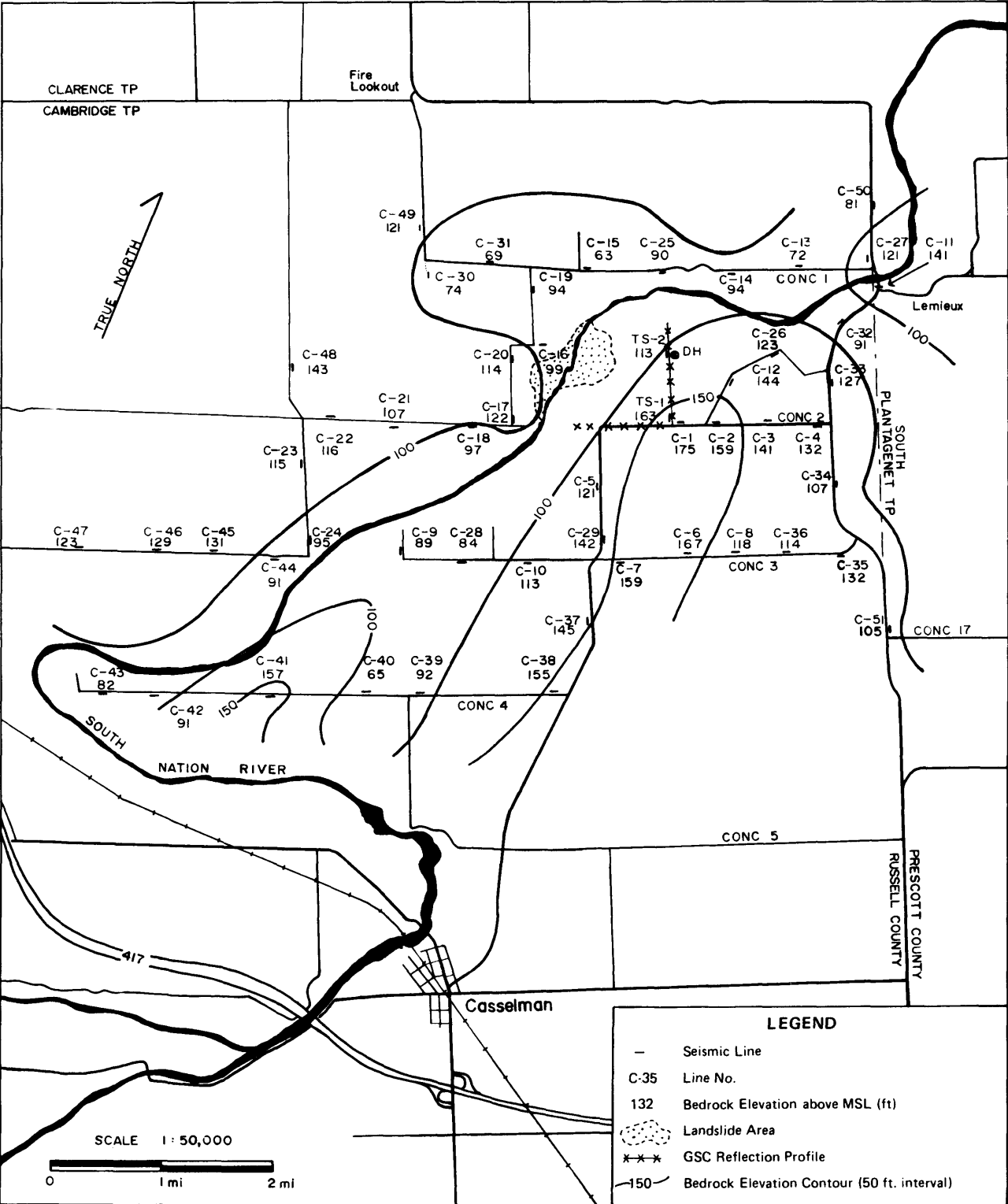


Figure 5. Map of seismic survey with bedrock topography, Casselman area.

refraction signals. In this range of offsets, usable reflections can be obtained for determining average overburden velocities and depths to bedrock.

Using a "normalized" case by taking the ratio of the offset distance x to the depth d , the "optimum window" is taken to be between $x/d=1/2$ to $x/d=2$. Without filtering, reflections near $x/d=1/2$ are not always identifiable. Near $x/d=2$, reflections may also undergo a phase change. This noted immediately on an X^2 vs T^2 plot because the points will curve away from a straight line. Usually offsets greater than $3d/2$ are not recommended. However, the window of $x/d=1/2$ to $x/d=2$ is used to ensure that all possible usable reflections are obtained. Also, the points at $x/d=1/2$, 1, $3/2$, and 2 are useful for simple calculation purposes.

Usually some part of a reflection signal (a peak or trough) can be identified at most offsets in the "optimum window". Usually 1 or more complete reflection signals are also obtained which give the accurate arrival time of the onset of the reflection wave. A peak or trough that is correlated from trace to trace can be corrected to the time of the onset by measuring the period of the reflection wave.

Visual trace to trace correlation of a reflection signal is accomplished by recording the geophone signal (a trace) displayed on the screen of the ES-125 seismograph at each offset distance on an ESR-100 single channel strip chart recorder. Although the trace records could be cut and stacked 1 below the other to give the equivalent of a multichannel record, a reflection wave can easily be correlated from trace to trace along the strip chart using a peak or trough.

The offset distance and arrival times are plotted on square-square paper to give an X^2 vs T^2 plot. For true reflections, these points plot in a straight line. The inverse slope of the line gives the average velocity of the overburden above bedrock. The ordinate intercept gives the travel time of a shock wave verti-

cally below the shot point. From these data, the depth-to-bedrock below the shot point can be easily calculated.

This reflection method is satisfactory for depths of 60 feet (18 m) or more but 100 feet (30 m) is perhaps a better minimum depth. Reflection lines can be done more easily and rapidly than refraction lines. A shorter line (usually from 50 to 200 feet (15 to 60 m)) and fewer shot points (16 shots) are needed. An advantage of this reflection method is that the average velocity of the overburden is obtained. However, it does not give (in this survey) the bedrock velocity or topsoil velocity which are determined by the refraction method.

RESULTS

The survey results are given in Table 2a. The seismic depth measurements have been adjusted to give depths below road or land surface and are considered accurate to $\pm 10\%$. The mean sea level (MSL) elevation at each line location was estimated from spot elevation, bench marks, and contours shown on 1:50 000 scale topographic map 31 G/6 for the area. These MSL elevations are no better than ± 10 feet (3 m). By subtraction, the bedrock elevations above MSL were obtained. The accuracy of these elevations is not high but the data serve the purpose. Figure 5 is a map of the area showing the line locations, MSL bedrock elevations, bedrock contours, and other information.

From visual inspection of outcrops and the high seismic velocities, the bedrock is now known and accepted to be Lindsay limestone and not a shale as previously believed. The bedrock has an irregular undulating topography developed by very early erosional processes. The limestone has been eroded down to hard, dense, competent and thick layers having an extremely high seismic velocity of about 21 000 feet per second. In places of higher bedrock elevation above about 130 feet (40 m), the layers are thinner, more fractured,

and have a lower seismic velocity of about 16 000 feet per second.

The bedrock contours show a trough or depression extending along the present course of the South Nation River. This is interpreted to be a fault zone that was more easily eroded or perhaps downfaulted. There is evidence of downfaulting just north of Lemieux. Here the bedrock is exposed in the river but drops away suddenly where the river turns to the north. The seismic data show that the bedrock drops from about 120 feet (36.5 m) above MSL to 80 feet (24.5 m), a drop of about 40 feet (12 m).

CONCLUSIONS

1. The new energy source and reflection technique proved to be effective and useful for spot depth measurements greater than 40 feet (12 m) using a single channel seismograph.
2. The seismic data confirmed that the area was underlain by Lindsay Formation limestone.
3. The bedrock topography indicated a fault zone in a bedrock depression that follows along the present course of the South Nation River. The sloping of the bedrock towards the river, combined with the local increased thickness of sand and clay in the eroded valley, could play a role in the occurrence of landslides.
4. This work has been useful for updating the geological map of the area for more accurate location of faults.

ACKNOWLEDGMENTS

Much credit for this work must go to the Eastern Region senior staff members who recognized the usefulness of geophysics and supported the seismic survey, more particularly John Oatway, Regional Director; Eric Gage, Deputy Regional Director; Tom Fletcher, Regional Mines Coordinator; and Paul Kingston, Regional Geologist. Assistance and advice was also received from James Hunter, Susan Pullan, and Robert Gagne of the Resource Geophysics and Geo-

SUMMARY OF SEISMIC RESULTS

TABLE 2a

Line No.	Location	Type	Velocities ¹ (Ft./Sec.)	Depth Below Surface (Ft.)	Surface MSL Elev. (Ft.)	Bedrock MSL Elev. (Ft.)
Test Site 1	Lane N. of Conc.2	RR ²	V ₁ = 5,100	62	225	163
		RX ³	V ₂ =21,000			
Test Site 2	Lane N. of Conc.2	RX	V ₁ = 5,100	112	225	113
Test Site 3	Conc.17	RR	V ₂ =21,000	-	-	-
C-1	Conc.2	RR	V ₀ = 1,100	50	225	175
			V ₁ = 4,800			
			V ₂ =18,000			
C-2	Conc.2	RR	V ₀ = 2,500	66	225	159
			V ₁ = 5,000			
			V ₂ =17,000			
C-3	Conc.2	RR	V ₁ = 4,900	84	225	141
			V ₂ =16,000			
C-4	Conc.2	RR	V ₀ = 1,500	93	225	132
			V ₁ = 4,900			
			V ₂ =15,000			
C-5	Rd. S. of Conc.2	RR	V ₁ = 4,800	89	210	121
			V ₂ =20,000			
C-6	Conc.3	RR	V ₀ = 650	43	210	167
			V ₁ = 4,800			
			V ₂ =15,000			
C-7	Conc.3	RR	V ₀ = 650	51	210	159
			V ₁ = 4,500			
			V ₂ =23,000			
C-8	Conc.3	RR	V ₀ = 1,200	97	215	118
			V ₁ = 4,600			
			V ₂ =23,000			
C-9	Conc.3	RX	V ₁ = 4,600	111	200	89
C-10	Conc.3	RR	V ₀ = 1,300	87	200	113
			V ₁ = 4,400			
			V ₂ =21,000			
C-11	Under Lemieux Bridge	RR	V ₀ = 500	19	160	141
			V ₁ = 5,500			
			V ₂ =16,000			
C-12	Rd. N. of Conc.2	RX	V ₁ = 4,900	81	225	144
C-13	Conc.1	RX	V ₁ = 4,400	153	225	72
C-14	Conc.1	RX	V ₁ = 4,500	131	225	94
C-15	Conc.1	RX	V ₁ = 4,900	162	225	63
C-16	Rd. S. of Conc.1	RX	V ₁ = 4,500	116	215	99
C-17	Martels Corners	RX	V ₁ = 3,900	63	185	122
C-18	Conc.2	RX	V ₁ = 4,800	103	200	97
C-19	Rd. S. of Conc.1	RX	V ₁ = 4,400	131	225	94
C-20	Rd. S. of Conc.1	RX	V ₁ = 4,600	101	215	114
C-21	Conc.2	RX	V ₁ = 4,900	118	225	107
C-22	Conc.2	RX	V ₁ = 4,500	109	225	116
C-23	Rd. between Conc.2&3	RX	V ₁ = 4,600	110	225	115
C-24	Rd. between Conc.2&3	RX	V ₁ = 4,700	120	215	95
		RR	V ₂ =23,000			
C-25	Conc.1	RX	V ₁ = 4,400	135	225	90
C-26	Rd. N. of Conc.1	RX	V ₁ = 4,900	102	225	123
C-27	Conc.1	RX	V ₁ = 4,600	104	225	121
C-28	Conc.3	RX	V ₁ = 4,900	116	200	84
C-29	Rd. N. of Conc.3	RX	V ₁ = 4,600	68	210	142
C-30	S. of Conc.1	RX	V ₁ = 5,100	156	230	74
C-31	Conc.1	RX	V ₁ = 4,800	161	230	69
C-32	Hwy. S. of Lemieux	RX	V ₁ = 4,700	134	225	91
C-33	Hwy. S. of Lemieux	RX	V ₁ = 4,800	98	225	127
C-34	Hwy. between Conc.2&3	RX	V ₁ = 4,900	113	220	107
C-35	Conc.3	RX	V ₁ = 4,700	88	220	132
C-36	Conc.3	RX	V ₁ = 4,800	106	220	114
C-37	Rd. between Conc.3&4	RR	V ₀ = 1,200	70	215	145
		RX	V ₁ = 4,700			
			V ₂ =21,000			

SUMMARY OF SEISMIC RESULTS

TABLE 2a CONTINUED

Line No.	Location	Type	Velocities ¹ (Ft./Sec.)	Depth Below Surface (Ft.)	Surface MSL Elev. (Ft.)	Bedrock MSL Elev. (Ft.)
C-38	Conc.4	RX	V ₁ = 4,700	45	200	155
		RR	V ₂ =18,000			
C-39	Conc.4	RX	V ₁ = 4,400	108	200	92
C-40	Conc.4	RX	V ₁ = 5,100	135	200	65
C-41	Conc.4	RX	V ₁ = 4,500	58	215	157
C-42	Conc.4	RX	V ₁ = 4,700	109	200	91
C-43	Conc.4	RX	V ₁ = 4,500	118	200	82
C-44	Conc.3	RX	V ₁ = 4,600	124	215	91
C-45	Conc.3	RX	V ₁ = 4,300	94	225	131
C-46	Conc.3	RX	V ₁ = 4,400	101	230	129
C-47	Conc.3	RX	V ₁ = 3,800	102	225	123
C-48	Rd. between Conc.1&2	RX	V ₁ = 4,900	82	225	143
C-49	Rd. N. of Conc.1	RX	V ₁ = 4,600	109	230	121
C-50	Hwy. N. of Lemieux	RX	V ₁ = 4,600	144	225	81
C-51	Hwy. N. of Conc.17	RR	V ₁ = 4,700	95	200	105
			V ₂ =20,000			

¹ V₀ - Topsoil; V₁ - Sand, clay overburden/water table; V₂ - Bedrock.

