

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

**Ontario Geological Survey
Miscellaneous Paper 78**

**Annual Report
of the
Regional and Resident Geologists
1977**

Edited by

C.R. Kustra

Chief, Geoservices Section

1978



Ontario

**Ministry of
Natural
Resources**

**Hon. Frank S. Miller
Minister**

**Dr. J. K. Reynolds
Deputy Minister**

©OMNR-OGS 1978
Printed in Canada

This report is published by permission of E.G. Pye, Director, Ontario Geological Survey.

Publications of the Ontario Ministry of Natural Resources and price list are available through the *Map Unit, Public Service Centre, Queen's Park, Toronto*, and the *Ontario Government Bookstore, 880 Bay Street, Toronto*. Orders for publications should be accompanied by cheque or money order, payable to the *Treasurer of Ontario*.

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:

Giblin, P.E.

1978: 1977 Report of the Northeastern Regional Geologist and Sault Ste. Marie Resident Geologist p.83-90 *in* Annual Report of the Regional and Resident Geologists, 1977, edited by C.R. Kustra, Ontario Geological Survey Misc. Paper MP78, 121p.

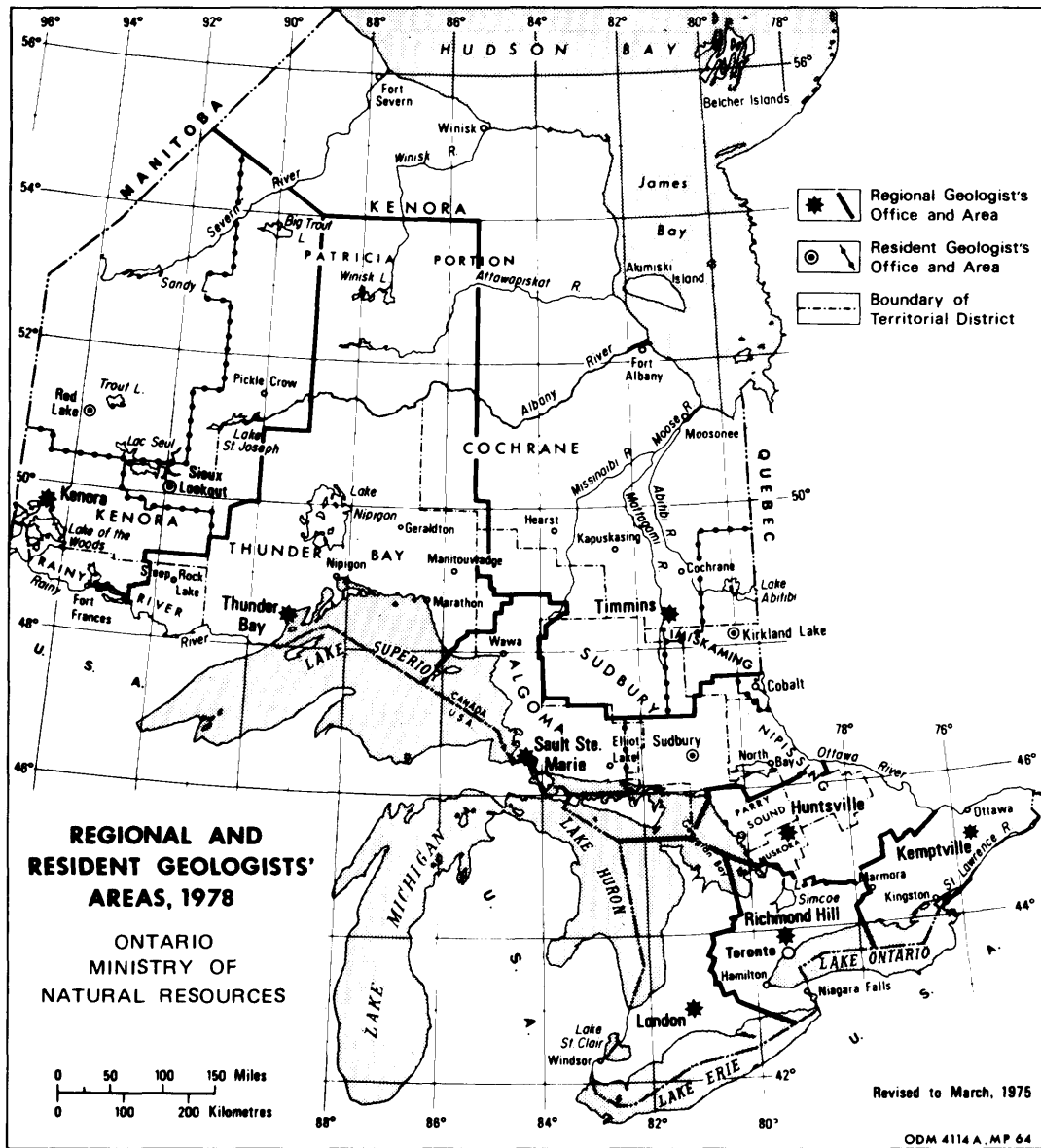
PREFACE

This report summarizes the activities of Regional and Resident Geologists for the year 1977. It is also an account of mining and exploration activities in Ontario, and is prepared from geoscience information collected and filed in 1977. For the convenience of the reader, listings of new additions to the records, including reports of government survey and university sponsored projects are provided.

Regional and Resident Geologists are located in various centres of the Province to provide geoscience information and advice to the public on the geology and mineral deposits of Ontario. As part of the government resource management organization in the field, they provide geoscience data into a variety of land planning functions.

Each Regional and Resident Geologist maintains a library of published and unpublished reports including publications of the Division of Mines, Ontario Ministry of Natural Resources 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 Geologist and other staff geologists, and information received directly from companies and individuals. In addition, most offices contain microfiche copies of the Ontario Index to Geoscience Data, 1971. Duplicate copies of work submitted for assessment credit may also be examined in the Assessment Files Research Office, Room 801, 77 Grenville St., Toronto. Regional and Resident Geologists and their records are available for consultation without charge.

Staff changes during 1977 are recorded in the introductory remarks of each section. L.A. Tihor assumed responsibilities as Regional Geologist at Timmins; W.O. Karvinen replaced D.G. Innes, who was transferred to the Mineral Deposits Section, Geological Branch, as Resident Geologist at Sudbury.



REGIONAL GEOLOGISTS' OFFICES

Northwestern Region – R.C. Beard
 North Central Region – K.G. Fenwick
 Northern Region – L.A. Tihor
 Northeastern Region – P.E. Gibling
 Algonquin Region – J.R. Trusler
 Eastern Region – M.A. Klugman
 Central Region – M. Narain
 Southwestern Region – R.G. Bryant

ADDRESS

808 Robertson St., Kenora, P9N 3X7
 435 James St.S., Thunder Bay, P7C 5G6
 60 Wilson Ave., Timmins, P4N 3W2
 875 Queen St.E., Sault Ste. Marie, P6A 2B3
 Box 9000, Huntsville, POA 1K0
 South Boundary Road, Kemptville, K0G 1J0
 10670 Yonge St., Richmond Hill, L4C 3C9
 1106 Dearness Drive, London, N6E 1N9

TELEPHONE

(807) 468-3111
 (807) 475-1331
 (705) 267-1401
 (705) 942-1414
 (705) 789-9611
 (613) 258-3413
 (416) 884-9203
 (519) 681-5350

RESIDENT GEOLOGISTS' OFFICES

Red Lake – L.O. Koskitalo
 Sioux Lookout – P.A. Palonen
 Kirkland Lake – H.L. Lovell
 Sudbury – W.O. Karvinen

Ontario Govt. Bldg., Box 860, Red Lake, P0V 2M0
 Box 1089, Sioux Lookout, P0V 2T0
 4 Government Rd.E., Kirkland Lake, P2N 1A2
 1112 The Kingsway, Sudbury, P3B 2E5

(807) 727-2252
 (807) 737-1291
 (705) 567-5242
 (705) 566-2580

TABLE OF CONTENTS

	Page
NORTHWESTERN REGION	
1977 Report of Northwestern Regional Geologist and Kenora Resident Geologist	1
1977 Report of Red Lake Resident Geologist	14
1977 Report of Sioux Lookout Resident Geologist	28
NORTH CENTRAL REGION	
1977 Report of North Central Regional Geologist	37
NORTHERN REGION	
1977 Report of Northern Regional Geologist and Timmins Resident Geologist	52
1977 Report of Kirkland Lake Resident Geologist	66
NORTHEASTERN REGION	
1977 Report of Northeastern Regional Geologist and Sault Ste. Marie Resident Geologist.	83
1977 Report of Sudbury Resident Geologist.	91
ALGONQUIN REGION	
1977 Report of Algonquin Regional Geologist	100
EASTERN REGION	
1977 Report of Eastern Regional Geologist	109
CENTRAL REGION	
1977 Report of Central Regional Geologist	114
SOUTHWESTERN REGION	
1977 Report of Southwestern Regional Geologist	118

LIST OF PUBLICATIONS (back pocket)

1977 Supplement to Bulletin 25, List of Publications.
Geological Branch, Ontario Ministry of Natural Resources. 20p.

1977 Report of Northwestern Regional Geologist and Kenora Resident Geologist

R.C. Beard¹ and S. Rivett²

CONTENTS

Introduction	1
Regional Geologist's Activities	1
Mining Activity	3
Exploration Activity	3
Base Metal Exploration	3
Uranium Exploration	3
Gold Exploration	4
Iron Exploration	4
Reconnaissance of Airborne Radiometric Anomalies	4
Sydney Lake Zone	4
Umfreville Lake Area	6
Dryberry Dome	6
Carbonate-Related Gold Occurrences in the Dinorwic Lake Area	6
Property Examinations	7
Petursson Lake Uranium Occurrence	7
Snook Lake Uranium Occurrence	7
Perch Lake Uranium Occurrence	8
Barber Lake Base Metal Occurrence	8
McTavish Base Metal Occurrence	8
Access Roads	9
Mineral Exploration Assistance Program	9
Geological Branch Activities	9
Research by Other Agencies	9
Geological Survey of Canada	9
Centre for Precambrian Studies, University of Manitoba	9
University Theses	9
Recent Publications and References	10

TABLES

1—Maps and Reports Issued by the Geological Branch . . .	11
2—Exploration Activity in 1977	12
3—Assessment Work and Other Information Received in 1977	12

FIGURES

1—Kenora Resident Geologist's District	2
2—Location of Ground Checks of Airborne Radiometric Anomalies, Sydney Lake-Umfreville Lake Area	5

¹ Regional Geologist, Ontario Ministry of Natural Resources,
Provincial Building, 808 Robertson Street, Kenora, P9N 3X7.