² RR - Refraction Line.

³ RX - Reflection Line.

chemistry Section, Geological Survey of Canada. A special thanks goes to Robert Brunette, Forest Operations Manager, Larose Forest Headquarters in Bourget who provided living accommodations during the survey. Thanks are also extended to all the summer students who worked so hard during the field work. In particular, Rick Renouf who also assisted in the seismic data reduction and prepared the map accompanying this report.

PITS AND QUARRIES - NAPANEE, TWEED, AND BROCKVILLE DISTRICTS

S. Thatcher

Mineral Resources Supervisor, Napanee, Tweed, and Brockville Districts.

The Mineral Resources staff in Napanee commented on numerous severances, zoning by-laws, and official plan amendments throughout the 3 districts. These comments dealt with the protection of viable aggregate reserves from incompatible land uses and to ensure that proposed land use or development would not significantly preclude or hinder extraction. A total of 60

planning documents were reviewed.

Table 3 shows the distribution of licenced pits and quarries in those townships that are designated under the Pits and Quarries Control Act. A total of 73 townships are under the administrative responsibility of Napanee, with 41 geographic townships being designated under the Act. Tables 4, 5, and 6 give the reported production figures for licenced operators in designated areas.

ABANDONED PITS AND QUARRIES STUDY

The abandoned pit and quarry study continued from 1982 to 1984, to locate and describe briefly the Quaternary and Paleozoic geology of Prince Edward County. A total of 8 townships were inventoried, 1 being in Hastings County. Table 7 shows the number of sites inventoried in 1984. These sites were then rated as: (a) depleted, (b) moderate, (c) substantial reserves.

INACTIVE HAZARDOUS MINE SITES INVENTORY

The hazardous mines inventory was initiated in 1983. However,

the program was curtailed in 1984 due to higher priorities in other programs. The Napanee District did respond to 8 complaints regarding hazardous sites in the Tweed area and remedial action may be undertaken this fall.

PITS AND QUARRIES CORNWALL DISTRICT

M. MacDonald

Mineral Resources Supervisor, Cornwall, and Ottawa-Carleton Districts.

The statistics for Cornwall District are summarized in Tables 8 through 11.

REFERENCES

Bright, F.G.

1984: Mellon Lake Area, Hastings and Lennox and Addington Counties; p.82-87 in Summary of Field Work 1984, by the Ontario Geological Survey, edited by John Wood, Owen L. White, R.B. Barlow, and A.C. Coivine, Miscellaneous Paper 119, 309p.

TABLE 3. LICENCED PITS AND QUARRIES IN NAPANEE, TWEED, AND BROCKVILLE DISTRICTS*

District	Licensed Quarries	Licensed Pits	Licensed Quarries and Pits
Napanee	34	132	3
Tweed	10	55	2
Brockville	22	75	3
Totals	66	262	8

*Only a portion of both Tweed and Napanee Districts are designated under the Pits and Quarries Control Act.

TABLE 4. REPORTED AGGREGATE PRODUCTION BY TOWNSHIP FROM LICENCED OPERATORS IN NAPANEE DISTRICT UNDER THE PITS AND QUARRIES CONTROL ACT

TOWNSHIP	1981 Tonnes	1982 Tonnes	1983 Tonnes
Ameliasburgh	60 036	20 324	12 131
Athol	40 801	49 824	50 348
Brighton	197 780	266 578	184 546
Cramahe	1 548 672	1 275 435	1 035 460
Hallowell	45 918	19 324	44 099
Hillier	19 737	42 301	15 295
Kingston	498 984	592 636	745 439
Murray	343 251	263 683	436 159
North Marysburgh	1 745	2 421	3 725
Percy	77 138	47 567	71 751
Pittsburg	161 848	118 657	151 027
Rawdon	8 902	18 058	7 602
Seymour	148 234	139 230	162 856
Sidney	469 407	342 686	267 040
Sophiasburg	560 394	1 226 317	1 331 520
South Marysburgh	3 223	1 740	511
Thurlow	192 852	97 370	127 832
Tyendinaga	144 085	132 466	146 804
TOTALS	4 559 007	4 656 617	4 801 145

TABLE 5. REPORTED AGGREGATE PRODUCTION BY TOWNSHIP FROM LICENCED OPERATORS IN TWEED DISTRICT UNDER THE PITS AND QUARRIES CONTROL ACT

*TOWNSHIP	**1981 Tonnes	1982 Tonnes	1983 Tonnes
Elzevir	6 963	1 830	19 254
Grimsthorpe	-	-	-
Hungerford	86 507	161 715	107 967
Huntingdon	43 645	98 185	108 350
Lake	761	333	1 590
Madoc	15 711	31 605	51 854
Marmora	10 451	22 303	36 012
Tudor	-	-	-
TOTALS	<u>164 038</u>	<u>315 971</u>	<u>325 027</u>

*Denotes geographic townships

**The 1981 totals are for the second half of that year, July 1 - December 31.

TABLE 6. REPORTED AGGREGATE PRODUCTION BY TOWNSHIP FROM LICENCED OPERATORS IN BROCKVILLE DISTRICT UNDER THE PITS AND QUARRIES CONTROL ACT

TOWNSHIP	1981 Tonnes	1982 Tonnes	1983 Tonnes
Augusta	88 792	171 867	75 316
Bastard	4 558	629	8 217
South Burgess	5 098	2 166	7 979
North Crosby	3 119	70 728	67 951
Edwardsburg	2 223	12 389	6 186
Elizabethtown	170 729	226 522	227 468
South Elmsley	500	20 283	7 242
South Gower	47 521	14 780	33 558
Kitely	2 026	17 979	28 104
Front of Leeds and Lansdowne	11 232	34 988	53 274
Rear of Leeds and Lansdowne	188 751	306 628	309 935
Oxford-on-Rideau	2 751	4 486	5 192
Wolford	14 719	73 114	179 212
Front of Yonge	8 593	7 151	4 373
Rear of Yonge and Escott	47 710	105 705	114 943
TOTALS	<u>598 322</u>	<u>1 069 415</u>	<u>1 128 950</u>

TABLE 7. ABANDONED PITS AND QUARRIES STUDY

TOWNSHIP	COUNTY	PITS	QUARRIES
Ameliasburg	Prince Edward	10	9
Athol	Prince Edward	5	1
Hillier	Prince Edward	-	3
Hallowell	Prince Edward	13	5
North Marysburgh	Prince Edward	-	12
Sophiasburg	Prince Edward	3	3
South Marysburgh	Prince Edward	3	7
Huntingdon	Hastings	22	1
TOTALS		<u>56</u>	<u>41</u>

TABLE 8. LICENCED PITS, QUARRIES, AND PITS/QUARRIES FOR 1984 CORNWALL DISTRICT				
County/Township	Licensed Pits	Licensed Quarries	Licensed Pits/Quarries	Total
A. STORMONT COUNTY				
1. Osnabrock Tp.	16	2	0	18
2. Cornwall Tp.	32	5	0	37
3. Roxborough Tp.	23	3	0	26
4. Finch Tp.	6	4	1	11
				<u>92</u>
B. DUNDAS COUNTY				
1. Matilda Tp.	8	2	0	10
2. Mountain Tp.	8	2	0	10
3. Williamsburg Tp.	0	3	0	3
4. Winchester Tp.	10	1	0	11
				<u>34</u>
C. GLENGARRY COUNTY				
1. Lancaster Tp.	1	1	0	2
2. Lochiel Tp.	4	0	0	4
3. Charlottenburg Tp.	4	0	0	4
4. Kenyon Tp.	16	3	0	19
				<u>29</u>
D. PRESCOTT COUNTY				
1. Alfred Tp.	6	1	0	7
2. N. Plantagenet Tp.	5	0	0	5
3. S. Plantagenet Tp.	4	1	0	5
4. Longueuil Tp.	0	1	0	1
5. Caledonia Tp.	1	2	1	4
6. W. Hawkesbury Tp.	17	0	0	17
7. E. Hawkesbury Tp.	7	0	0	7
				<u>46</u>
E. RUSSELL COUNTY				
1. Clarence Tp.	11	1	0	12
2. Russell Tp.	4	3	0	7
3. Cambridge Tp.	5	1	0	6
				<u>25</u>
GRAND TOTAL				226

AGGREGATE PRODUCTION FROM LICENCED PITS AND QUARRIES DURING THE YEAR. 1981

TABLE 9

CORNWALL DISTRICT

County	Townships	Number of Licenced Pits and Quarries	Sand and Gravel (Tonnes)	Stone (Tonnes)	Clay and Shale (Tonnes)	Total (Tonnes)
Stormont	Cornwall		6,872.36	198,448.45		205320.81
	Osnabruck		15,442.28	6,369.00		21811.28
	Finch		29,712.78	52,212.25		81925.03
	Roxborough		13,255.00	15,132.24		28377.24
Dundas	Matilda		21,677.82	21,944.00		43621.82
	Mountain		68,628.90	-		68628.90
	Winchester		48,078.34	-		48078.34
	Williams-burgh		-	110,365.00		110365.00
Glengarry	Lancaster		-	34,705.90		34705.90
	Lochiel		145,367.00	-		145367.00
	Charlotten-burgh		480.00	-		480.00
	Kenyon		47,616.95	-		47616.95
Prescott	Alfred		640.00	-		640.00
	Longueuil		-	116,218.86		116218.86
	S. Plantagenet		27,350.21	-		27350.21
	N. Plantagenet		11,422.00	-		11422.00
	E.Hawkes-bury		43,611.60	24,370.00		67981.60
	W.Hawkes-bury		7,890.00	-		7890.00
	Caledonia		8,340.00	9,570.00		17910.00
Russell	Russell		74,847.35	-		75709.35
	Clarence		59,886.71	46,757.00		106643.71
	Cambridge		26,143.00	-		26143.00
<u>TOTAL FOR 1981</u>						1294207.00

AGGREGATE PRODUCTION FROM LICENCED PITS AND QUARRIES DURING THE YEAR. 1982

TABLE 10

CORNWALL DISTRICT

County	Townships	Number of Licenced Pits and Quarries	Sand and Gravel (Tonnes)	Stone (Tonnes)	Clay and Shale (Tonnes)	Total (Tonnes)
Stormont	Cornwall		22,256.50	370,512.00		392768.50
	Osnabruck		11,532.50	34,347.00		45879.50
	Finch		29,147.63	114,300.29		143447.92
	Roxborough		11,428.17	55,558.24		66986.41
Dundas	Matilda		44,646.00	64,181.00		108827.00
	Mountain		175,709.40	-		175709.40
	Winchester		93,963.65	-		93963.65
	Williams- burgh		-	95,433.00		95433.00
Glengarry	Lancaster		-	116,642.30		116642.30
	Lochiel		24,936.23	-		24936.23
	Charlotten- burgh		1,890.00	-		1890.00
	Kenyon		23,682.65	-		23682.65
Prescott	Alfred		1,495.00	-		1495.00
	Longueuil		-	125,469.95		125469.95
	S. Plan- tagenet		58,814.76	20,097.00		78911.76
	N. Plan- tagenet		5,076.25	-		5076.25
	E. Hawkes- bury		81,935.00	48,879.00		130814.00
	W. Hawkes- bury		13,739.03	-		13739.03
	Calendonia		3,748.00	14,065.00		17813.00
Russell	Russell		117,881.00	44,956.90		162837.90
	Clarence		70,040.65	94,020.00		164060.65
	Cambridge		17,948.00	-		17948.00
TOTAL FOR 1982						1988235.10