² Resource Geologist.

INTRODUCTION

Staffing of the Kenora office remained unchanged in 1977, with R. Beard as Regional Geologist, S. Rivett as Resource Geologist, and B. Stockham and V. Bruce, secretaries. Three student technicians were employed through the summer, under the Experience '77 program.

REGIONAL GEOLOGIST'S ACTIVITIES

The Regional Geologist's office in Kenora continued to provide information and geoscience consultative service to the mining industry, the general public, and the various levels of government, through its professional staff and its geotechnical library and files.

The Kenora staff, as part of its program, visited a number of producing and recently producing mines in northwestern Ontario, as follows: Campbell Red Lake Mines Limited; Dickenson Mines Limited; mill of the Gordon Lake Mine, (Consolidated Canadian Faraday Limited); Thierry Mine (Union Miniere Exploration and Mining Corporation Limited); Mattabi Mines Limited; Lyon Lake Mine (Mattagami Lake Mines Limited, under development); Sturgeon Lake Mines Limited (Falconbridge Copper Limited and NBU Mines Limited); Shebandowan Mine (Inco Limited); Steep Rock Iron Mines Limited; Caland Ore Company Limited; Arctic Peat Moss Limited; Universal Granite Company Limited. In addition, 14 properties undergoing active exploration, and 10 inactive mineral properties were examined and reported upon. A stratigraphic mapping project was undertaken by the Regional Geologist, in the Dinorwic area east of Dryden, to study the geological control of carbonate-associated gold occurrences.

A field inventory of past-producing gold properties in the Kenora Mining Division was undertaken to assess their suitability as possible historical mining sites or museums, and to inventory all existing mine buildings, equipment, and other historical artifacts on the sites. Several of these properties will be studied in more detail to determine their historical significance and possible tourism potential.

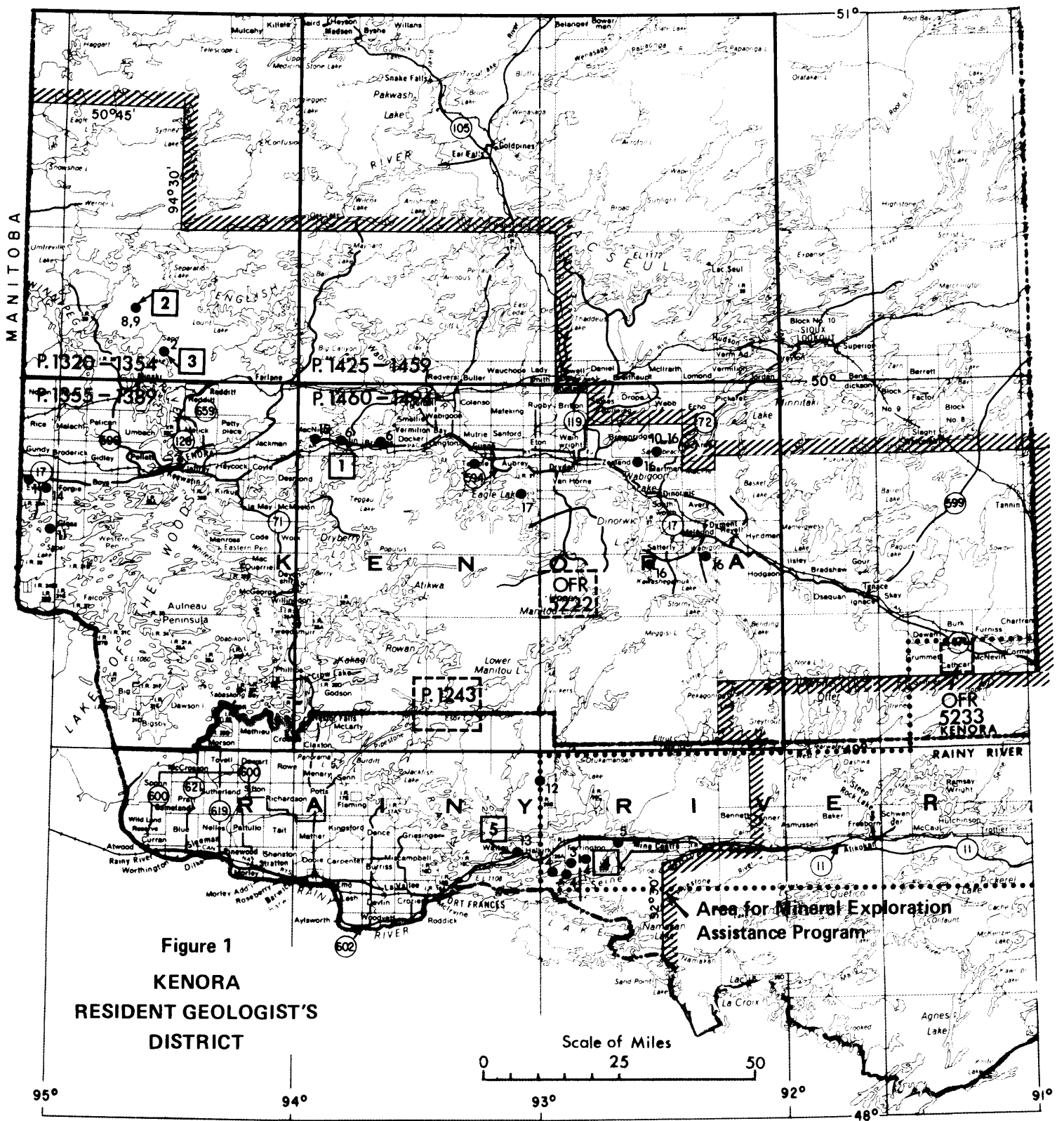


Figure 1
KENORA
RESIDENT GEOLOGIST'S
DISTRICT

Scale of Miles
 0 25 50

EXPLANATION

- Exploration activity in 1977 (keyed to Table 2)
- 3 Property visit described in report
- ▨ Boundary of Resident Geologist's District
- Map or report issued by the Geological Branch in 1977 (keyed to Table 1)
- P - Preliminary Map
- OFR - Open File Report
- Federal-Provincial Uranium Reconnaissance Program

The results of a Federal-Provincial airborne radiometric survey were released in August, and geological reconnaissance was carried out by the Kenora staff in areas north and east of Kenora, to determine the cause and economic significance of some of the more prominent anomalies. Because of the increased interest in uranium deposits over the past year, a number of field trips were organized to visit some of the known uranium occurrences in the Vermilion Bay area and in the English River area north of Kenora. Participants included representatives of the Geological Branch, the Manitoba Mines Branch, the Geological Survey of Canada, and industry.

Considerable time was spent on the planning committees of both the Strategic Land Use Plan for Northwestern Ontario (SLUP) and the West Patricia Land Use Plan (WPLUP). The main concern of the Regional Geologist in these exercises was to prevent, as much as possible, conflict between mineral resource development and other land uses. Mineral-potential evaluations were prepared for four proposed park areas, 14 lake development plans, and one timber management plan.

The revision and indexing of the Kenora Regional Geologist's Assessment Files were completed, and index overlays and accompanying lists of data, for each NTS sheet, are now available for use at the Kenora office.

MINING ACTIVITY

No producing mines operated in the Kenora Mining Division in 1977, nor were any major mining properties under active development. The Maybrun Mine Limited property at Atikwa Lake, east of Sioux Narrows, remained on standby throughout the year. Disposition of mine and mill equipment, and rehabilitation of the tailings area at the recently closed Consolidated Canadian Faraday Limited property at Werner Lake continued through the summer.

Granite tombstone blanks were quarried at the Universal Granite Company quarry near Vermilion Bay.

No rock ballast was quarried at either the White or Hawk Lake quarries during 1977. Large volumes of material had been stockpiled at both sites the previous year, providing adequate supplies for the current year.

EXPLORATION ACTIVITY

A reduction in the level of exploration activity was again noted in 1977 in the Kenora Mining Division. The number of claims recorded during the year decreased, with 1,237 claims recorded, down 10 percent from the 1,380 claims recorded the previous year. More significant however, was the 26 percent decrease in the amount of work filed for assessment credit, with 40,316 days

of credit recorded in 1977, compared with 55,042 days credit the previous year.

Uranium exploration made up a significant portion of the mining activity in the area. The release of the joint Federal-Provincial airborne radiometric survey, in August, covering most of the Kenora Mining Division, stimulated considerable staking activity and reconnaissance follow-up by both individuals and companies.

Some large integrated surveys for base metals were conducted by major mining companies. However widespread corporate budget constraints reduced the general level of this type of program. Many companies emphasized 2- or 3-man geological reconnaissance projects, searching out favorable areas for work in the future.

Some interest was displayed in lithium deposits during the year. A number of previously known small occurrences in the Dryden area were restaked and prospected.

Renewed interest was displayed in several of the district's known copper-nickel deposits, especially those associated with gabbroic rocks. However, no detailed programs to evaluate specific deposits were noted, except for some diamond drilling on the former Norpax property in the Werner Lake area.

An increase in the price of gold revived interest in several gold deposits of the area, resulting in drilling programs on at least three properties, described below.

Base Metal Exploration

In 1977 most of the exploration activity directed towards base metals was centred in the Dryden area. Integrated surveys were carried out in the vicinity of Eagle Lake, Wabigoon Lake and Dinorwic Lake. Some activity was also noted in the Manitou Lakes area, the Rainy Lake area, and the Otukamamoan Lake area. Major companies engaged in these programs included Amoco Canada Petroleum Company Limited, Gulf Minerals Limited, Hudson Bay Exploration and Development Company Limited, Hudbay Mining Limited (formerly HBOG Mining Limited), Inco Limited, Selco Mining Corporation Limited and Sherritt Gordon Mines Limited.

Exploration programs, including ground geophysical surveys and diamond drilling, were also noted in the Werner Lake area north of Kenora, in the Watten-Halkirk-Farrington Townships area east of Fort Frances, and in the townships northeast of Dryden.

No significant discoveries were reported from any of these exploration programs.

Uranium Exploration

Much of the claim staking related to uranium exploration was spurred by the release of a reconnaissance

airborne radiometric survey carried out jointly by the Provincial and the Federal governments. Following release of the airborne results, the more significant anomalies were immediately staked.

Follow-up work on the airborne anomalies and other known uranium occurrences, acquired both this year and in previous years, was relatively limited. Several detailed airborne radiometric surveys were undertaken. Ground follow-up work, including geophysical surveys and diamond drilling, was carried out on uranium occurrences in Temple Township; at Peturrson Lake in Tustin Township; on the Pipeline occurrence in Bridges Township; at Tourist Lake and Perch Lake north of Kenora; and at Richard Lake in the Vermilion Bay area.

Diamond drilling at Richard Lake, by Golden Standard Mines Limited on the old New Campbell Island Mines Limited property, consisted of 10 holes, drilled from surface, to confirm and detail the tonnages outlined in earlier diamond drilling and underground development work. Work was suspended on this program at mid-year.

Companies active in uranium exploration in the Kenora area include Urangesellschaft Canada Limited, Sherritt Gordon Mines Limited, Noranda Exploration Company Limited, Anschutz Oil Company, Consolidated Summit Mines Limited, F.O.B. Mining and Exploration Limited, and Rollmac Exploration Corporation Limited.

Gold Exploration

Diamond drilling was carried out on three properties in 1977; earlier work on the three included trenching and geophysical surveys.

The Gold Mountain occurrence on the Western Peninsula, Lake of the Woods, was tested by Cominco Limited with two diamond drill holes (Cominco Limited, personal communication, 1977).

The Arsenic zone on the former Electrum Lake Gold Mines Limited property in the Shoal Lake area was drilled by Pelican Mines Limited. Low gold values were reported in seven of eight holes drilled; one hole intersected 5.7 feet grading 0.33 ounces gold per ton (The Northern Miner, February 9, 1978).

Ed-Vic Explorations drilled two holes on the Stellar occurrence west of Mine Centre.

Iron Exploration

Feasibility studies were continued on the Bending Lake iron property of The Algoma Steel Corporation Limited-Algoma Ore Division. A detailed diamond drilling program, completed last year, has delineated the

orebody, and a 600 ton bulk sample was removed and tested in early 1977 (Dryden Observer, Sept. 28, 1977). Company reports indicate sufficient open pit reserves to sustain an output of 2.0 million tons of pellets per year for at least 20 years. Plans would reportedly include an 80 km slurry pipeline to transport concentrate from the mine site, southwest of Ignace, to the company's pelletizer operations at Atikokan. This would be the first pipeline of its type operating in subarctic climatic conditions.

Surveying of the right-of-way for a highway linking Atikokan with the Trans-Canada Highway, via the proposed mine site, was underway in 1977 (Dryden Observer, Sept. 28, 1977).

RECONNAISSANCE OF AIRBORNE RADIOMETRIC ANOMALIES

Following the release of the Uranium Reconnaissance Program (URP) airborne radiometric survey in August, the Kenora staff investigated a number of the more significant anomalies in an attempt to determine their cause and to evaluate their economic potential. Most of the reconnaissance in the areas north of Kenora (see Figure 2) was helicopter assisted, and the time spent at each stop was limited. No ground radiometry was used to pinpoint the anomalous zones, but prospect pits and trenches helped to locate some of the radioactive areas. The following describe the general geology and lithology in the vicinity of the anomalies, but may not explain the cause of the anomaly.

Sydney Lake Zone

The Sydney Lake Cataclastic Zone is a major break, or zone of dislocation, which represents the contact between the Uchi Subprovince to the north and the English River Subprovince (Breaks *et al.* 1975). This zone is well delineated by the radiometric survey, showing up on most flight lines (5 km line spacing) as 1.5 to 2.5 ppm uranium anomalies.

Six separate stops along this zone (Stops 1-6 on Figure 2) revealed a variety of granitoid and anatectic rock types exhibiting radioactivity levels ranging from background to 3X background. Varying degrees of cataclasis were noted at several locations, but the relationship between uranium mineralization and the cataclastic zone is still uncertain.

Stop 1, Octopus Lake. Foliated and sheared granitoid rock, highly cataclastic with coarse augen feldspar, highly sericitic, low radioactivity.

Stop 2, Johnson Lake. Grey, highly folded quartz-biotite metasediment with occasional (10 percent) narrow lenses and knots of leucosome, little cataclasis, radioactivity 1½X back-

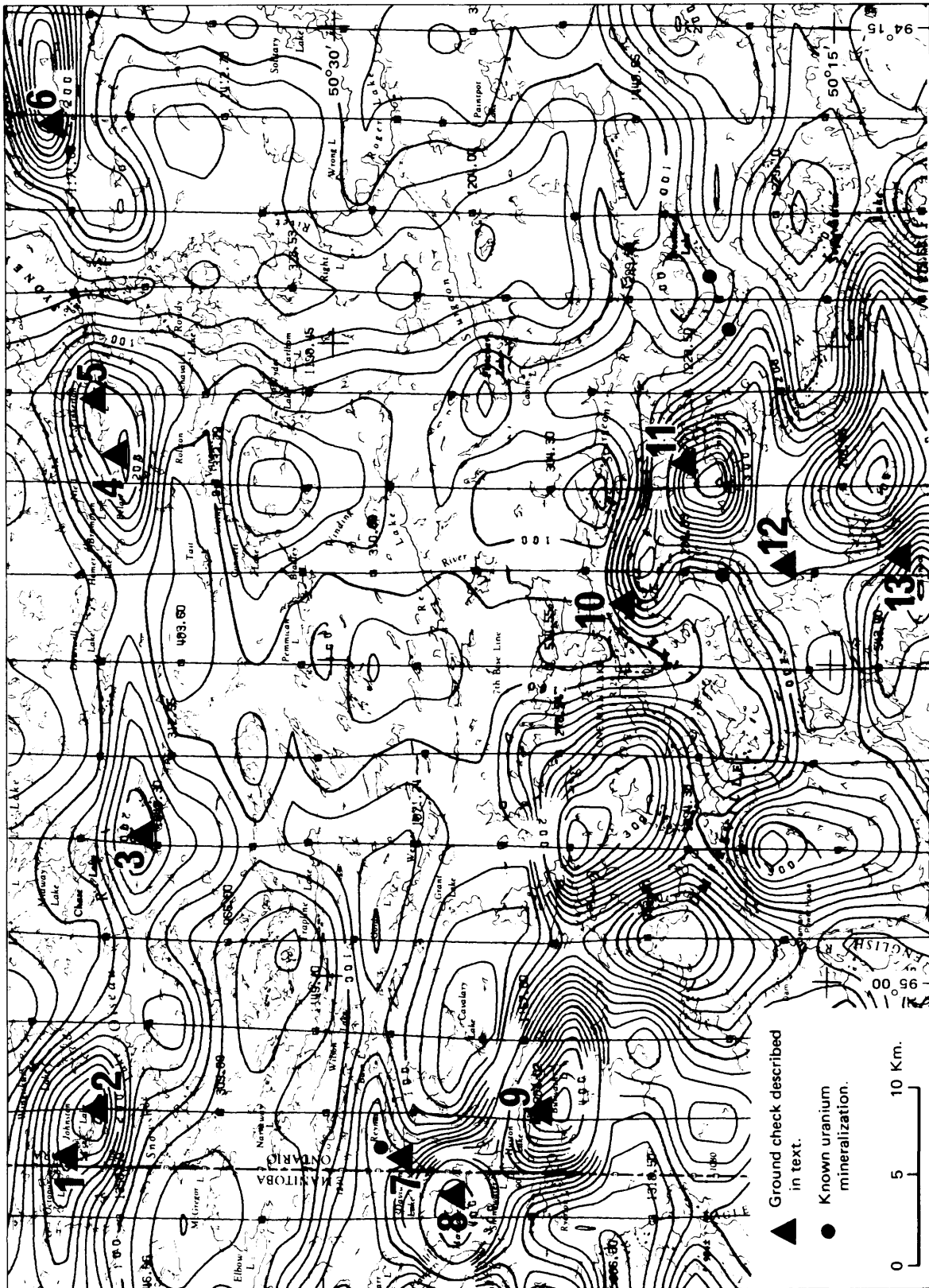


Figure 2 — Location of ground checks of airborne radiometric anomalies, Sydney Lake-Umfreville Lake area. Contours in equivalent ppm uranium. From ODM-GSC (1977a).

ground.