AGGREGATE PRODUCTION FROM LICENCED PITS AND QUARRIES DURING THE YEAR. 1983

TABLE 11

CORNWALL DISTRICT

County	Townships	Number of Licenced Pits and Quarries	Sand and Gravel (Tonnes)	Stone (Tonnes)	Clay and Shale (Tonnes)	Total (Tonnes)
Stormont	Cornwall		219,427.20	613,027.00		832454.20
	Osnabruck		3,501.80	91,681.86		95183.66
	Finch		214,104.23	-		214104.23
	Roxborough		28,498.92	28,730.25		57229.17
Dundas	Matilda		35,287.00	2,664.00		37951.00
	Mountain		222,385.79	-		222385.79
	Winchester		93,578.11	-		93578.11
	Williams-burgh		-	99,602.00		99602.00
Glengarry	Lancaster		-	83,366.50		83366.50
	Lochiel		55,279.17	-		55279.17
	Charlotten-burgh		2,180.00	-		2180.00
	Kenyon		113,751.60	-		113751.60
Prescott	Alfred		3,720.00	-		3720.00
	Longueuil		-	225,805.00		225805.00
	S. Plan-tagenet		44,512.30	27,256.00		71768.30
	N. Plan-tagenet		15,460.80	-		15460.80
	E. Hawkes-bury		67,297.04	-		67297.04
	W. Hawkes-bury		11,623.53	-		11623.53
	Caledonia		2,830.00	2,730.00		5560.00
Russell	Russell		156,836.30	71,043.69		227879.99
	Clarence		108,765.88	112,217.00		220982.88
	Cambridge		33,631.00	-		33631.00
TOTAL FOR 1983						2790793.97

- Dobrin, M.B.
1960: Introduction to Geophysical Prospecting; McGraw-Hill, New York.
- Gleeson, C.F., Rampton, V.N., Thomas, R.D., and Paradis, S.
1984: Grant 065 Development and Adaptation of Geochemical Techniques to Gold Exploration in Glacial Drift; p.129-149 in Summary of Research 1983-1984 by the Exploration Technology Development Program of the Board of Industrial Leadership and Development, edited by V.G. Milne and R.B. Barlow, Ontario Geological Survey, Miscellaneous Paper 120, 176p.
- Gorrell, G.A.
1984: Terrain Analysis of the South Nation River from Casselman to Lemieux; unpublished report prepared for the South Nation River Conservation Authority, Berwick, Ontario, June 15, 1984.
- Grant, W.T., and Kingston, P.W.
1984: Geology and Geochemistry of Grenville Marble in South-eastern Ontario; Ontario Geological Survey, Open File Report 5509, 297p., 4 tables, 27 figures, 4 photos, and 1 map in back pocket.
- Huntec (70) Limited
1972: FS-3 Facsimile Seismograph Operator's Manual; Revised 1972, Toronto.
- Hunter, J.A., Burns, R.A., Good, R.L., MacAulay, H.A., and Gagne, R.M.
1982: Optimum Field Techniques for Bedrock Reflection Mapping with the Multichannel Engineering Seismograph; p.125-129 in Current Research, Part B, Geological Survey of Canada, Paper 82-1B.
- Kelly, W., Papertzian, V.C., and Kingston, P.W.
1984: Vermiculite in Eastern Ontario; Poster Display, Ontario Geological Survey Geoscience Research Seminar, Toronto, December 4 and 5, 1984.
- Northern Miner, The
1984: Underground Exploration for Lasir Gold; Northern Miner Press Limited, June 21, p.47.
- Papertzian V.C.
1984: A Summary of Gold Prospects in Barrie Township; published by the Township of Barrie, Cloyne, Ontario, 67p. Copies available through the Resident Geologist Office, Tweed.
- Papertzian, V.C., and Kingston, P.W.
1982a: Chemistry of Grenville Carbonate Rocks; Ontario Geological Survey, Open File Report 5378 (Part 1), 81p., 1 figure, 1 table, 1 map.
1982b: Appendix to Chemistry of Grenville Carbonate Rocks; Ontario Geological Survey, Open File Report 5378 (Part 2), 33p.
- Springer, J.S., and Mussakowski, R.
1984: Colour Clues to Archean Weathering; Ontario Geological Survey, Geoscience Research Seminar, Toronto, December 4 and 5, 1984.
- Vos, M.A.
1984: Granite and Anorthosite as Ceramic Raw Materials, p.252-255 in Summary of Field Work 1984, by the Ontario Geological Survey, edited by John Wood, Owen L. White, R.B. Barlow, and A.C. Colvine, Miscellaneous Paper 119, 309p.
- Williams, D.A., and Wolf, R.R.
1984a: Paleozoic Geology of the Westport Area; Ontario Geological Survey, Map P.2723, Geological Series-Preliminary Map, scale 1:50 000.
1984b: Paleozoic Geology of the Perth Area; Ontario Geological Survey, Map P.2724, Geological Series-Preliminary Map, scale 1:50 000.
1984c: Paleozoic Geology of the Carleton Place Area; Ontario Geological Survey, Map P.2725, Geological Series-Preliminary Map, scale 1:50 000.
- Williams, D.A., Wolf, R.R., and Rae, A.M.
1984: Paleozoic Geology of the Arnprior-Quyon Area; Ontario Geological Survey, Map P.2726, Geological Series-Preliminary Map, scale 1:50 000.
- Williams, D.A., Rae, A.M., and Wolf, R.R.
1984: Paleozoic Geology of the Ottawa Area; Ontario Geological Survey, Map P.2716, Geological Series-Preliminary Map, scale 1:50 000.

Central Regional Geologist Area, Central Region

Mahendra Narain¹ and Jackie Burkart²

¹Regional Geologist, ²Resource Geologist, Ontario Ministry of Natural Resources, Central Region

INTRODUCTION

Geoscience information and consultative services continued to be provided from the Regional Geologist's Office at Richmond Hill and the district offices at Cambridge, Maple, Lindsay, Fonthill, and Midhurst. The user groups for this information included various federal and provincial government agencies, private consulting firms, prospectors, aggregate industry, and the general public.

There was a general increase in requests for information relating to mining and petroleum resources. Several inquiries for investment opportunities originated in the United States and one in Germany. The current interest is in resources related to building stone, high purity limestone, mica, and tile manufacture. Some companies are interested in setting up tile plants in the Central Region.

The regional geoscience library now has a large collection of microfiche files along with the reader and printer facilities. All geoscience information has been catalogued and indexed and is available to interested parties on request.

Production of mineral aggregates in 1983 showed a slight increase of about 6.4% over 1982 production in the Central Region. The number of licenced operations in the Region in 1984 stood at 866, showing a slight decrease over 1983.

The 3 gypsum mines in the Region continued their operations with increased production during the year and some expanded their operations.

Current staff at the regional office included: Martin Groneng, Regional Lands and Minerals Coordinator, Jackie Burkart, Resource Geologist, and June Feeney, Secretary.

Geological staff at the district offices included: Ted Harvey (Cambridge), Amar Mukherjee (Maple), Tom Cumby (Lindsay), John Fraser (Fonthill), and Bill Fitzgerald (Midhurst).

The Regional Geologist administered and initiated programs related to promotion of regional mineral resources, geoscience information services, data gathering, and mineral resources management. Technical support and direction was provided to district programs and staff.

REGIONAL GEOLOGIST'S ACTIVITIES

RESOURCES AND LAND USE PLANNING

The Regional Geologist spent most of his time initiating and coordinating several mineral resources studies in the Region. The second stage of study on the depositional characteristics of Whirlpool Sandstone resources was continued through the year by Dr. Peter Martini and James Kwong of Guelph University. The draft report on this study was reviewed by the Regional Geologist and others and is now being finalized for publication as an Open File Report, expected to be available in March 1985.

Another project on evaluation of shale and clay resources of the Region was initiated. This project was started when several inquiries were received by the Region regarding the suitability of these resources for the manufacture of roofing tiles, and wall and floor ceramic tiles. Dr. Martini and James Kwong of Guelph University are the principal investigators, and the Regional Geologist worked very closely with them during sampling of resource sites and testing procedures. Fifty (50) resource sites were examined and sampled with the help of district staff; out of these, 16 sites were selected for detailed testing. All testing has been completed and the report is under preparation. It is expected that the report will be available as an Open File Report by the middle of 1985. The results of this study have been very encouraging and several sites have been found to be satisfactory. It is proposed to continue the study during 1985-86 on molded products to determine the

suitability of resources for manufacture of specific molded products. The Regional Geologist and the district staff conducted geological tours for the individuals who showed interest in the Region's mineral resources.

The Regional Geologist assisted the 5 districts in planning their licenced pit and quarry and aggregate resources evaluation projects which are now being undertaken and may continue over several years. Both the districts and the Region are now planning projects that will assist in the promotion, conservation, and proper utilization of the regional mineral resources, and assist both levels of the municipal governments in their planning process. The Regional Geologist, along with the Maple District and other ministry staff from Parks and Ontario Geological Survey, participated in planning the preservation of important geological features at the Don Valley brickyard site. Consultations were provided to the staff of C. Mirza Engineering Incorporated and Peter Martini and Associates of Guelph, who are working on several projects in the Region.

The following is a list of some of the geological and mineral resources inputs that were made by the regional and district staff:

Regions of Durham, Haldimand-Norfolk, Niagara, Waterloo

Counties of Victoria, Peterborough, Wellington

Townships of Ops, Hamilton, South Monaghan, Hope, Wainfleet, Glanbrook

Towns of Pelham, Grimsby, Dunnville, Pickering, Richmond Hill, Ancaster, Milton, Newcastle

Cities of Stoney Creek, Oshawa.

CONSULTATION AND EDUCATIONAL SERVICES

The regional office at Richmond Hill and the 5 district offices at Cambridge, Maple, Midhurst, Lind-

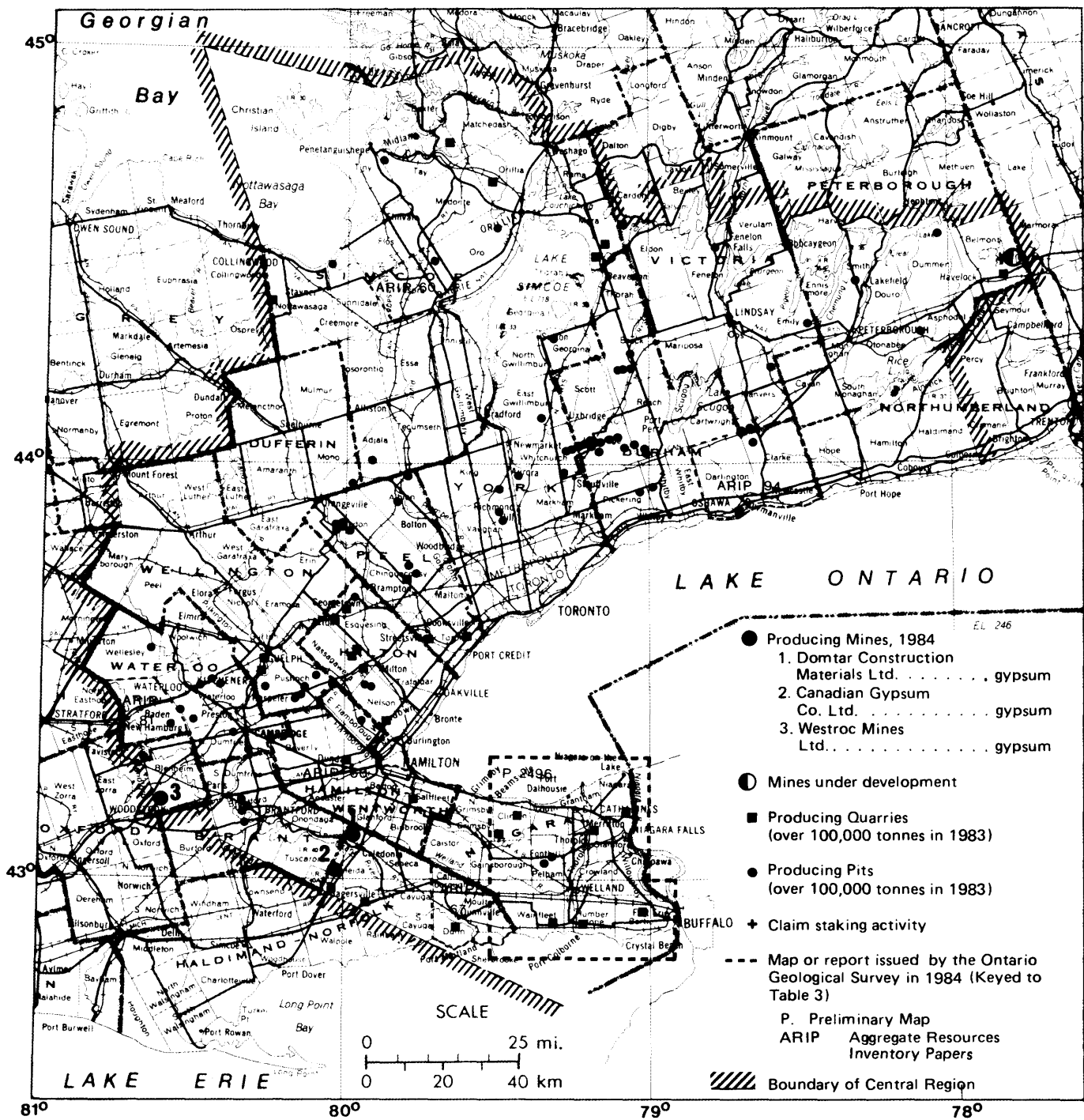


Figure 1
CENTRAL REGION

TABLE 1. LICENCED PITS AND QUARRIES IN THE CENTRAL REGION 1984

DISTRICT	LICENCED QUARRIES	LICENCED PITS
Maple	10	142
Cambridge	22	206
Niagara	19	15
Lindsay	14	246
Huron	11	181
TOTAL	76	790

say, and Fonthill continued to provide consultation related to geology and mineral resources legislation. Some inquiries were related to the proposed new Mining Act, mineral rights, claim staking, and prospecting. Inquiries regarding the status of mining companies continued from people in the United States who have either inherited or just found old stocks. The district staff have continued making input and review to the Aggregate Sources List of the Ontario Ministry of Transportation and Communications and to the township aggregate resources inventories of the Ontario Geological Survey, Ontario Hydro Conservation Authorities, Niagara Escarpment Commission, local and regional municipal governments, Ontario Waste Management Corporation, Ministries of Agriculture, Labour, Environment, Housing, and Transportation and Communications were the beneficiaries of these consultations from district and regional offices. The nature of consultations included water table problems, mineral resources potential, availability of mineral resources data, oil and gas data, and identification of rock and mineral samples. There seemed to be a decline in inquiries by students and also in inquiries regarding the Ontario Mineral Exploration Program (OMEP). There was increased interest in industrial minerals.