Stop 3, south of Chase Lake. Homogeneous diatexite with 1 percent widely scattered, thin relic bands of sediment up to 15 cm wide, slight cataclasis, radioactivity 3X background.

Stop 4, Belair Lake. White homogeneous diatexite, medium grained with small spots of relic biotite throughout and 40 percent paleosome material, occasional pegmatite sections, moderate cataclasis, radioactivity 1½X background.

Stop 5, southwest arm of Sydney Lake. Predominantly leucogranite with some sections of relic sedimentary rock.

Stop 6, south of Pineneedle Lake. White inhomogeneous diatexite as at stop 4, with 50 percent paleosome, highly cataclastic, radioactivity 2X background.

Umfreville Lake Area

These anomalies appear to reflect a narrow to broad band of supracrustal rocks extending eastward from the Manitoba border to the English River (Breaks *et al.* 1975b). This same stratigraphic unit continues eastward from the English River, but exhibits little radioactive imprint between the English River and Lennan Lake. In detail, this unit of supracrustal rocks consists of a sequence of metasediments, mostly greywacke, with occasional volcanic sections, all of which have been subjected to varying degrees of anatexis, and consequently containing granitoid mobilizate in varying amounts.

Several airborne anomalies south of Umfreville Lake cannot be directly related to mappable units of supracrustal rocks. However, as at Snook Lake and Tourist Lake, metasediments and inhomogeneous diatexite derived from supracrustal rocks are associated with known uranium mineralization and areas of anomalous radioactivity.

Previous exploration work in the Umfreville Lake section located a number of uranium occurrences, many of which are related to airborne anomalies.

Stop 7, Davidson Lake uranium occurrence. Radioactivity associated with pegmatitic phases of pink to grey granitoid rocks containing some relic metasediments, radioactivity 2X to 10X background at showings.

Stop 8, Marijane Lake. Pink quartz monzonite with occasional pegmatitic sections, some magnetite, little biotite. Uniform moderate radioactivity with some areas up to 3X background.

Stop 9, Huston Lake. Medium- to fine-grained pink quartz monzonite, nebulitic, containing 10-15 percent biotite as fine disseminations and small clumps, radioactivity similar to stop 2, moderate radioactivity (2-2½X background) over large areas.

Stop 10, Oneman Lake uranium occurrence. Mixed quartz-biotite metasediments and inhomogeneous diatexite, radioactivity largely confined to more pegmatitic phases of leucosome which contain large proportion of vague irregular seams and spots of biotite, very high radioactivity locally.

Stop 11, Pancer uranium occurrence. Radioactivity associated with pink granitoid material, varying from very fine grained to pegmatitic, usually with moderate amounts of biotite as relic seams and coarse clumps, some dense, fine-

grained, cherty-looking sections suggesting remelted felsic volcanic rock or arkose, very high radioactivity locally.

Stop 12, Tourist Lake uranium occurrence. Mixed metasediments and leucogranite, radioactivity associated with white granitoid sections varying from medium grained to pegmatitic, locally having a vaguely porphyritic texture, granitoid contains about 15 percent biotite as coarse clumps and vague relic layering, very high radioactivity locally, associated with coarser biotitic sections.

Stop 13, Snook Lake uranium occurrence. See description under 'Property Examination' section. Moderate to high radioactivity over relatively large areas.

Dryberry Dome

Approximately 50 km southeast of Kenora, radiometric anomalies, ranging in intensity from 2 to 3 ppm uranium (see map P.1462, OGS-GSC 1977b) are grouped around what may be the western margin of the Crabclaw Lake Batholith of the Dryberry Dome (Morin 1977).

The anomaly at Feist Lake was not examined, but exploration work is currently being carried out on a claim group covering this anomaly. Radioactivity is locally very high, and is reportedly associated with 'gneissic' (or migmatitic?) rocks.

Although the central part of the anomaly at Hillock Lake was not examined, anomalous radioactivity (about 2X background) was noted on the ground, north and east of the peak of the anomaly. The relatively low radioactivity is associated with pink, medium-grained, homogeneous quartz monzonites containing < 3 percent biotite. Some sections contain rafts and inclusions of sedimentary rocks, as well as relic biotite layering (inhomogeneous diatexite).

CARBONATE-RELATED GOLD OCCURRENCES IN THE DINORWIC LAKE AREA

A number of gold occurrences in the areas north and east of Dinorwic Lake are related to carbonate zones and highly carbonated rocks in mafic metavolcanics. The character of the carbonate-quartz at several of these occurrences, including the L. Pidgeon occurrence in Avery Township, suggests a possible syngenetic origin, perhaps related to volcanic exhalative activity, and hence might be stratigraphically controlled.

Geological mapping was undertaken by the authors in an attempt to determine the correlation of the gold-carbonate occurrences with volcanic stratigraphy. Results of this work were largely negative. Highly carbonated zones are very common throughout the area; however, the more discrete carbonate-quartz units with which the gold is often associated are generally too narrow and localized to be mapped over any distances. The mafic metavolcanics tend to be rather uniform throughout the area and, although concurrent geological mapping

in the Dinorwic area by the Precambrian Geology Section has refined the stratigraphy and structure over the previous mapping (Blackburn 1977), few distinctive marker horizons could be carried far enough across the area to provide adequate stratigraphic control for the study.

On the Avery-Southworth Townships boundary, west of Avery Lake, a magnetic anomaly approximately 15 m wide, striking nearly north, was traced northerly for 730 m. This anomaly is caused by a massive, dark green magnetite-rich rock of mafic to ultramafic composition. It appears to intrude the surrounding mafic metavolcanics.

PROPERTY EXAMINATIONS

In 1977, a total of 24 mining properties or mineral occurrences were examined, including the following:

Uranium:

- Bamaji Lake occurrence, north of Sioux Lookout
- Bluett Lake occurrence, northeast of Dryden
- Coulee occurrence, Bridges Tp.
- Davidson Lake occurrence, Werner Lake area north of Kenora
- Favourable Lake occurrences, north of Red Lake
- Perch Lake occurrence, north of Kenora
- Petursson Lake occurrence, Tustin Tp.
- Pine Road occurrence, Bridges Tp.
- Richard Lake occurrence, MacNicol Tp.
- Snook Lake occurrence, north of Kenora

Base metals:

- Belacoma prospect
- Emo (Young-Corrigan) prospect, Dobie Tp.
- Gagne Lake prospect, Farrington Tp.
- McTavish occurrence, Watten Tp.
- Norpax prospect, Werner Lake area
- Barber Lake occurrence, Mine Centre area
- Werner Lake Cobalt Mine, Werner Lake area

Gold:

- Electrum (Arsenic zone) prospect, Shoal Lake area, west of Kenora
- Gold Mountain occurrence, Western Peninsula, Lake of the Woods
- Stellar prospect, Mine Centre area

Iron:

- Bending Lake (The Algoma Steel Corporation Limited) prospect, west of Ignace

Petursson Lake Uranium Occurrence

This radioactive occurrence located in Tustin Township east of Kenora was discovered by R. Fairservice in 1976. One grab sample obtained at that time ran 42 pounds U₃O₈. Further prospecting revealed significant radioactivity over a length of about 300 m (R. Fairservice, personal communication 1977).

In early 1977 the property was optioned by Sherritt Gordon Mines Limited. A ground radiometric survey of

the property using a GAD-6 was carried out and four Winkie diamond drill holes put down (Regional Geologist's Files, Ontario Ministry of Natural Resources, Kenora). The radiometric survey outlined a relatively well-defined, radioactive zone, 350 m long with an average width of about 8 m. This zone is nearly continuous, with occasional slight offsets and irregularities. Rock outcrop is extensive along the anomaly but trenching and blasting are difficult due to the presence of a pipeline, which parallels the zone to the east, and a power line which crosses it near the north end.

Uranium mineralization, probably fine-grained uraniumite, occurs in pink medium-grained to pegmatitic quartz monzonite. The mineralized zone parallels the contact between the granitic rocks and well-bedded, highly amphibolitized mafic volcanic tuff, several hundred metres from the main contact. Rafts and tongues of volcanic rock are common. Pegmatite consists of orthoclase, quartz and some biotite which occurs in segregations, 3 to 20 mm in size, and occasionally up to 7 cm. Yellow staining is present locally. Allanite crystals up to 15 mm have been usually identified in the field. Only minor magnetite is present.

Scintillometer readings over a 30 m long by 10 m wide section of outcrop gave uranium equivalents in the range of 180 ppm uranium.

Average assays from three drill holes range from 0.2 pounds to 0.4 pounds, and occasional 0.6 m to 1.5 m sections assay from 1 to 2 pounds U₃O₈ (Regional Geologist's Files, Ontario Ministry of Natural Resources, Kenora).

Snook Lake Uranium Occurrence

This uranium occurrence, located 50 km north of Kenora, was discovered and trenched at an earlier date by persons unknown. The property was restaked in 1976 by J. Harrison who has since carried out additional trenching on the property. One diamond drill hole was drilled in late 1976 (J. Harrison, personal communication 1977).

Uranium mineralization is associated with a coarse-grained, weakly porphyritic pink granite or quartz monzonite. The rock is very homogeneous except for a few finer-grained and pegmatitic sections. Mafic minerals are less prominent than in most other uranium occurrences in the region. Some coarse spots and crystals of magnetite up to 2 cm are present locally. Here, the magnetite does not appear to control uranium mineralization as it does elsewhere in the district. Only minor uranophane staining is visible.

Other rock types noted in the immediate vicinity of the showing include gneiss, inhomogeneous diatexite, metatexite with leucosome of granitoid rock, and xenoliths and larger sections of recrystallized, well-bedded

metasediments.

Scintillometer readings over the main outcrop ridge (90 m wide by 240 m long) are typically 3X to 4X background. Higher grade sections on the outcrop (6X to 8X background) have been trenched. Scintillometer readings within the main trenched area give radioactive equivalents averaging 50 to 75 ppm uranium with some readings up to 300 ppm uranium.

Chip samples, collected by the authors from two trenches across a total width of 40 m were assayed by the Mineral Research Branch, Ontario Ministry of Natural Resources. One 20 m sample (a chip every 1.5 m) assayed 0.54 pounds U₃O₈ and 0.24 pounds thorium. The second sample over a width of 21 m assayed 0.12 pounds U₃O₈ and 0.26 pounds thorium. Considering the uniform levels of radioactivity over large areas, the homogeneity of the host rock, and the relatively low assay values obtained, this occurrence would appear to have low-grade, high-tonnage possibilities, and explored accordingly.

The 1977 Uranium Reconnaissance Program airborne survey revealed a number of significant radiometric anomalies to the east of the Snook Lake occurrence. These anomalies were subsequently staked but no work has been reported to date.

Perch Lake Uranium Occurrence

This property, 30 km north of Kenora, was staked in early 1976 by D. Loudon and subsequently optioned by Anschutz Oil Company of Denver, Colorado. During the spring and summer of 1977, Anschutz carried out ground radiometric surveys and geological mapping over the claim group, and drilled seven Winkie diamond drill holes (Regional Geologist's files, Ontario Ministry of Natural Resources, Kenora).

The area is underlain by a hybrid mixture of metasediments, metavolcanics and granitoid rocks. Radioactivity is confined to the granitoid rocks, which consist predominantly of pink quartz monzonite or granite. Biotite content varies from less than 2 percent to greater than 10 percent locally. Feldspars are generally highly sericitized.

The supracrustal rocks vary from very siliceous felsic tuff or metaquartzite to quartz-biotite metagreywacke. All are well-bedded. Some of the more siliceous sections contain conspicuously bedded sulphides, often up to 40 percent. These sulphides are predominantly pyrrhotite with minor pyrite and locally some chalcopyrite.

Some sections of granitoid rock display layering or relic bedding features that vary from well-defined to extremely vague and obscure, suggesting a complete transition from metatexites through inhomogeneous diatexites to homogeneous diatexites. The homogeneous diatexites typically have a granodioritic composition.

No assays are available from the recent drilling program but earlier grab samples collected by the author from some of the surface test pits, and analysed by the Mineral Research Branch, ranged from 0.44 pounds to 1.72 pounds U₃O₈.

Barber Lake Base Metal Occurrence

Barber Lake is located west of Mine Centre, south of Highway 11. In 1969-1970, Noranda Exploration Company Limited drilled two holes in this area, presumably testing an electromagnetic conductor. This earlier drilling did intersect some zinc values but no further work was carried out by the company at that time (Regional Geologist's files, Ontario Ministry of Natural Resources, Kenora).

In early 1977, the area was restaked by G. Armstrong. Ground electromagnetic surveys revealed several strong conductors, one with a strike length of approximately 600 m. Four drill holes were put down to test these conductors. The drilling encountered dacite flows, laminated tuff of intermediate composition containing some graphitic sections, sections of dense very cherty rhyolite, quartz feldspar porphyry, and dark spherulitic mafic metavolcanics. Some sections contained conspicuous yellow carbonatized spots, seams and irregular areas.

One hole, drilled at a dip of 80 degrees, intersected a section of massive sulphide mineralization containing significant amounts of zinc and some chalcopyrite. One 3.5 m section averaged 4.1 percent zinc, 0.11 percent copper and 0.14 ounces silver per ton (Regional Geologist's files, Ontario Ministry of Natural Resources, Kenora).

McTavish Base Metal Occurrence

Mineralization was first noted in this part of Watten Township in 1963 by K. McTavish of Fort Frances. Exploration, largely prospecting and trenching, has been carried out on the property since 1972. Noranda Mines Limited optioned the property in 1972 and carried out geological mapping, geophysical surveys, and drilled two diamond drill holes (Regional Geologist's files, Ontario Ministry of Natural Resources, Kenora).

Prospecting and trenching on the eastern part of the claim group revealed disseminated 'blebby' chalcopyrite in a dark massive fine-grained volcanic rock. In some places, copper content appeared to approach 2 percent.

Under an agreement with G. Armstrong of Fort Frances, geological mapping and additional geophysical surveys and trenching were carried out on this part of the property in 1977, and four diamond drill holes were put down. One of these holes (DDH 55) intersected two zones of massive sulphide mineralization in fragmental

rhyolite. Chalcopyrite and minor sphalerite were noted, grading up to about 0.3 percent copper over sections 0.3 to 0.9 m wide. A second drill hole 75 m along strike also intersected the massive sulphide zones, but carried less chalcopyrite.

Although only low grade values have been obtained to date, the geological environment appears favorable for massive-sulphide base metal deposition.

ACCESS ROADS

During the past year, a number of government ministries and private companies have extended access and logging roads, some of which may be useful to exploration companies or prospectors to gain entry into areas of higher mineral potential. These include the following:

Turtle River road extended 8 km northerly from Otter Rapids;
Daniels Lake road extended 2.4 km;
Rosamond Lake road extended 3.9 km;
Rowell Township road extended 2.1 km;
Reed Paper Company road opened to Canal Bay, Atikwa Lake;
Pine road (Reed Paper Company) opened to the vicinity of Geejay Lake;
Godson Township road (Tri-Lake Timber Company) extended;
Manitou access road opened southerly 40 km to Gold Rock Portage and northerly 76 km to Preacher Creek.

MINERAL EXPLORATION ASSISTANCE PROGRAM (MEAP)

A total of four projects falling within the Kenora portion of the Atikokan MEAP area was approved in 1977-1978. These included work by Hudson Bay Exploration and Development Company Limited in the Otukamamoan Lake area; George Armstrong in Farrington Township, Ed-Vic Exploration Limited in the Grassy Lake area, and E.A. Pearson in the Reed Lake area.

GEOLOGICAL BRANCH ACTIVITIES

Detailed geological mapping of the Mine Centre area initiated the previous summer by John Wood of the Precambrian Geology Section was completed in 1977. C.E. Blackburn and G.R. Edwards continued a regional study of the stratigraphy, structure and economic geology of the Wabigoon metavolcanic-metasedimentary belt in the Eagle Lake, Wabigoon Lake, Stormy Lake, Kakagi Lake, Rowan Lake, and Pipestone Lake areas.

A joint Federal-Provincial reconnaissance airborne gamma-ray spectrometer survey, flown in 1976 over much of the Kenora Mining Division, was released in August, 1977. Considerable interest was generated in the Tustin-Bridges Townships-Vermilion Bay area and in the English River Gneiss Belt resulting in the staking of most anomalous areas. The Ontario portion of the survey covered the following areas: Pointe du Bois (52L), Kenora (52E), Dryden (52F), and Lac Seul (52K).

RESEARCH BY OTHER AGENCIES

Geological Survey of Canada

G. Bernius of the Geological Survey of Canada spent several weeks in the Kenora Mining Division doing ground-check verification of radiometric anomalies outlined by the joint Federal-Provincial airborne radiometric survey. Investigations included locating the anomalous outcrops, sampling and on-location analysis for uranium, thorium, and potassium using a gamma ray spectrometer.

The Geological Survey of Canada was also involved in a geochemical orientation survey in an area of heavy clay overburden near Vermilion Bay.

Centre for Precambrian Studies, University of Manitoba

A number of geophysical studies carried out in the Kenora Mining Division in recent years are nearing completion. Two projects by A.G. Green, W.D. Brisbin, and D.H. Hall are, firstly, a high resolution seismic refraction survey to interpret crustal structure in the Sioux Narrows area and, secondly, gravity studies in the Lake of the Woods area. In another study, D.H. Hall is investigating paleomagnetism in the southern Aulneau Peninsula of Lake of the Woods and in the English River Gneiss Belt near the Winnipeg River.

University Theses

University of Manitoba Ph.D. Thesis

1. B. Brown continued investigations into the deformational history of the eastern portion of the Lake of the Woods "greenstone" belt.

University of Manitoba M.Sc. Theses

1. D. Carr completed his analyses of a dacitic, volcanoclastic sequence, northwestern Lake of the Woods area.

NORTHWESTERN – KENORA

2. R. Bald commenced investigations into the origin of granitic rocks in Gundy Township.

McMaster University Ph.D. Theses

1. D. Birk completed his studies of the geochemistry and geochronology of selected granitoid plutons within the Wabigoon Belt.

2. F.J. Longstaffe completed investigations into the stratigraphy and sedimentology of the Manitou Lake group, in the Dryden area.

McMaster University M.Sc. Theses

1. G.E. McMaster continued a geochemical investigation of the volcanic rocks and quartz porphyries of the Washeibemaga Lake area.

2. M. Wolff continued a geochronological study of the Stephen Lake pluton and associated felsic volcanic rocks.

University of Toronto

The following students are believed to be working on or nearing completion of various theses.

S. Sabag (M.Sc. thesis): petrology and geochemistry of the Meggissi Lake pluton, northwestern Ontario.

R. Sutcliffe (M.Sc. thesis): geological mapping of granitic rocks around Rainy Lake, north of the Quetico fault.

D. Stone (Ph.D.): the Sydney Lake Fault, northwestern Ontario.

RECENT PUBLICATIONS AND REFERENCES

Annis, R.C. and Cranstone, A.D.