The Lindsay district staff made presentations on mineral resources to students at Sir Sandford Fleming

College and to Junior Rangers at Coldspring camp. Niagara district staff provided information on agricultural rehabilitation, Lake Erie shorelines and bedrock geology to postgraduate students. The regional office arranged a talk on clay and shale resources related to ceramics and roofing tile manufacture, and a poster session on some important resources of the Region — sandstone, clay, and shale, at the Ontario Geoscience Research Seminar at Queen's Park in Toronto in December 1984.

PITS AND QUARRIES

Both district staff and the Regional Geologist provided input and review of mineral policies and other related matters to the provincial and municipal governments. Regional governments of Waterloo, Durham, and Halton are currently reviewing their mineral aggregate policies.

PROPERTY EXAMINATIONS

The Regional Geologist along with the district staff and consultants examined several sandstone, clay, and shale deposits. Fifty (50) sites were examined and sampled in Cambridge, Maple, Niagara, and Huron districts. The district geologists have conducted field evaluations of both licenced and other resource areas.

GEOLOGY AND MINING RELATED ACTIVITIES

A wide variety of structural materials are produced in the Region. The materials include building stones from limestone, dolostone, granite, sandstone, gypsum, crushed stone, sand and gravel, clay and shale. The Region still retains its status as the largest producer of structural materials in the Province.

There was an improvement in construction industry and as a result it was also reflected in the structural materials industry which is now optimistic about the outlook for 1985. Approximately 48.3 million tonnes of aggregate materials were produced in the Region, a slight increase of about 6.4% over 1982 production of 45.6 million tonnes. Operations at the Fairmont Granite Quarry in Belmont Township were suspended during the year due to poor quality of stone. No gold production was reported at Cordova Gold Mines in Belmont Township.

Peat is produced at several locations in the Region.

The gypsum production in the Region showed considerable improvement over the past years. An estimated 1.3 million tonnes of gypsum were produced during 1984. All 3 gypsum mines (at Drumbo, Hagersville, and Caledonia) showed improvements.

Following are the highlights of some of the mining and consulting activities in the Central Region, as reported by the respective companies:

C. MIRZA ENGINEERING INCORPORATED, DON MILLS

The company is involved in the following projects for various clients:

A feasibility study for the preservation of significant geological features at the Don Valley Brickyard site in Toronto, for the Ontario Heritage Foundation.

A study of alternative sources of supply of sand and gravel for the Regional Municipality of Niagara. Martini and Associates of

**REPORTED AGGREGATE PRODUCTION BY TOWNSHIP
FROM LICENCED OPERATIONS IN CENTRAL REGION**

TABLE 2

HURONIA DISTRICT

Township	1981 Tonnes	1982 Tonnes	1983 Tonnes
Adjala	605,828	552,880	636,466
Amaranth	59,218	117,666	117,365
Essa	40,582	23,074	32,462
Flos	128,299	152,895	147,352
East Garafraxa	358,334	71,927	81,081
West Gwillimbury	40,411	21,790	37,183
Innisfil	228,200	131,381	145,636
Mara	919,874	587,903	832,088
Matchedash (included in Orillia figures)			
Medonte	588,907	374,445	99,307
Melancthon	39,217	47,239	25,775
Mono	574,352	301,171	553,424
Mulmur	24,495	55,109	89,502
Nottawasaga	229,582	195,404	270,799
Orillia (includes figures for Matchedash)	2,047,129	1,757,468	1,717,137
Oro	440,642	474,913	374,850
Rama	50,005	272,209	103,677
Sunnidale	233,937	234,249	202,766
Tay	471,265	297,053	464,679
Tecumseth	57,793	42,036	46,237
Tiny	182,259	137,004	201,974
Tosorontio	80,871	66,311	122,071
Vespra	318,556	284,949	274,063
TOTALS	7,719,756	6,199,074	6,575,894

TABLE 2 CONTINUED

LINDSAY DISTRICT

Township	1981 Tonnes	1982 Tonnes	1983 Tonnes
Alnwick	61,764	58,921	38,053
Asphodel	283,405	380,582	328,700
Belmont	228,762	366,670	325,508
Bexley-Carden	602,352	449,366	635,101
Cavan	85,546	42,878	55,196
Douro	20,781	37,358	14,118
Dummer	242,632	225,442	188,211
Eldon	67,405	42,827	91,525
Emily	190,058	202,945	359,843
Ennismore	77,266	53,884	62,164
Fenelon	652,574	289,506	419,557
Haldimand	221,768	76,340	104,402
Hamilton	239,981	288,694	198,793
Harvey	35,529	38,434	27,983
Hope	60,444	165,872	33,235
Manvers	2,220,546	1,644,096	1,660,671
Mariposa	170,960	202,229	174,228
Town of Newcastle:			
Former Twp. of Clarke	197,516	145,787	148,095
Former Twp. of Darlington	936,359	803,730	778,239
N. & S. Monaghan	14,841	11,696	7,926
Ops	13,670	1,172	6,054
City of Oshawa	5,546	8,016	5,764
Otonabee	192,018	90,285	97,496
Scugog:			
Former Twp. of Cartwright	50,234	52,161	49,404
Former Twp. of Reach	632,988	761,387	754,129
Smith	339,256	304,710	409,775
Verulam	160,496	87,572	130,128
Whitby	149,212	115,306	113,298
TOTALS	8,153,909	7,048,026	7,227,636

TABLE 2 CONTINUED

CAMBRIDGE DISTRICT

Township	1981 Tonnes	1982 Tonnes	1983 Tonnes
City of Brantford	319,186	334,080	391,437
Brantford/Onondaga	601,759	402,859	437,688
South Dumfries	29,767	43,615	45,012
Ancaster	71,818	55,950	30,438
Flamborough	2,582,286	2,059,260	2,070,116
Stoney Creek	460,940	311,099	463,435
Blenheim	107,684	117,207	182,607
North Dumfries	757,053	554,525	759,142
Wellesley	678,662	344,773	461,370
Wilmot	249,595	190,068	207,181
Cambridge)			
)			
Kitchener)	854,085	535,244	362,480
)			
Waterloo)			
Woolwich	318,648	317,193	675,058
Arthur/West Luther	116,572	101,496	89,967
Maryborough	107,134	65,803	89,421
Peel	36,762	25,025	6,502
Nichol	-	-	-
Pilkington	264,428	287,852	244,429
West Garafraxa	59,798	25,723	21,638
Eramosa	48,652	35,929	28,640
Erin	197,090	310,143	149,635
Guelph	408,952	410,830	241,688
Puslinch	1,601,549	1,701,671	1,816,021
Burlington	2,391,039	1,622,202	1,592,715
Milton	5,588,744	3,820,244	3,806,495
Halton Hills	2,250,240	1,705,394	1,927,413
East Luther	31,966	39,709	32,968
TOTALS	20,134,409	15,378,644	16,133,496

TABLE 2 CONTINUED

MAPLE DISTRICT

Township	1981 Tonnes	1982 Tonnes	1983 Tonnes
Brock	1,167,027	998,490	1,305,531
Pickering (includes East York figures)	454,251	458,207	343,576
Uxbridge	3,642,328	2,402,183	3,533,940
East Gwillimbury	201,752	122,515	193,850
East York (included in Pickering figures)			
Georgina	298,627	214,843	320,787
King	272,276	159,827	254,619
Markham	-	-	-
Richmond Hill	575,296	329,795	181,301
Vaughan	327,311	436,203	695,152
Whitchurch-Stouffville	2,692,770	2,512,166	1,851,553
Brampton	1,657,559	820,619	742,737
Caledon	4,547,395	3,897,251	3,885,899
Mississauga	363,904	281,326	417,180
TOTALS	16,200,496	12,633,425	13,726,124

NIAGARA DISTRICT

Town of Dunnville	192,487	213,400	219,226
Town of Fort Erie	246,631	255,000	117,902
Town of Haldimand	1,078,983	811,000	900,511
Town of Lincoln	974,586	966,900	979,354
City of Niagara Falls	29,605	23,800	39,287
Town of Niagara-on-the-Lake	404,159	328,700	380,225
Town of Pelham	674,905	482,200	565,354
City of Port Colborne	1,186,396	181,770	431,075
Township of Wainfleet	437,720	412,900	474,512
City of Thorold	828,777	698,900	653,054
TOTALS	6,052,249	4,374,570	4,820,500

Guelph are collaborating with the company on this project.

Foundation and soils investigations for the Ontario Ministry of Transportation and Communications, Ontario Ministry of Government Services, Ontario Hydro, Public Works Canada, Canada Standards Association, Toronto Board of Education, Moriyama Teshima Architects, Sanyo Canada and others.

FRANCESCHINI BROTHERS AGGREGATES LIMITED, MISSISSAUGA

1984 has been a much better year than expected. Sales will exceed estimated forecasts by more than 13% as recoveries in most sectors of the construction industry were prevalent. Due to 1983's below average volumes, expansion and capital expenditures in 1984 were considerably restrained. The company did however attempt to update operations with the addition of a multi-purpose screening plant and a new front-end loader.

During 1984 the company attempted to increase reserves by applying for rezoning of an additional acreage (approximately 85 acres), adjacent to one of the operating pits in the Town of Caledon. The required zoning change was approved by the town council and the company now awaits final zoning approval by the Ministry of Housing, prior to Ministry of Natural Resources approval, and subsequent licencing under the Pits and Quarries Control Act.

ST. MARYS CEMENT COMPANY, BOWMANVILLE

The St. Marys Cement Company operates a cement plant and a limestone-shale quarry near Bowmanville. The company facilities are located immediately south of Highway 401 at Waverley Road.

Due to the slightly improved economic climate and an upturn in construction, the cement plant has been operating at 80% of its rated capacity for the year of 1984. Most of the cement is shipped by bulk

tank truck, and some by rail. The company is also shipping clinker by boat to its Milwaukee plant in Wisconsin. About 15% of St. Marys' total production is shipped to the United States. Most of the remaining production is shipped to the Metropolitan Toronto market.

The company presently employs 120 people at its Bowmanville plant.

WALKER BROTHERS QUARRIES LIMITED, NIAGARA FALLS

This is a limestone surface mine located on the corner of Mountain Road and Thorold Townline Road in Niagara Falls.

The company presently employs 18 people who are directly related to the production of crushed stone. As of the end of October 1984, the company has produced 580 000 tonnes of limestone and plans to produce until December 1984, which should give a yearly production of approximately 700 000 tonnes. The company operates 3 extraction faces ranging from 20 to 40 feet high, and have made no major changes in the production system over the past year.

In 1985 the company expects to experience a 15% drop in sales due to a depressed market in the area.

VINELAND QUARRIES AND CRUSHED STONE LIMITED, VINELAND

This is a limestone surface mine located on the corner of Fly Road and Regional Road 24 in Vineland.

The company presently employs 11 people who are directly involved in the production of crushed stone. As of the end of October 1984, 490 000 tonnes were produced. The company plans to produce until December which should give a yearly production of approximately 540 000 tonnes. The company operates one extraction face ranging from 20-40 feet high.

In 1985 the company expects to experience a 10% drop in sales

due to a depressed market in the area.

NATIONAL SEWER PIPE LIMITED, OAKVILLE

The company has a clay pit in Burlington and a manufacturing plant in St. Thomas, Ontario. It manufactures clay flue liners, clay sewer pipe, and plastic drain tubing.

In 1984, the St. Thomas plant has worked almost to capacity, and the company is just completing the construction of 2 new periodic kilns which should improve energy consumption substantially. Further improvements are also contemplated in this area such as: addition of new efficient burners to the shuttle kiln and a computer controlled firing cycle.