1976: A Survey of Known Mineral Deposits in Canada That are not being Mined; Mineral Dev't. Sector (EMR) & M. Vallee, Quebec Mining Expl'n. Co. (SOQUEM), 90p.

Bau, F.S.

1977: The Dip of Quetico Fault - A Symmetry Argument; Proceedings of the 1977 Geotraverse Conference, University of Toronto, p.218-219.

Beakhouse, G.P.

1977: A Subdivision of the Western English River Subprovince; Canadian J. Earth Sci., Vol.14, p.1481,1489.

Beard, R.C.

1977: Uranium Deposits of the Kenora Area; paper presented at 1977 Institute on Lake Superior Geology, Thunder Bay, p.4.

Birk, D. and McNutt, R.H.

1977: Rb/Sr Isochrons for Archean Granitoid Plutons within the Wabigoon Greenstone Belt, Northwestern Ontario: A Preliminary Evaluation; Report of Activities, Part A; Geol. Surv. Canada, Paper 77-1A (1977).

Blackburn, C.E.

1977a: Identification of Archean Calc-Alkaline Volcanic Centers in the Manitou Lakes area, Northwestern Ontario; Paper presented at 1977 Institute on Lake Superior Geology, Thunder Bay, p.7.

1977b: Eagle Lake-Wabigoon Lake-Stormy Lake Area; p.40-43, in Summary of Field Work, 1977, by the Geological Branch, edited by V.G. Milne, O.L. White, R.B. Barlow, and J.A. Robertson, Ontario Geological Survey Misc. Paper 75, 208p.

Breaks, F.W., Bond, W.D., McWilliams, G.H., Gower, C.F., and Stone, D.

1975a: Marginal Notes for Operation Kenora-Sydney Lake; Ontario Div. Mines, 17p.

Breaks, F.W., Bond, W.D., Gower, C.F., Findley, D., and Stone, D.

1975b: Operation Kenora-Sydney Lake, Umfreville-Separation Lakes Sheet, District of Kenora; Ontario Div. Mines, Prelim. Map P.1028, scale 1 inch to 1 mile. Geology 1974.

Breaks, F.W. and Bond, W.D.

1977: Manifestations of Recent Reconnaissance Investigation in the English River Subprovince, Northern Ontario; Proceedings of the 1977 Geotraverse Conference, University of Toronto, p.170-211.

Centre for Precambrian Studies

1976: 1976 Annual Report: Centre for Precambrian Studies; University of Manitoba, Winnipeg, 150p.

Coker, W.B.

1974: Lake Sediment Geochemistry in the Superior Province of the Canadian Shield; unpublished Ph.D. thesis, Queen's University, 297p.

Cranstone, D.A. and Hamilton, S.A.

1976: Canadian Reserves of Copper, Nickel, Lead, Zinc, Molybdenum, Silver, Gold; Mineral Bulletin MR 166, Energy, Mines and Resources Canada, 39p.

Goodwin, A.M.

1977: Archean Greenstone Belts and the Development of Archean Crust: Preliminary Appraisal; Proceedings of the 1977 Geotraverse Conference, University of Toronto, p.222-234.

Goodwin, A.M., Chou, C.L., and Chen, G.S.J.

1977: Preliminary Report on Cu-Zn-Au Contents in Archean Iron Formation; Proceedings of the 1977 Geotraverse Conference, University of Toronto, p.45-47.

Goodwin, A.M. and Howat, I.P.

1977: Granitic Plutons of the Superior Geotraverse: Shape, Size and Composition; Proceedings of the 1977 Geotraverse Conference, University of Toronto, p.24-32.

Gower, C.F. and Clifford, P.M.

1977: Metamorphism in the English River Subprovince near Kenora, Northwest Ontario; Paper presented at 1977 Institute on Lake Superior Geology, Thunder Bay, p.19.

Institute on Lake Superior Geology

1977: Proceedings of the Twenty-third Annual Institute on Lake Superior Geology, Thunder Bay, 53p.

Krough, T.E., Davis, G.L., Ermanovics, I., Harris, N.B.W.
 1977: U-Pb Isotopic Ages of Zircons from the Berens Block and English River Gneiss Belt; Proceedings of the 1977 Geotraverse Conference, University of Toronto, p.41.

Kryzan, A. and Strangway, D.W.
 1977: Magnetotelluric Studies in the Geotraverse; Proceedings of the 1977 Geotraverse Conference, University of Toronto, p.121-130.

Listerude, W.H.
 1976: Sulphides in the Birchdale-Indus Area, Koochiching County, Minnesota; Minnesota Dept. of Natural Resources, Div. of Minerals, Report 26, 21p.

McMaster, G.E. and McNutt, R.H.
 1977: Archean Volcanism, Washeibemaga Lake Area, Wabigoon Subprovince, Northwest Ontario; paper presented at 1977 Institute on Lake Superior Geology, Thunder Bay, p.30.

Meineke, D.G. and Vadis, M.K.
 1977: Geophysical Profiles - Manitou Rapids Area, Project 41; Minnesota Dept. of Natural Resources, Div. of Minerals, 29p.

Meineke, D.G., Vadis, M.K. and Gilgosh, M.A.
 1976: Geophysical Surveys Conducted in Northwestern Koochiching County, Minnesota; Minnesota Dept. of Natural Resources, Div. of Minerals, Report 36-8, 10p.

Meineke, D.G., Vadis, M.K. and Klaysmat, A.W.
 1976: Gytja Lake Sediment Exploration Geochemical Survey of Eastern Lake Vermilion-Ely Area, St. Louis and Lake Counties, Minnesota; Minnesota Dept. of Natural Resources, Div. of Minerals, Report 73-3-1, 53p.

Meineke, D.G., Gilgosh, M.A. and Vadis, M.K.
 1976: Exploration Geochemistry of Quaternary Deposits in Northwestern Koochiching County, Minnesota; Minnesota Dept. of Natural Resources, Div. of Minerals, Report 36-7, 69p.

Morin, J.A.
 1977: Allanite in Granitic Rocks of the Kenora-Vermilion Bay Area, Northwestern Ontario; Canadian Mineralogist, Vol.15, p.297-302.

OGS-GSC
 1977a: Airborne Gamma-Ray Spectrometry Survey, Equivalent Uranium ppm Contours, Pointe Du Bois Sheet, District of Kenora (Patricia Portion); Ontario Geological Survey Prelim. Map P.1322, Geophys. Ser., scale 1:250,000.
 1977b: Airborne Gamma-Ray Spectrometry Survey, Equivalent Uranium ppm Contours, Dryden Sheet, Districts of Kenora and Rainy River; Ontario Geological Survey Prelim. Map P.1462, Geophys. Ser., scale 1:250,000.

Peterman, Z.E., Goldich, S.S., Hedge, C.E. and Yardley, D.H.
 1972: Geochronology of the Rainy Lake Region, Minnesota-Ontario; Geological Society of America, Memoir 135, p.193-215.

Pilatzke, R.H., Karner, F.R. and Peterson, W.M.
 1977: Petrology and Trend Surface Analysis of Two Late-stage Granodioritic Plutons, Northern Lake of the Woods Region, Ontario; Paper presented at 1977 Institute on Lake Superior Geology, Thunder Bay, p.40.

Sabag, S. and Blackburn, C.E.
 1977: Granitic Rocks at Meggisi Lake, Northwest Ontario; Proceedings of the 1977 Geotraverse Conference, University of Toronto, p.134-8.

Schwerdtner, W.M.
 1977a: Irene-Eltrut Lakes Granitic Complex: Progress Report, 1977; Proceedings of the 1977 Geotraverse Conference, University of Toronto, p.139-142.
 1977b: Origin of the Tonalitic-Gneisses in the Wabigoon and Shebandowan Superbelts with Special Emphasis on the Irene-Eltrut Lakes Granitic Complex; Proceedings of the 1977 Geotraverse Conference, University of Toronto, p.34-40.

Schwerdtner, W.M. and Goodwin, A.M.
 1977: Structural Geology of Geotraverse Region; Proceedings of the 1977 Geotraverse Conference, University of Toronto, p.10-24.

Sutcliffe, R.H.
 1977: Geology and Emplacement at the Jackfish Lake Pluton, a Major Intrusion in the Rainy Lake Dome; Proceedings of the 1977 Geotraverse Conference, University of Toronto, p.146-154.

Wright, J.
 1977: Seismic Crustal Studies in North-Western Ontario; Proceedings of the 1977 Geotraverse Conference, University of Toronto, p.7-9.

TABLE 1 | MAPS AND REPORTS PERTAINING TO THE KENORA MINING DIVISION, ISSUED BY THE GEOLOGICAL BRANCH OF THE ONTARIO MINISTRY OF NATURAL RESOURCES IN 1977.

**MINERAL DEPOSITS CIRCULAR
 MDC 15**

**MINERAL POLICY BACKGROUND PAPER
 MPBP 3**

MISCELLANEOUS PAPERS
 MP 48 (reprint)
 MP 70
 MP 71
 MP 74
 MP 75

OPEN FILE REPORTS
 OFR 5222
 OFR 5230
 OFR 5233

PRELIMINARY MAPS
 P. 1227
 P. 1243
 P. 1245
 P. 1320 to P. 1354
 P. 1355 to P. 1389
 P. 1425 to P. 1459
 P. 1460 to P. 1494

TABLE 2

Exploration activity in 1977.

The following is a list of individuals and companies known to be engaged in exploration within the Kenora Mining Division in 1977, and the type of work undertaken in each case. The numbers correspond to the numbered areas on Figure 1.

Individual or Company	Activity
1. Anderson, C.D.	Ground geophysical surveys in Ewart Township and Indian Bay area.
2. Anschutz Uranium Corp.	Geological survey and diamond drilling in the Sand Lake area.
3. Armstrong, G.	Geological survey and diamond drilling in Farrington Twp.
4. Canadian Nickel Co. Ltd.	Geophysical survey in Halkirk-Farrington Twps; diamond drilling in Halkirk-Farrington Twps. and Bliss Lake area.
5. Ed-Vic Explorations Ltd.	Trenching in the Grassy Lake area.
6. Fairservice, R.	Diamond drilling in Tustin & Bridges Twps.
7. F.O.B. Mining and Exploration Ltd.	Radiometric surveys in Temple Twp.
8. Hale, S.	Trenching in the Snook Lake area.
9. Harrison, J.	Trenching in the Snook Lake area.
10. Hollinger Mines Ltd.	Geological survey in Brownridge & Laval Twps.; Ground geophysical survey in Laval Twp.
11. Hopkins, A.	Diamond drilling in Snowshoe Bay area.
12. Hudson Bay Exploration and Development Co. Ltd.	Overburden and diamond drilling in the Otukamamoan Lake area.
13. McTavish, K.	Trenching and diamond drilling in Watten Twp.
14. Pelican Mines Ltd.	Ground geophysical survey and diamond drilling in Ewart Twp.
15. Rollmac Exploration Corp. Ltd.	Radiometric and ground geophysical surveys in MacNicol Twp.
16. Selco Mining Corporation Ltd.	Geophysical surveys in Brownridge, Zealand, Laval, & Melgund Twps., Kawashegamuk Lake and Tabor Lake areas; diamond drilling in Melgund Twp. and Turtlepond Lake areas; geological survey in Laval Twp.
17. Wright, R.J.	Diamond drilling in Buchan Bay area.

TABLE 3

Assessment work and other information received in 1977.

Abbreviations								
Air	- Airborne	Geol	- Geological Survey	Pros	- Prospectus			
Assess	- Assessment Work	Geochem	- Geochemical Survey	Rad	- Radiometric Survey			
Au	- Gold	IP	- Induced Polarization Survey	Res	- Resistivity Survey			
BM	- Basemetals	Mag	- Magnetometer Survey	SA	- Sampling			
5 DDH (620)	- 5 Diamond Drill holes totalling 620'	MEAP	- Mineral Expl. Assistance Program Report	Tr	- Trenching			
EM	- Electromagnetic Survey			U	- Uranium			
Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work	Year	Toronto File No.	Local File No
Bliss Lake	52C/10 NW	Pitkanen, R.	Au, BM	M.E.A.P. Assess	Tr	1976	MEAP A-12	O-1
Boyer Lake	52F/7 NE	Underwood, McLellan & Assoc. Ltd.	BM	Assess	EM, Mag	1976	2.2223	X-5
Bridges Twp.	52F/13 SE	Fairservice, R.	U	Assess	2 DDH (371) SA	1977 1977		X-3
Buchan Bay	52F/11 NE	Wright, R.J.	BM	Assess	2 DDH (656)	1977		U-1
Ewart Twp.	52E/11 NE	Pelican Mines Ltd.	Au	Pros Assess Assess	EM 1 DDH (451)	1977 1977 1977	2.2369	II-1 II-2 II-3
Farrington Twp.	52C/10 NW	Armstrong, G.	BM BM	Other Assess	Geol 1 DDH (423)	1977 1977		H-8 H-9
		Canadian Nickel Co. Ltd.	BM	M.E.A.P.	5 DDH (2512)	1977	MEAP A-16	K-7
Grassy Lake	52C/10 NE	Ed-Vic Explorations Ltd.	BM	Assess	Tr	1977		Z-2
		Stellar Gold Mines Ltd.	Au	Other	Geol	1975		Q-1
Halkirk-Farrington Twp.	52C/10 NW	Armstrong, G.	BM BM	Assess M.E.A.P.	8 DDH (3388) 13 DDH (5298) Tr	1976 1976 1976	MEAP A-14	H-6 H-7 H-7
		Canadian Nickel Co. Ltd.	BM BM	Assess Assess	1 DDH (364) 1 DDH (289)	1976 1977		K-3 K-4

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work	Year	Toronto File No.	Local File No.
			BM	Assess	3 DDH (1880)	1977		K-5
			BM	Assess	Mag	1977	2.2328	K-6
Melgund Twp.	52F/9 SW	Selco Mining Corp. Ltd.	BM	Assess	1 DDH (148)	1977		V-2
Otukamamoan Lake	52C/15 NW	Hudson Bay Exploration & Development Co. Ltd.	BM	Assess	EM	1976	2.2134	A-1
			BM	M.E.A.P. Assess	8 DDH (2100)	1976/77	MEAP A-15	A-2
			BM	M.E.A.P. Assess	7 DDH (1212) Geochem	1977	MEAP A-17	A-3
Paterson Lake	52L/7 SE	Consolidated Summit Mines Ltd.	U	Assess	3 DDH (670)	1976		G-3
		Noranda Exploration Co. Ltd.	BM	Assess	Rad	1976	2.2212	F-2
			BM	Assess	Geol, Mag, Rad	1976	2.2207	F-3
Porter Inlet	52F/3 SE	Hudson Bay Exploration & Development Co. Ltd.	BM	Assess	EM	1976	2.2134	D-1
Reed Lake	52C/16 SW	Pearson, E.	BM	Assess	Tr	1976		M-1
			BM	M.E.A.P. Assess	Tr	1976	MEAP A-13	M-2
Sand Lake	52L/2 SE	Anschutz Uranium Corp.	U	Assess	7 DDH (328)	1977		H-1
Shoal Lake	52E/10 SW	Imperial Oil Ltd. (Doborznski, Z.)	BM	Other	EM, Mag	1974		Y-2
		Kenora Prospectors & Miners Ltd.	BM	Other	Geol	1963		EE-1
Snook Lake	52L/2 NE	Hale, S.	U	Assess	Tr	1977		C-1
		Harrison, J.	U	Assess	Tr	1977		B-1
Snowshoe Bay	52E/11 SE	Hopkins, A.	BM	Assess	1 DDH (222)	1977		E-3
Tabor Lake	52F/9 SW	Selco Mining Corp. Ltd.	BM	Assess	1 DDH (298)	1976		V-1
Temple Twp.	52F/14 SW	F.O.B. Mining & Exploration Ltd.	U	Assess	Rad	1976	2.2261	E-5
Turtlepond Lake	52F/10 SE	Selco Mining Corp. Ltd.	BM	Assess	2 DDH (514)	1977		V-1
		Underwood, McLellan & Assoc. Ltd.	BM	Assess	EM, Mag	1976	2.2224	P-4
Tustin Twp.	52F/13 SW	Fairservice, R.	U	Assess	5 DDH (365) SA	1977		Z-1
Vista Lake	52F/3 SE	Hudson Bay Exploration & Development Co. Ltd.	BM	Assess	EM	1976	2.2134	C-1
Watten Twp.	52C/11 NE	McTavish, K.	BM	Assess	Tr	1976		T-5
			BM	Assess	Tr	1977		T-6
			BM	Assess	3 DDH (1141)	1977		T-7
Weller Lake	52C/14 NE	Hudson Bay Exploration & Development Co. Ltd.	BM	Assess	EM	1976	2.2134	A-1

1977 Report of Red Lake Resident Geologist

L.O. Koskitalo¹ and D.A. Panagapko²

CONTENTS

Introduction	14
Resident Geologist's Activities	14
Mining Activity	15
Campbell Red Lake Mines Limited	15
Dickenson Mines Limited	15
Griffith Mine	15
Selco Mining Corporation Limited	18
Mount Jamie Mines (Quebec) Limited	18
Exploration Activity	18
Recommendations for Exploration	18
Mineral Exploration Assistance Program	19
Geological Branch Activities	19
Research by Other Agencies	20
Geological Survey of Canada	20
Centre for Precambrian Studies	20
Superior Geotraverse	20
University Theses	20
Recent Publications and References	21

TABLES

1— Maps and Reports Issued by the Geological Branch	24
2— Exploration Activity in 1977	25
3— Assessment Work and Other Information Received in 1977	26

FIGURES

1,2— Red Lake Resident Geologist's District	16,17
---	-------

INTRODUCTION

Exploration activity showed a modest increase in 1977; assessment work recorded increased by 27 percent; mining claim recordings declined by 14 percent; airborne surveys and reconnaissance work were done by a number of major companies, in initiation of multi-year programs, additional to other current integrated programs. Mineral exploration activities remained dominantly base-metal oriented.

¹Resident Geologist, Ontario Ministry of Natural Resources, P.O. Box 860, Government Buildings, Red Lake, P0V 2M0.

²Resource Geologist.

Mining operations at two gold mines, one iron mine and one zinc-copper-silver mine within the area continued at full production levels during 1977.

Consultation with and assistance to prospectors, the mining industry, and the general public were the main services, in increased demand, of the Red Lake office staff. Input to other branches of the ministry and to other government agencies, particularly with respect to land-use planning and past, current and future development, also grew during the year.

RESIDENT GEOLOGIST'S ACTIVITIES

The geological staff in the Red Lake office in 1977 consisted of L.O. Koskitalo, Resident Geologist; D.A. Panagapko, Resource Geologist; and A. Havard, secretary.