Additional improvements will be introduced to the company's process, which will result in an increased production capacity. This additional production capacity is needed in order to support a further penetration of the United States market aimed for in 1985.

TRT SAND AND GRAVEL, ORONO

TRT Sand and Gravel operates out of its main pit located at the southwest corner of Manvers Township (Concession 1, Lots 1-5) in the County of Victoria. This single parcel of approximately 1000 acres contains reserves of about 250 million tons of high quality aggregate and is part of the Oak Ridges Moraine. The pit has been in operation since 1972 and presently employs 10 people permanently, with seasonal help hired as necessary. Russell H. Steward Construction in Orillia, Ontario does all crushing, washing, and screening of material in the pit and employs up to 40 additional people during the peak production periods.

Aggregates include washed sand and stone for ready-mix concrete, crushed and screened asphalt aggregates, crushed gravel, and various pit run materials. These products are sold in a market area ranging from Toronto east to Port

Hope, and from Lake Ontario north to Peterborough, with the highest percentage being shipped to the Oshawa area. All processing is carried out by portable equipment which is capable of meeting all present volume requirements.

1984 has been the busiest year in the company's history. This is due to a local construction market which has seen activity in both the public and private sectors. While it would not appear that the extraordinarily high volumes of 1984 are likely to be repeated, the company is cautiously optimistic of continued brisk activity in both sectors for 1985.

3M CANADA INCORPORATED, HAVELOCK

The company operates a 30 ha basalt rock quarry that employs about 120 people. It also operates a mill and a colouring plant located approximately 3 miles east of Havelock, immediately north of Highway 7.

The original mill was started in 1907 by Ontario Rock Limited to produce aggregates for road surfacing. In 1948, Building Products Canada Limited took over the operations and built a colouring plant to produce artificially coloured roofing granules. 3M Canada Incorporated bought the operation in 1960. The original mill was destroyed by fire and a new mill was erected in 1961. Major additions were made to the new mill in 1979 which increased the crushing and screening capacity by 50%. Modifications were also made to the colouring plant which increased mixing capacity by 30%.

About 1800 tonnes of quarried rock are crushed daily. The crushed rock is fired and ceramically coated to give colour to the granules. About 1100 tonnes of finished product are produced daily. The company is currently supplying all of the demand for the eastern Canadian markets and about half of the western Canadian markets for artificially coloured granules. A small amount of the product is exported to Belgium and

France. The product is shipped by both truck and rail.

The \$50 million facilities of 3M Canada Incorporated are unique in Canada. The company also owns and operates 4 other plants in the United States. 3M also produces 3/8" commercial stone and sand for the asphalt paving industry.

FRED NELSON AND SONS LIMITED, KEENE

Fred Nelson and Sons Limited has been operating for over 40 years in the gravel crushing business. Equipment includes 7 portable commander plants, 2 primary crushers, and 2 screening plants. Support equipment includes loaders, tandems, tractor trailers, and floats. At the present time the company employs 33 full time workers.

LASIR GOLD INCORPORATED, CORDOVA MINES, CORDOVA

Lasir Gold Incorporated is the owner of 3 contiguously located mineral claims and licences, being the west half of Lot 20, Marmora Township, Concession I, comprising 100 acres more or less; and the east half Lot 20, Belmont Township, Concession I, comprising 50 acres more or less. Lasir Gold Incorporated, has also acquired surface rights to the east and west halves Lot 20 and the southeast quarter Lot 21, Belmont Township, Concession I. The old Cordova mine tailings are located on the east half of Lot 20, Belmont Township.

The property is located 12 miles from the village of Havelock and 8 miles from the village of Marmora. Access to the property is by paved road.

Gold was first discovered on the property in 1892. The Cordova Development Company acquired the property and did extensive development work and operated stamp mills for 9 years producing 15 746 ounces of gold from 56 785 tons mined. In 1911 Cordova Mines Limited purchased the property and operated it until fire de-

stroyed the plant in 1917. During the period from 1917 and 1930 two other operators treated an additional 46 000 tons and recovered 13 700 ounces of gold. The 70 000 tons total of stamp mill tailings which it is proposed to now treat were produced prior to 1935.

In 1935 Consolidated Mining and Smelting Company of Canada Limited acquired the property and carried out exploration and development operations until July 1940 when operations were suspended due to the war. In 1939 a 100 ton-per-day straight cyanide mill was built which produced 3487 ounces of gold from 33 434 tons milled from October 1939 to July 1940. At the close of operations in 1948, there were 3 shafts with depths of 401, 185, and 1050 feet, 16 676 feet of drifting, 3697 feet of cross-cutting, 2203 feet of sinking, and 768 feet of raising. Reserves were reported as 77 130 tons of proven ore grading 0.175 ounce of gold per ton, and 50 000 tons of possible ore, with an additional possible tonnage of from 50 000 to 100 000 tons.

In 1980 Lasir Gold took over the property, and uncrushed surface development rock was cyanide leached on a 1500-ton heap leach pad. Approximately 90 ounces of gold were recovered from this operation.

In 1981-82 the extent of the old tailings was established by sampling. Pilot testing on the property established that gold could be extracted by cyanidation.

In 1983 the company entered a joint venture with Minetech Limited in which the latter undertook to build a plant to recover gold from the old tailings using cyanidation. About \$250 000 was expended by Minetech Limited before it went bankrupt. The whole tailings area was cleaned of grass, trees, and roots, and stockpiling of some of the tailings was completed. Two large plastic-lined ponds and a tailings pond have been completed. The mill building with 8 leach tanks was erected, and 550 volt power was brought to the property. The access road to the

tailings has been improved. These facilities will be incorporated into the current treatment plant.

Direct cyanide tests on old stamp mill tailings, carried out by the Ontario Research Foundation of Mississauga and Lakefield Research of Canada Limited of Lakefield, Ontario, have achieved 75% gold recovery.

Currently, the company is actively pursuing development of the property. An exploration program by Silver Princess Resources of Vancouver started this fall under a joint venture agreement staged over a 3-year period. These will involve expenditures of \$200 000 in first year of the agreement, \$300 000 in the second year, and \$500 000 in the third year.

STAKING AND EXPLORATION ACTIVITY

Seven new mining claims were recorded and 4 claims cancelled in 1984. The current total of mining claims in the Central Region now stands at 22. All the claims are located in Belmont Township. There are also 12 mining leases in Belmont Township. 200 man days of assessment work has so far been filed on the unpatented mining claims.

REGIONAL GEOLOGICAL EVALUATION PROJECTS

SANDSTONE RESOURCES STUDY

Stage II of this study has now been completed. The final report is now under review for publication as an Open File Report. The study has concluded that potential new areas of sandstone resources could be identified using techniques and criteria outlined in the report. The report on this part of the study is expected to be available as an Open File Report in March 1985.

SHALE AND CLAY RESOURCES RELATED TO TILE MANUFACTURE

This study was initiated as a result of several inquiries from potential investors who are looking for suitable resources for roofing and ce-

ramic wall and floor tile manufacture.

Tests for ceramic properties were carried out on selected shale and clay samples. Fifty (50) samples were collected but only 16 were tested in detail. All the tests have now been completed and the final report is now under preparation. It is expected that the final report will be available as an Open File Report in May 1985. The results of the study are very encouraging and it will be continued in 1985.

TOWNSHIP AGGREGATE INVENTORIES

Fifty-six (56) inventories for this Region have been completed and published. Inventories for Vespra, Wilmot, and Oro Townships, towns of Dunnville and Newcastle, and the Regional Municipality of Hamilton were completed and published in 1984.

Inventories for the municipalities of Georgina, East Gwillimbury, Pickering, Welland, Thorold, St. Catharines, Niagara-on-the-Lake, and Niagara Falls have been prepared in draft form. Papers for Wainfleet, Cavan, North and South Monaghan, and Scugog Townships, towns of Grimsby, Lincoln, and West Lincoln are expected to be released in 1985.

CANADA WORKS PROJECTS

Lindsay, Maple, Niagara, and Cambridge District Offices and the Central Regional Office have all submitted sponsored projects under this program. Lindsay is already working on an approved project. Other projects will proceed as and when approved. The projects are designed to collect additional mineral resources data for planning and resource management.

PUBLIC AWARENESS PROGRAMS

The regional staff arranged a poster session on sandstone resources for building stone, and shale and clay resources related to tile manufacture at the Ontario Geoscience Research Seminar at Toronto in

December 1984. Also a talk was presented at the same meeting outlining the results of the tests on selected shale and clay resources.

Lindsay district staff arranged a lecture for the resource drilling students at Sir Sandford Fleming College in Lindsay. A presentation on the pit and quarry legislation and a tour of the pit operation of TRT Industries was arranged for the Junior Ranger camp at Cold-spring.

Niagara district staff presented displays at the Annual Ball's Falls Festival at the Niagara Peninsula Geological Society Show, and in Wainfleet Township at the Annual Sportsmen's Show.

The Ontario Geological Survey staff once again held their annual mineral exploration classes in February 1984. They also made presentations, and gave lectures to various student groups and mineral clubs in the Region.

SUMMARY OF FIELD WORK BY THE ONTARIO GEOLOGICAL SURVEY

P.F. Karrow mapped the Quaternary geology of the Brampton Sheet in June 1984. The Aggregate Assessment Office conducted field investigations in Harvey and Belmont Townships.

ONTARIO GEOSCIENCE GRANT PROGRAM

R.N. Fervolden, J.P. Greenhouse, and P.F. Karrow have focussed their work, for 1984, on calibration and interpretation methods for comparing geophysical logs with geological core which will be used to decipher subsurface Quaternary stratigraphy. The project has already added greatly to the ability to interpret geophysical logs in terms of the lithological and hydrogeological nature of regional overburden.

M.C. Miles, P. Fritz, S.K. Frappe, D.E. Lawson, and E.C. Appleyard initiated a study in April of 1983, to establish geochemical evidence in support of paleoenvironmental interpretation, to interpret the nature and genesis of

TABLE 3. MAPS AND REPORTS PERTAINING TO THE CENTRAL REGION PUBLISHED DURING 1984 BY THE ONTARIO GEOLOGICAL SURVEY, MINISTRY OF NATURAL RESOURCES

Open File Reports OFR 5461 OFR 5470	Aggregate Resources Publications ARIP 50 ARIP 60 ARIP 67 ARIP 81 ARIP 65 ARIP 94	Coloured Maps MAP 2224 MAP 2225 MAP 2226	Mineral Resources Branch Publications IMBP 5
Preliminary Maps - Geological Series P.2715 P.2697		Miscellaneous Reports MP 120 MP 121	

brines within salt formations, to contribute to a data base for the study of Canada Shield saline brines, and to provide modern analog chemical data for Precambrian evaporite investigations. Isotopic and chemical analysis have been carried out on samples from selected areas of the Salina Formation. Work is expected to continue into 1985.

U. Brand and J. Terasmae continued their investigation to develop geochemical techniques for the characterization of glacial tills and their source rocks. These techniques will be applied to an actual glacial model. The investigation will be used to determine the usefulness of new techniques in defining the origin and source rocks of the Dummer Moraine glacial till deposits.

Canadian Geotechnical Journal, Volume 21, 1984.

Narain, M., and Brand, J.
1984: 1983 Report of the Regional Geologist; p.237-247 *in* Report of the Activities of the Regional and Resident Geologists, 1983, edited by C.R. Kustra, Ontario Geological Survey, Miscellaneous Paper 117.

McKelvey, Margaret and Marilyn
1984: Toronto: Carved in Stone; Fitzhenry & Whiteside, Toronto.

RECENT REFERENCES

Barnigan, J.
1984: Silica Markets and Uses in Northern Ontario; Open File Report 5526, Ontario Geological Survey, 41p.

Chapman, L.J., and Purnam, D.F.
1984: The Physiography of Southern Ontario, 3rd Edition; Ontario Geological Survey, Special Volume 2.

Clem, B.M.
1982: Heap Leaching Gold and Silver Ores; p.68-76 *in* Engineering and Mining Journal Bulletin, April 1982.

Nadon, R.L., and Gale, J.E.
1983: Impact of Groundwater on Mining and Underground Space Development in the Niagara Escarpment; p.60-74 *in*

Southwestern Regional Geologist Area, Southwestern Region

B.H. Feenstra¹, R.A. Trevail², and D.K. Parker³

¹Mineral Resources Geologist, ²Senior Petroleum Geologist, ³Geological Assistant, Southwestern Region and Petroleum Resources Laboratory, Ontario Ministry of Natural Resources, London

INTRODUCTION

Personnel of the Southwestern Regional Geologist Area are responsible for petroleum resources activities for the entire Province of Ontario as well as for the mineral resources activities within Southwestern Region. Staff are located at two offices in London: the Southwestern Regional Office, which has recently moved to 659 Exeter Road in the Ministry of Transportation and Communication's building, and the Petroleum Resources Laboratory at 458 Central Avenue.

Permanent staff at the Southwestern Regional Office are: P.A. Palonen, Provincial Petroleum Supervisor and Southwestern Region Mineral Resources Co-ordinator; R.M. Rybansky, Reservoir Engineer; H.E. Habib, Reservoir Engineer; G.L. Tanton, Geotechnical Engineering Assistant; P.A. Wright, Administrative Assistant Petroleum Resources; I. Cameron, Map Drafter; and F.E. Kamps, Junior Petroleum Resources Clerk. Contract staff includes C.L. Trusler and C.M. Rose. Permanent personnel at the Petroleum Resources Laboratory are: B.H. Feenstra, Mineral Resources Geologist; R.A. Trevail, Senior Petroleum Geologist; C.E. Hesselmans, Data Processing Technician; and M. Campbell, Petroleum Resources Laboratory Technician. Contract staff includes L. Walkom, D.K. Parker, J.A. Barnicke, M.T. van-Deursen, and M. Bernardo.

Petroleum Resources Inspectors, responsible for enforcement of the Petroleum Resources Act, and Pits and Quarries Inspectors, responsible for enforcement of the Pits and Quarries Control Act, are located at the various District Offices.

REGIONAL GEOLOGIST OFFICE ACTIVITIES

PETROLEUM RESOURCES ACTIVITIES

The principal function of the Petroleum Resources Laboratory is to

catalogue and store all subsurface geological samples consisting of drill cuttings and cores obtained from the drilling of all petroleum exploration and development wells. Cuttings are sorted, washed, and catalogued when they are received from the field. The cores received at the Lab are slabbed using a diamond saw. All cores are catalogued and permanently stored for use by the public. Once samples and core have been prepared for examination, formation tops are determined by microscopic examination. Well cards showing well location, elevations of all formation tops and other technical information are completed. Regulations under the Petroleum Resources Act require that information on all exploratory wells remain confidential for a period of one year from completion of the well. Development wells are held confidential for one month.

A summary of the 1982 oil and gas exploration, drilling, and production activity was published as Oil and Gas Paper 5 (Habib and Trevail 1984). This paper contains special listings of all Paleozoic core samples known to be recovered in the province. An index of all wells penetrating Cambrian and Ordovician rocks is also included in this report. Detailed 1983 well information will not be published until 1985 when the one year confidentiality period for exploratory wells has expired. For the same reason detailed information, regarding the 1984 drilling activity summarized briefly in this report (Tables 1, 2) will not be released until 1986.

In April a contract was awarded to DataPlotting Services Incorporated for development and implementation of the Ontario Petroleum Data System (OPDS), a completely revised and updated version of the previous Ontario Well Data System (OWDS). OPDS is a computerized information system designed to store, process, and retrieve the geological and technical data gathered during exploration

for oil and gas in Ontario. OPDS allows the user to extract information contained within the system and display it in either report or graphic format.

DataPlotting Services Incorporated's powerful mapping package provides OPDS with a means of generating structural, isopach, trend surface, and residual maps of formation tops. The system will provide a fast and up-to-date data retrieval service to the Petroleum Resources staff, the petroleum industry, and the general public. Access to non-confidential information will be available to all users.

A detailed study of the Silurian reef complex of Ontario comprising Phase 5 of the evaluation of Ontario's conventional hydrocarbon reserves and potential was completed. This project formed part of the Hydrocarbon Energy Resources Program (HERP) funded by the Ontario Ministry of Treasury and Economics under the Board of Industrial Leadership and Development (BILD). The project was originally subdivided into 7 phases, each with its own separate technical report. Results of the evaluation of the Cambrian and Ordovician were released in April (1984) through the Ontario Geological Survey as Open File Reports 5498 and 5499, along with 40 Preliminary Maps at a scale of 1:250 000 showing the regional structure and isopach contours of the Trenton Group, Black River Group, Shadow Lake Formation to Cambrian interval, and top of the Precambrian basement. In addition to this, detailed oil and gas pool maps at a 1:20 000 scale for 6 Cambrian and 10 Ordovician pools accompanied the reports.

Both the Devonian and Silurian Sandstone reports are in the final stages of preparation for publication and should be ready for release in February and March, 1985 respectively. Copies of all Open File Reports are available for the cost of reproduction from:



Paragon Industrial
Photographic Reproductions

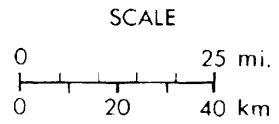
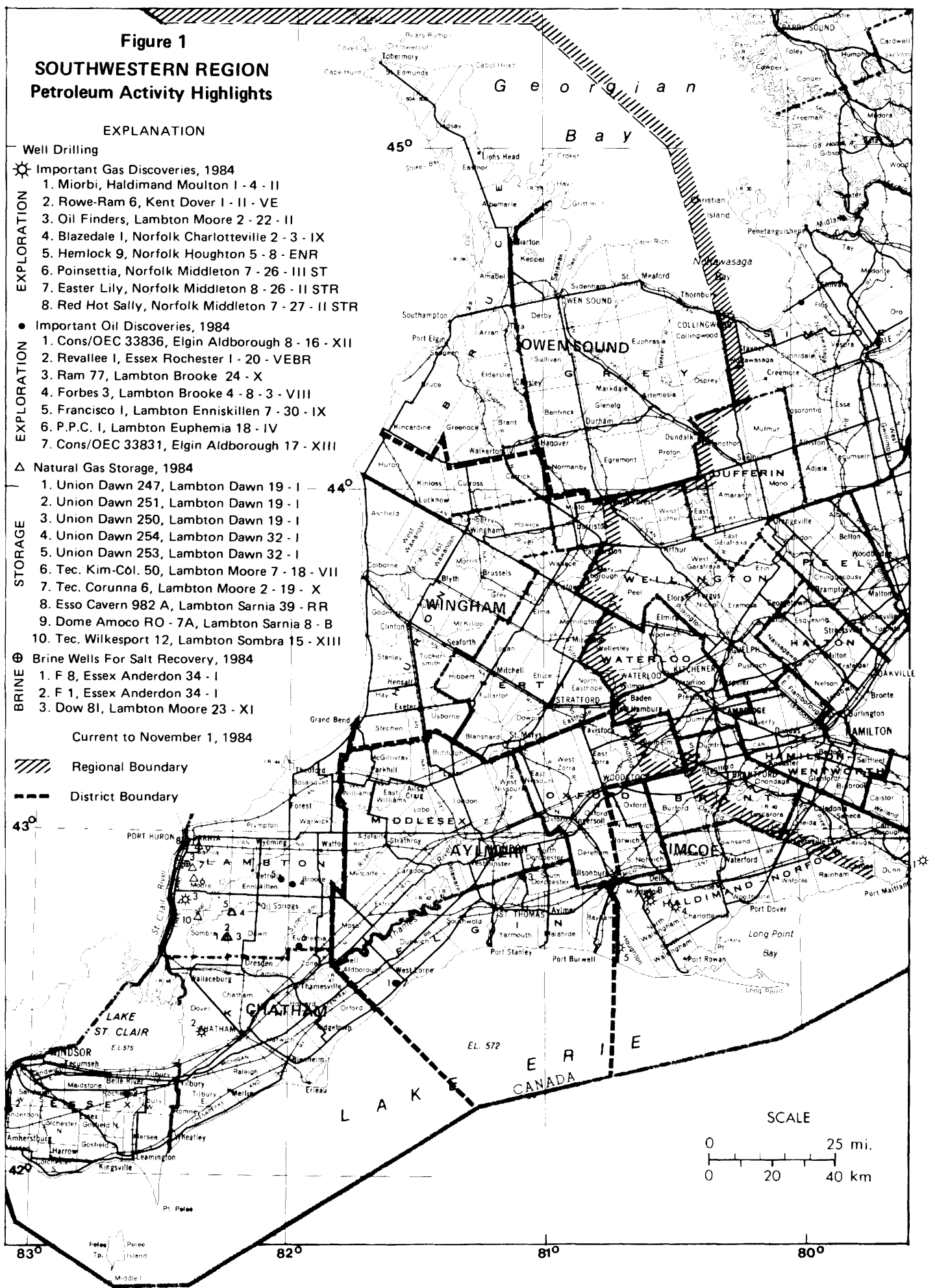
Figure 1
SOUTHWESTERN REGION
Petroleum Activity Highlights

EXPLANATION

- Well Drilling**
- EXPLORATION**
- ☀ Important Gas Discoveries, 1984
 1. Miorbi, Haldimand Moulton I - 4 - II
 2. Rowe-Ram 6, Kent Dover I - II - VE
 3. Oil Finders, Lambton Moore 2 - 22 - II
 4. Blazedale I, Norfolk Charlotteville 2 - 3 - IX
 5. Hemlock 9, Norfolk Houghton 5 - 8 - ENR
 6. Poinsettia, Norfolk Middleton 7 - 26 - III ST
 7. Easter Lily, Norfolk Middleton 8 - 26 - II STR
 8. Red Hot Sally, Norfolk Middleton 7 - 27 - II STR
 - Important Oil Discoveries, 1984
 1. Cons/OEC 33836, Elgin Aldborough 8 - 16 - XII
 2. Revallee I, Essex Rochester I - 20 - VEBR
 3. Ram 77, Lambton Brooke 24 - X
 4. Forbes 3, Lambton Brooke 4 - 8 - 3 - VIII
 5. Francisco I, Lambton Enniskillen 7 - 30 - IX
 6. P.P.C. I, Lambton Euphemia 18 - IV
 7. Cons/OEC 33831, Elgin Aldborough 17 - XIII
 - △ Natural Gas Storage, 1984
 1. Union Dawn 247, Lambton Dawn 19 - I
 2. Union Dawn 251, Lambton Dawn 19 - I
 3. Union Dawn 250, Lambton Dawn 19 - I
 4. Union Dawn 254, Lambton Dawn 32 - I
 5. Union Dawn 253, Lambton Dawn 32 - I
 6. Tec. Kim-Col. 50, Lambton Moore 7 - 18 - VII
 7. Tec. Corunna 6, Lambton Moore 2 - 19 - X
 8. Esso Cavern 982 A, Lambton Sarnia 39 - RR
 9. Dome Amoco RO - 7A, Lambton Sarnia 8 - B
 10. Tec. Wilkesport 12, Lambton Sombra 15 - XIII
 - ⊕ Brine Wells For Salt Recovery, 1984
 1. F 8, Essex Anderdon 34 - I
 2. F 1, Essex Anderdon 34 - I
 3. Dow 81, Lambton Moore 23 - XI

Current to November 1, 1984

-  Regional Boundary
-  District Boundary



SUMMARY OF WELLS DRILLED IN 1984
(JAN.1-NOV.30)

TABLE 1

County & Township	EXPLORATORY						DEVELOPMENT						OTHER	
	Gas	Oil	Dry	Susp	Total Wells	Total Metres	Gas	Oil	Dry	Susp	Total Wells	Total Metres	Total Wells	Total Metres
ELGIN														
Aldborough	-	2	3	1	6	865.2	-	3	-	-	3	398.8	-	-
Dunwich	-	-	1	-	1	1,169.0	-	-	-	-	-	-	-	-
Lake Erie	-	-	4	-	4	2,142.0	3	-	9	-	12	6,374.1	-	-
ESSEX														
Anderdon	-	-	-	-	-	-	-	-	-	-	-	-	2	751.8
Gosfield S.	-	-	-	-	-	-	-	1	-	-	1	749.2	-	-
Mersea	-	-	2	-	2	1,967.4	-	3	1	1	5	5,286.4	-	-
Rochester	-	1	-	-	1	838.4	-	-	1	-	1	1,061.5	-	-
Tilbury W.	-	-	-	-	-	-	-	-	1	1	2	486.6	-	-
HALDIMAND														
Lake Erie	1	-	-	-	1	362.0	18	-	8	-	26	9,556.8	-	-
Moulton	1	-	-	-	1	237.7	2	-	-	-	2	486.7	-	-
KENT														
Camden Gore	-	-	-	1	1	180.9	-	-	-	-	-	-	-	-
Dover East	-	2	4	1	7	7,564.6	-	2	-	-	2	2,314.5	-	-
Howard	-	-	1	-	1	104.6	-	-	-	-	-	-	-	-
Lake Erie	-	-	2	-	2	1,150.0	-	-	-	-	-	-	-	-
Raleigh	-	-	-	-	-	-	-	2	1	-	3	249.7	-	-
Romney	-	-	1	-	1	485.5	-	-	-	-	-	-	-	-
Tilbury East	-	-	1	1	2	2,228.2	-	-	-	-	-	-	-	-
Zone	-	-	-	-	-	-	-	-	1	-	1	126.5	-	-
LAMBTON														
Brooke	-	2	3	-	5	2,091.6	-	-	1	-	1	159.7	1	135.3
Dawn	-	-	4	1	5	2,569.5	-	3	2	-	5	3,024.6	5	2,799.6
Enniskillen	-	1	1	-	2	1,291.6	-	-	-	-	-	-	1	198.0
Euphemia	-	1	-	-	1	500.7	-	-	-	-	-	-	-	-
Moore	1	-	1	1	3	2,727.6	-	-	-	-	-	-	3	2,159.4
Plympton	-	-	2	1	3	1,774.6	-	-	-	-	-	-	-	-
Sarnia	-	-	-	-	-	-	-	-	-	-	-	-	9	2,522.2
Sombra	-	-	1	-	1	1,168.0	-	1	-	-	1	612.3	1	614.6
Warwick	-	-	5	-	5	1,846.9	-	-	-	-	-	-	1	147.2
MIDDLESEX														
Mosa	-	-	2	-	2	303.1	-	2	-	-	2	244.1	2	388.1
West Williams	-	-	1	-	1	587.5	-	-	-	-	-	-	-	-
NORFOLK														
Charlotteville	1	-	-	-	1	392.6	3	-	-	-	3	1,318.9	-	-
Houghton	1	-	-	-	1	436.4	-	-	-	-	-	-	-	-
Lake Erie	-	-	-	-	-	-	11	-	11	-	22	10,195.4	-	-
Middleton	3	-	-	-	3	1,155.5	1	-	-	-	1	379.7	-	-
N. Walsingham	-	-	-	-	-	-	2	-	-	-	2	782.7	-	-
WELLAND														
Crowland	-	-	-	-	-	-	1	-	-	-	1	188.4	-	-
WENTWORTH														
Binbrook	-	-	-	-	-	-	1	-	-	-	1	140.8	-	-
TOTAL 1984	8	9	39	7	63	36,141.1	42	17	36	2	97	44,137.4	25	9,716.2

TOTAL 1984 - Number of Wells = 185
 - Metres Drilled = 89,994.7

LAKE ERIE DRILLING FOR 1984

TABLE 2

County	EXPLORATORY				DEVELOPMENT				No. of Wells	Total Metres
	Gas	Dry	Total	Metres	Gas	Dry	Total	Metres		
Elgin	-	4	4	2,142.0	3	9	12	6,374.1	16	8,516.1
Essex	-	-	-	-	-	-	-	-	-	-
Haldimand	1	-	1	362.0	18	8	26	9,556.8	27	9,918.8
Kent	-	2	2	1,150.0	-	-	-	-	2	1,150.0
Norfolk	-	-	-	-	11	11	22	10,195.4	22	10,195.4
TOTAL	1	6	7	3,654.0	32	28	60	26,126.3	67	29,780.3

Limited
1160 Ellesmere Road
Scarborough, Ontario
M1P 2X4.

The annual status report entitled "Oil and Gas Developments in Eastern Canada in 1983" (Trevail and Parker 1984) was compiled and written for the American Association of Petroleum Geologists. The report summarizes activities and highlights of exploration and production trends in Ontario and Eastern Canada for 1983. This same report is scheduled for publication by the Canadian Society of Petroleum Geologists. Reprints are available at the Petroleum Resources Laboratory.

The 1984 Joint Annual Meeting of the Geological Association of Canada and the Mineralogical Association of Canada was held in London, Ontario, May 14-16. R.A. Trevail and C.L. Trussler coordinated and co-chaired a Special Session on "The Geology and Resources of the Michigan Basin". The session focused on basin tectonics, Keweenaw rifting, diagenetic history of hydrocarbon-bearing strata, hydrocarbon formation and entrapment, and oil shales. Application of COCORP seismic profiling and integration of gravity surveys with subsurface mapping provided new insight into the geologic history of the Michigan Basin. S.M.B. Bailey of Bailey Geological Services Limited presented the results of the Cambrian and Ordovician phases of the conventional hydrocarbon portion of HERP. The optimistic assessment of the as of yet undiscovered oil and gas resources of Ontario sparked a number of comments concerning the exploration possibilities available in the province, including remarks on the low cost of operations in Ontario as compared to elsewhere in Canada.

Three technical papers were presented by R.A. Trevail during 1984. "Hydrocarbon Entrapment in the Trenton of Southern Ontario" was presented at the 1984 meeting of the Eastern Section of the American Association of Petroleum Geologists (AAPG) held in

Pittsburgh, Pennsylvania in October.

The paper is scheduled to be published in a special symposium volume of the AAPG Studies in Geology series (Trevail, *in press*). The second paper entitled "Conventional Oil and Gas Resources of Ontario" was presented at the Hydrocarbon Energy in Ontario Symposium featured at the Ontario Geological Survey Geoscience Research Seminar, 1984.

A program to evaluate remote sensing techniques, specifically airborne colour and thermal infrared imagery, as a potential hydrocarbon exploration tool, was conducted by R.A. Trevail and V.H. Singhroy from the Ontario Centre for Remote Sensing (OCRS). Funding was jointly provided by the Ministry of Natural Resources and the OCRS. The study area consisted of Dawn and Euphemia Townships in Lambton County and Zone and Camden Townships in Kent County. Interpretation of both colour and thermal infrared imagery revealed the presence of a number of small and subtle, moisture filled or dry lineaments associated with the Dawn and Electric Faults.

Preliminary results indicated that airborne infrared imagery has the potential for being a relatively rapid and inexpensive reconnaissance exploration tool in Ontario and may be used to target more detailed exploration techniques such as seismic and geochemical surveys. Results of this study were presented at the 23rd Annual Conference of the Ontario Petroleum Institute (Trevail and Singhroy, *in press*).

MINERAL RESOURCES ACTIVITIES

The primary function of the Mineral Resources Geologist in Southwestern Region is to stimulate exploration and development of the Region's mineral resources. Emphasis in this program has to date been aimed chiefly at industrial minerals. Because of the general scarcity of information, data gathering, and analysis, area specific inventories have been undertaken. Information and technical advice

regarding local and regional geology, mineral deposits, mining activities and related legislation, policies and procedures are available at the Petroleum Resources Laboratory. In addition, T.R. Carter in Wingham and J.W.E. Lau in Aylmer provide geological expertise respectively to the Wingham and Owen Sound District Offices in the north, and to the Aylmer, Chatham, and Simcoe District Offices in the south.

Construction Aggregate Resources

Inventories and assessment of sand and gravel aggregates resources in deposits presently licenced in the Region under the Pits and Quarries Control Act have been carried out in 1983 and 1984. These studies are intended to supplement ongoing inventories and assessments by the Aggregate Assessment Office of the Ontario Geological Survey which do not provide specific resource data on licenced deposits. Such information is critical for assessing present and short-term supplies of construction aggregate resources at the local level for effective input to the municipal land use planning process. The reports include information on geological descriptions, sampling, and estimates of the quantity and quality of remaining sand and gravel aggregate resources in the licenced deposits.

Laboratory analysis of the samples to determine grain size distribution, soundness, absorption, and lithology (petrographic number) were performed by the Materials Testing Laboratories of the Ministry of Transportation and Communication in London and Kingston. Results of these projects are now complete for the Chatham, Wingham, and Owen Sound Districts. Studies will be continued in 1985 in the Aylmer and Simcoe Districts.

Results of the projects will be incorporated in Aggregate Resources Inventory Papers published by the Ontario Geological Survey and will be made available to municipalities for land use plan-

ning purposes. A property report detailing the results will also be available to each respective owner/operator.

The following summary of results of the licenced sand and gravel aggregate resource assessment project in the Wingham and Owen Sound Districts has been provided by T.R. Carter. The project was funded equally by the federal and provincial governments under the Canada-Ontario Employment Development Program and created employment for four geologists for one year.

In general, sufficient licenced resources appear to be available to satisfy forecasted needs for both districts for the near future. There are, however, significant local variations in the availability of construction aggregate resources due to lack of licenced suppliers, and material which is capable of meeting the quality constraints. In the Owen Sound District, licenced pits in Keppel and Sarawak Townships are depleted in crushable gravel. Crushable gravel is also in short supply in Kincardine, Albemarle, and St. Edmunds Townships. Pit distribution problems occur throughout the Bruce Peninsula, and in the southern portion of Bruce County necessitate costly long distance haulage or use of short-term wayside pits.

Sand and gravel resources, particularly along Georgian Bay, locally do not meet stringent specifications for high quality products due to the presence of deleterious amounts of shale. This shale contamination necessitates costly beneficiation to meet Ministry of Transportation and Communication specifications. In the Wingham District, the townships of Stanley, Stephen, Fullarton, South Easthope, Mornington, and Elma all have less than 1 000 000 tonnes each of sand and gravel resources in currently licenced pits. Hay, Ellice, Logan, and Huron Townships have potential shortages of crushable gravel. There are also local quality constraints for aggregates, particularly in Minto, Wallace, and Carrick Townships due to the presence of deleterious amounts of

chert and shale. Records maintained in both District Offices indicate a gradual increase in construction aggregate production from natural sand, gravel, and stone. Attractive exploration and development opportunities consequently exist in those townships where licenced resources are in short supply or not readily available due to quality constraints or poor distribution of licenced sources. There is a continuing need for new licences to ensure the availability of low cost supplies of construction aggregates to local consumers.

A project involving inventory and assessment of buried sand and gravel in the Sparta Moraine southeast of St. Thomas in Yarmouth Township, Elgin County was initiated. A recent survey of the Quaternary geology and stratigraphy of this area by the Ontario Geological Survey (Dreimanis and Barnett 1984) noted occurrences of relatively coarse sand and gravel within the Catfish Creek Drift buried below fine-textured Port Stanley Till along the Sparta Moraine.

During the summer, Regional and Aylmer District mineral resources staff together carried out a detailed study consisting of examination of water well logs and pit exposures, drilling with a small auger rig and hammer seismic refraction surveying. The coarse sand and gravel layers were found to occur near the top of a relatively thick stratified sequence composed mainly of fine- to medium-grained sand. Favourable sites for exploration are most likely located along the south side of the moraine at localities where the cap of clayey till is thin or completely eroded away. Based on the results of this summer's work, 6 sites have been selected for large diameter auger drilling and split spoon sampling. The results of this project, to be completed in 1985, will be included in the Aggregate Assessment Office report on Yarmouth Township to be published by the Ontario Geological Survey (Aggregate Assessment Office 1984).

Mineral and Chemical Composition of Natural Quaternary Sands

Twenty-eight samples of the 0.1 to 0.7 mm fraction of Quaternary sands and gravels from licenced pits in glaciofluvial, glaciolacustrine beach, and eolian deposits in the Owen Sound and Wingham District areas, and Lambton County in the Chatham District, were analyzed by the Geoscience Laboratories of the Ontario Geological Survey to determine their mineral and chemical composition. Their mineral composition was found to be similar to that of the glacial sands and gravels in south-central and southeastern Ontario west of the Kingston-Gananoque area as presented in Hewitt and Karrow (1963), i.e. rich in rock fragments derived from Southern Ontario's Paleozoic carbonate formations, and poor in free quartz and feldspar grains. Relatively high amounts of free quartz (40-42%) occur in the samples from a kame deposit in North Easthope Township, Lake Warren beach deposits in Hay, Bosanquet, and Plympton Townships, and a deposit of wind-blown sand in the Pinery dunes in Bosanquet Township. The free feldspar content, mainly alkali feldspar, is relatively highest (30-40%) in the samples from the kame deposit in North Easthope Township and a Lake Algonquin beach deposit in Eastnor Township. The silica content in these samples varies between 58 and 80% and is highest in the Warren beach and Pinery dune samples (70-80%).

The results of preliminary analysis clearly indicate that all of the sand samples do not meet the chemical specifications for specialty industrial sands. The samples of impure feldspathic sand require considerable beneficiation before their chemical suitability for use in glass manufacturing or ceramics can be established (Guillet 1983). The suitability of some of the samples for use as fine aggregate in concrete products also requires further testing.

TABLE 3. MAPS AND REPORTS PERTAINING TO THE SOUTHWESTERN REGIONAL GEOLOGIST AREA PUBLISHED DURING 1984 BY THE ONTARIO GEOLOGICAL SURVEY, MINISTRY OF NATURAL RESOURCES

Open File Reports OFR 5496 OFR 5499 OFR 5498 OFR 5461 Preliminary Maps-Geological Series P2625 - P2635 P2637 - P2647 P2649 - P2666 P2707 - P2714	Aggregate Resources Publications ARIP 50 ARIP 59 ARIP 60 ARIP 67 ARIP 77 ARIP 82 ARIP 83 ARIP 84 ARIP 85 ARIP 86 ARIP 97	OGS Geochemical Series Map Map 80715 Coloured Maps Map 2496 Miscellaneous Reports Oil and Gas Paper 5: Oil and Gas Exploration, Drilling and Production Summary, 1982	Miscellaneous Publications AAPG Paper; Oil and Gas Developments in Eastern Canada in 1983.
---	--	---	--

QUATERNARY GEOLOGY

P.F. Karrow of the University of Waterloo, P.E. Calkin of the State University of New York at Buffalo, and B.H. Feenstra co-chaired the Special Session on the Quaternary History of the Great Lakes at the 1984 Joint Annual Meeting of the Geological and Mineralogical Associations of Canada, May 14-16, in London. Calkin and Feenstra presented a review paper on the Evolution of the Erie Great Lakes. The proceedings of this Special Session are to be published by the Geological Association (Calkin and Feenstra, *in press*).

The coloured final map of the Quaternary geology of the Niagara-Welland area, surveyed by B.H. Feenstra and assistants, was recently published by the Ontario Geological Survey (Feenstra 1984). Preparation of preliminary maps of the Quaternary geology of the Markdale and Owen Sound areas is currently in progress for publication in 1985. Revisions to the final report on the Quaternary geology of the Grimsby-Dunnville area are also in progress.

ONTARIO GEOLOGICAL SURVEY ACTIVITIES

ENGINEERING AND TERRAIN GEOLOGY SECTION

Aleksis Dreimanis, Professor Emeritus, Department of Geology at the University of Western Ontario in London, and P.J. Barnett

of the Engineering and Terrain Geology Section undertook detailed mapping and stratigraphic studies of the Quaternary geology of the Port Stanley (40 I/11) National Topographic Series map area along the northern shore of Lake Erie in Elgin County, south of London.

Staff of the Aggregate Assessment Office completed field investigations of the aggregate resource potential in the following 12 townships: Gosfield North, Gosfield South, and Mersea in Essex County; Harwich and Raleigh in Kent County; Southwold and Yarmouth in Elgin County; North Easthope, South Easthope and Downie in Perth County; McKillop and Morris in Huron County; and St. Vincent in Grey County.

Brief summaries of the important findings during the field investigations in the above areas were presented by Dreimanis and Barnett (1984) and staff of the Aggregate Assessment Office (1984) in Summary of Field Work 1984, Miscellaneous Paper 119 (Table 3).

ONTARIO GEOSCIENCE RESEARCH GRANTS

The following academic studies pertaining to Southwestern Ontario received Ontario Geoscience Research Grants for 1984-1985:

1. "Clay Minerals in Southwestern Ontario Oil Reservoirs" by

M.B. Dusseault, University of Waterloo

2. "Subsurface Quaternary Stratigraphy Using Borehole Geophysics" by R.N. Farvolden, P.K. Karrow, and J.P. Greenhouse
3. "Geochemical and Isotopic Studies of the Salina Formation" by P. Fritz, S.K. Frappe, D.E. Lawson, and E.C. Appleyard.

PETROLEUM ACTIVITY STATISTICS

The following preliminary statistics include data obtained from wells drilled between January 1 to November 30, 1984. Final figures will be available in Oil and Gas Paper 7 which is to be published in 1986.

All oil and natural gas exploration drilling and development in Ontario was conducted in Southwestern Ontario and in Lake Erie during 1984. Table 1 provides a summary of these wells drilled, listed by county and township. Petroleum activity highlights are shown in Figure 1. By November 30 of this year, 185 wells had been drilled compared with 195 for a similar time period in 1983 (Jan. 1 - Dec. 3). Of the 185 wells drilled during 1984, 63 were classified exploratory, 97 development, and 25 classified into the "other" category ("other" includes 9 stratigraphic tests, 9 gas storage wells, 3 brine wells, and 1 each of disposal, liq-

AGGREGATE PRODUCTION FROM LICENCED PITS AND QUARRIES DURING THE YEAR.

TABLE 4

County	Townships	Number of Licenced Pits and Quarries	Sand and Gravel (Tonnes)	Stone (Tonnes)	Clay and Shale (Tonnes)	*Total (Tonnes)
Aylmer	29 (all)	141 (67% of total)	5,507,703	2,424,764	114,778	8,047,245
Chatham	35 (all)	68 (54% of total)	1,622,257	1,490,657	11,585	3,124,499
Owen Sound	28 (all)	166 (80% of total)	2,535,450	168,295	8,645	2,712,390
Simcoe	15 (all)	24 (69% of total)	513,627.5	112,125.7	2,292.8	628,046
Wingham	32 (all)	172 (62% of total)	3,784,575	309,324	134,690	4,228,589
TOTAL	139	571	13,963,612.5	4,505,165.7	271,990.8	18,740,769

* producing

Sources: Ministry of Natural Resources District Offices in Southwestern Region, 1984

uefied petroleum gas (LPG), water, and injection wells). The total depth of section drilled was 89 994.7 m, a decrease of 1% from 88 890.1 m in 1983. Generally, most 1984 drilling statistics show a trend similar to the drilling pattern of 1983.

Statistics for offshore drilling for natural gas in Lake Erie are shown in Table 2. By November 30, 1984, 1670 wells had been drilled in the Lake. Sixty-seven (67) of these wells were drilled during 1984, of which 7 were exploratory and 60 were development wells. Thirty-three (33) wells were completed as gas producers for a drilling success rate of 49%. The total depth of section penetrated under Lake Erie during 1984 was 29 780.3 m.

Of the approximately 1.1 million hectares (ha) available for exploration in Lake Erie, 766 823.9 ha were under Exploratory Licence of Occupation and 301 229.3 ha were held under Production Leases. Therefore, approximately 31 946.8 ha were available for disposition in 1984. Oil exploration is not conducted in Lake Erie, as in 1970 Ontario adopted the recommendations of the Inter-

national Lake Erie Water Pollution Board of the International Joint Commission resulting in the prohibition of oil or wet gas production, the plugging of all wells capable of oil production, and a moratorium on issuance of Lake Erie mineral rights west of a line drawn between Point Pelee and Marblehead, Ohio.

On land, a total of 118 wells had been drilled by November 30 for a total depth of section of 60 214.4 m. Of these 118 wells, 56 were classified as exploratory, 37 development, and the remaining 25 wells were classified as "other" as previously defined. Sixteen (16) exploratory and 27 development wells were completed as producers for a drilling success rate of 39% (not including wells listed as waiting on completion or WOCO).

During 1984, the success ratio for drilling in Ontario both onshore and offshore combined was 43% (not including wells listed as WOCO). Fifty (50) wells were completed as gas producers (8 exploratory, 42 development) and 26 wells as oil producers (9 exploratory, 17 development). Total oil produced in 1984 is estimated to be 84 000 m³ valued at approxi-

mately \$20 million. Total gas production is estimated at 470 million m³ worth about \$55 million.

MINERAL ACTIVITY STATISTICS

AGGREGATES

The total production of sand and gravel, stone, clay, and shale from licenced and wayside pits and quarries in 1983 in the Southwestern Region remained at the 1982 level of 21 million tonnes with an estimated value of \$60 million. Sand and gravel aggregate production from 549 active licenced operations, representing 67% of all licenced sand and gravel pits throughout the Region, rose by 500 000 tonnes over the 1982 level to 14 million tonnes (Table 4). This increase is largely due to a greater output in 1983 from a fewer number of producing operations in the Wingham District. Although sand and gravel wayside operations were more numerous (113) in 1983 than (90) in 1982, their overall production declined by 1 million tonnes to 2.3 million tonnes. Nearly all wayside operations produced aggregate for municipal road construction purposes. In ad-

dition, a small amount of sand and gravel was dredged by a commercial operation, licenced under the Beach Protection Act, from the bed of Lake Erie in the area of the international boundary southeast of Pelee Island. All of the aggregate produced from the lake bed was exported to Ohio.

In 1983, total stone quarried at 16 licenced operations was 4.5 million tonnes (Table 4), up by 500 000 over 1982. About 50 to 60% of the crushed stone tonnage is consumed in local manufacture of high-calcium lime (Beachville-Ingersoll, Amherstburg). About 30 to 40% is used in construction aggregate and pulverized stone production. Between 10 and 20% is consumed by the local cement manufacturing industry (Woodstock, Themsford, St. Marys). Total building stone production of nearly 31 600 tonnes at Bruce Peninsula quarries increased from the previous year.

Approximately 2 million tonnes of crushed stone of concrete aggregate quality was brought into the Sarnia-Windsor area by truck from the Komoka delta deposit west of London, or by vessel from the Manitoulin Island quarry and other quarries in northern Michigan. Attempts are being made to replace this imported quality aggregate by utilizing material from the Lucas Formation. This material is being derived from the upper bench of Allied Chemical's, McGregor Quarry, and will be processed for concrete and other construction aggregate purposes.

The cement plants at Woodstock and St. Marys together utilized approximately 237 600 tonnes of local glacial drift in the manufacture of grey Portland cement in 1983 (Table 4: "Clay and Shale" column). Plants engaged in manufacturing of clay drain tile at Dresden, Meaford, Norwich, Paisley, Parkhill, and Thedford used local glacial lake clays or shales. The total tonnage extracted in 1983 was 34 417 tonnes. This figure represents no increase over the volume used in 1982.

SALT

Ontario's increasing salt production, approximately 6.8 million tonnes in 1984 based on company estimates and valued at \$116 million, comes from underground mines and brine well operations in the Salina Formation at Goderich, Windsor, Sarnia, and Amherstburg. The estimated 1984 production will represent an increase of approximately 600 000 tonnes over the 1983 value. A combined total of nearly 5.24 million tonnes of rock salt has been extracted from the A-2 Unit at a depth of 537 m at Domtar's Goderich Mine and from the middle F Unit at a depth of 297 m at Canadian Rock Salt Company Limited's Ojibway Mine at Windsor.

A combined total of nearly 1.6 million tonnes of fine salt has been extracted by brine well operation from the A-2 and B Units at Sarnia (Dow Chemical), and from the B Unit at a depth between 305 and 366 m at Amherstburg (Allied Chemical), 427 and 457 m at Windsor (Canadian Salt), and 427 m at Goderich (Domtar). Several new brine wells have been drilled in Anderdon Township near Amherstburg (Allied Chemical) and in Moore Township near Sarnia (Dow Chemical) for salt production (Figure 1).

THESIS PROJECTS

The following is a list of new M.Sc. and B.Sc. thesis studies of various aspects of the geology of Southwestern Ontario currently in progress at McMaster University in Hamilton, Queens University in Kingston and the University of Western Ontario in London. The information was provided by the Geology Departments of the various universities.

M.Sc.THESES

McMaster University

Rice, C.: Solution Generated Fabrics in Carbonate Rocks of the Lockport Formation, Windsor-Hamilton Area.

Queens University

Grimes, D.J.: Karst and Development of Crust and Permeability of Silurian Pinnacle Reefs, Southwestern Ontario.

B.Sc.THESES

Queens University

Card, G.M.: Stratigraphy and Sedimentology of Upper Devonian Black Shales, Southwestern Ontario.

University of Western Ontario

Brown, G.: Comparative Geochemistry of Southwestern Ontario Black Shales in Bedrock and Till Clasts for Glacier Provenance.

Burns, G.: Quaternary and Glacial Geology Exposed in the Springer No. 3 Gravel Pit near St. Thomas, Ontario.

de la Bastide, A.: Hydrocarbon Potential of the Bass Islands Formation in the Silver Creek Field, Lake Erie.

Dollar, P.: Geology of the Sarnia-London Road Oil Field.

Hadley, S.: Stratigraphy, Petrology and Geochemistry of the Upper Silurian A-2 Unit, in Lambton, Kent, and Elgin Counties.

Kriter, K.: Depositional Environment and Subsurface Extent of the DeCew Formation.

REFERENCES

Aggregate Assessment Office Staff 1984: Aggregate Resources Inventory Program; p.104-109 in Summary of Field Work, 1984, Ontario Geological Survey, edited by John Wood, Owen L. White, R.B. Barlow, and A.C. Colvine, Ontario Geological Survey, Miscellaneous Paper 119, 309p.

Calkin, P.E., and Feenstra, B.H. In Press: Evolution of the Erie Great Lakes; in Quaternary History of the Great Lakes, Special Publication of the Geological Association of Canada, edited by P.F. Karrow.

- Dreimanis, Aleksis, and Barnett, P.J.
1984: Quaternary Geology and Stratigraphy of the Port Stanley Area, Elgin County; p.100-101 *in* Summary of Field Work, 1984, Ontario Geological Survey, edited by John Wood, Owen L. White, R.B. Barlow, and A.C. Colvine, Ontario Geological Survey, Miscellaneous Paper 119, 309p.
- Feensira, B.H.
1984: Quaternary Geology of the Niagara-Welland Area; Ontario Geological Survey, Map 2496, Quaternary Geology Series, scale 1:50 000, Geology 1969-1972.
- Guillet, G.R.
1983: Westree Sand Deposit, Westree and Garvey Townships, District of Sudbury; Ontario Geological Survey Open File Report 5445, 77p., 2 tables, 3 figures, and 2 appendices.
- Habib, H.E., and Trevail, R.A.
1984: Oil and Gas Exploration, Drilling, and Production Summary, 1982; Ontario Ministry of Natural Resources, Oil and Gas Paper 5, 216p.
- Hewitt, D.F., and Karrow, P.F.
1963: Sand and Gravel in Southern Ontario; Ontario Department of Mines, Industrial Mineral Report No. 11, 151p.
- Trevail, R.A.
In Press: Hydrocarbon Entrapment in the Trenton of Southern Ontario; *in* Special Volume, American Association of Petroleum Geologists.
- Trevail, R.A., and Parker, Debra K.
1984: Oil and Gas Developments in Eastern Canada in 1983; The American Association of Petroleum Geologists Bulletin, Volume 68, Number 10, p.1281-1296.
- Trevail, R.A., and Singhroy, V.H.
In Press: Interpretation of Geology, Geophysics and Remote Sensing for Hydrocarbon Exploration in Southern Ontario; Proceedings of the 23rd Annual Conference of the Ontario Petroleum Institute.