Eleven visits were made to four producing mines and to one mine on a care and maintenance basis. Seventeen active and inactive properties and showings were examined during the year. In addition, 13 gold properties with underground workings, largely in the west Red Lake area, were appraised as historical sites and in regard to surface hazards. Advice and assistance were also provided to four Mineral Exploration Assistance Program projects.

Exploration files were obtained from a former producing mine, the Madsen Division of Bulora Corporation Limited, and are on file in the Red Lake Resident Geologist's office.

Geological field tours and visits to mining operations were assisted or organized for Geological Branch, ministry and industry personnel on eleven occasions.

Seven lectures, demonstrations and field tours were provided to public and high school students and Junior Rangers.

Seven field parties, engaged in Geological Branch activities, were visited and assisted during the year.

Four data series maps were prepared for future publication, covering the Bruce, Gerry, Karas and South of Otter Lakes areas in the Troutlake River region, north of Ear Falls. Initial drafts of mineral potential maps for the

entire district were completed for publication by the Mineral Deposits Section in 1978. A limited amount of detailed geological mapping was done in the southern part of Heyson Township. Preliminary drafts of six data series maps, and indices to aerial photographic coverage of the district as available in office files, were prepared.

Geological input to various government planning processes comprised internal mineral potential evaluations for the southern part of the Red Lake district for an interim ministry zoning plan, for five proposed wilderness parks in the northern and western parts of the district, and for eight individual lakes being considered for various recreational uses. Information on mining and exploration developments was provided to various agencies, including municipal planning groups. Some input was initiated to the comprehensive land use plan that will be prepared by the ministry over the next three years, covering nearly 260 000 km² in the West Patricia area, including mainly the Red Lake and Sioux Lookout Resident Geologists' districts (Dryden Observer, 1978).

MINING ACTIVITY

Continuous, full production was maintained at four mines; mining operations were suspended at one property where some production was obtained in 1976.

Rising gold prices pointed to improved results for the two operating gold mines, as compared to 1976, and are of major note in the district inasmuch as the Red Lake camp is the source of about 37 percent of Ontario's present primary gold production (The Northern Miner, January 26, 1978, p.15; Hogan 1976). Prevailing poor conditions in the Canadian iron ore industry and depressed base metal prices did not significantly inhibit production at the Griffith and South Bay mines, respectively. A summary of the main developments at the various operations follows. The information was supplied to the Resident Geologist by the mine manager of each operation.

Campbell Red Lake Mines Limited

Campbell Red Lake Mines Limited operated continuously through 1977, milling an average 814 tons per day and a total tonnage of 297,248 tons of ore, to yield 191,031 ounces of gold. The comparable figures in 1976 were 821 tons per day milled, 300,535 tons total milled, and 184,610 ounces of gold produced. Lateral development of 1949 m exposed enough ore to improve reserves to 1,730,000 tons grading 0.67 ounces of gold per ton. Employees numbered a constant 330 during the year. S.M. Reid is mine manager.

Dickenson Mines Limited

Dickenson Mines Limited (including associated Robin Red Lake Mines Limited) milled a daily average of 353 tons, including 117 tons from the Robin Red Lake property which is developed through Dickenson workings. While the higher price of gold resulted in mining of some lower grade stopes, total tonnage milled of 129,184 tons and recovery of 60,036 ounces of gold in 1977 were higher than in 1976, when 117,459 tons of ore were milled to yield 55,488 ounces of gold. As of June 30, 1977, combined ore reserves were estimated at 362,733 tons grading 0.541 ounces of gold per ton (The Northern Miner, Sept.8, 1977, p.3). Employment was an average 240 during the year. R.P. Tapper is mine manager.

A recent estimate of total proven and potential recoverable reserves, on the two properties, largely above the bottom 30th (or 1400 m) level, at 700,000 tons grading 0.50 ounces gold per ton, represents about a five year supply of ore at the current milling rate (The Northern Miner, Sept.8, 1977, p.3).

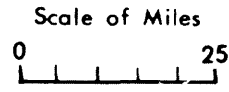
A significant extension of mine-life can be projected on the basis of the recently announced decision to deepen the No.2 internal shaft a minimum of 180 m and open four or five new deep levels. Shaft deepening may be extended to 300 m, depending on the results of a current underground diamond drilling program which is testing for the down-dip extensions of the adjacent Campbell Red Lake mine's South "C" zone into Dickenson ground. Sinking is expected to commence in May or June, 1978 (The Northern Miner, January 26, 1978, p.1,8).

The Griffith Mine

Crude ore production at The Griffith Mine during 1977 totalled 5,838,639 long tons from which 1,534,180 tons of pellets containing 66.67 percent iron and 3.46 percent silica were produced. Total ore, waste and overburden removed, from the two open-pits, was 14,412,869 long tons. The SL/RN kiln, which is the world's largest direct reduction kiln and achieves 89-93 percent metallization (Thom and Wilson 1976; Wilson 1977), was not opened during 1977 due to the low price of competing scrap steel. Average employment was 535. J.D. Jeffries is the mine manager.

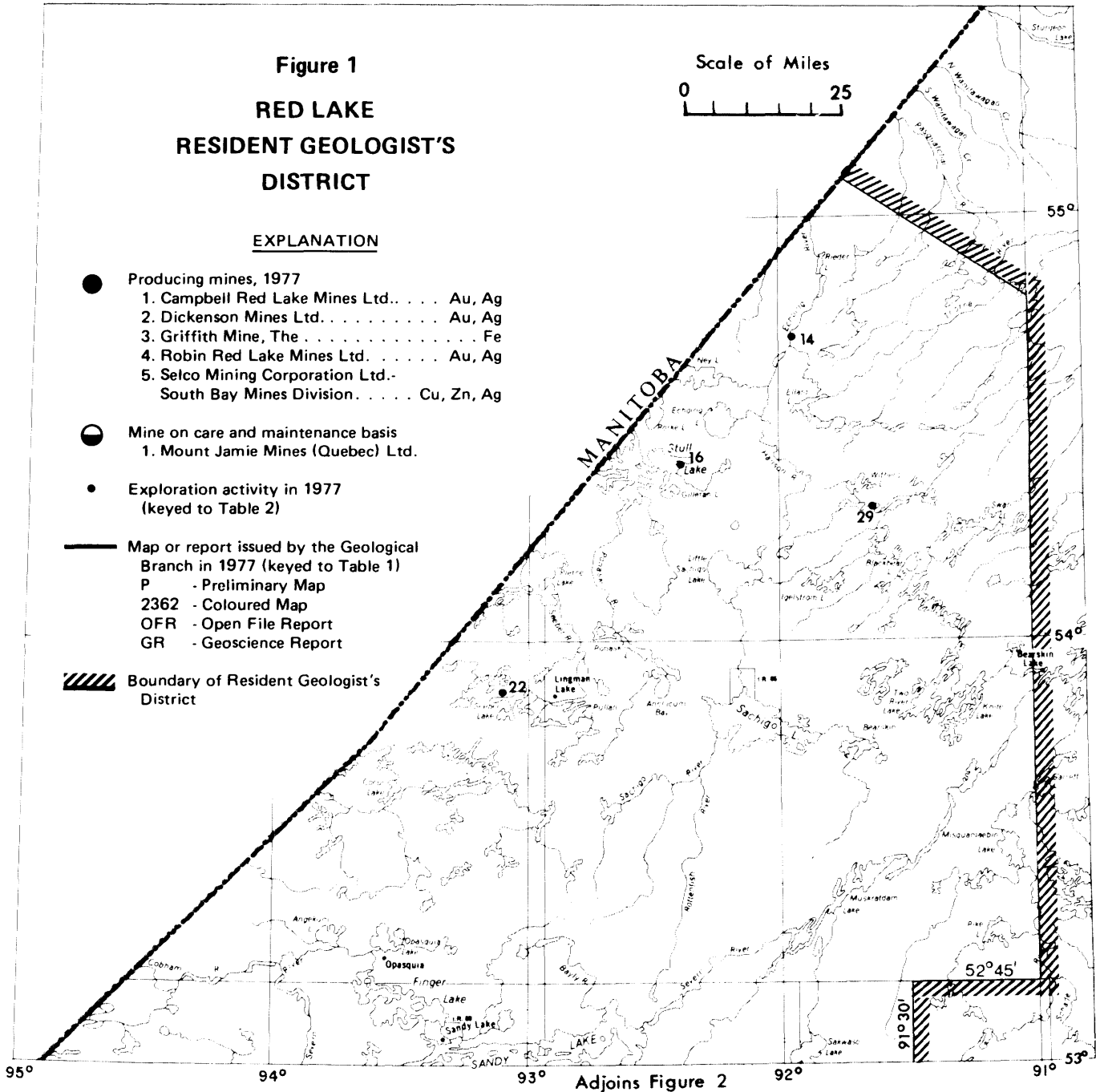
Other developments at the mine included raising of the pollution control dyke to its final level, diversion of waste material flow from the west side of the plant complex, addition to mining equipment of eight 85-ton haulage units, and a diamond drilling program for bank stability studies on the east side of the North Pit. No exploration or development diamond drilling was carried out on the mine property.

Figure 1
RED LAKE
RESIDENT GEOLOGIST'S
DISTRICT



EXPLANATION

- Producing mines, 1977
 - 1. Campbell Red Lake Mines Ltd. Au, Ag
 - 2. Dickenson Mines Ltd. Au, Ag
 - 3. Griffith Mine, The Fe
 - 4. Robin Red Lake Mines Ltd. Au, Ag
 - 5. Selco Mining Corporation Ltd.-
 South Bay Mines Division. Cu, Zn, Ag
- ◐ Mine on care and maintenance basis
 - 1. Mount Jamie Mines (Quebec) Ltd.
- Exploration activity in 1977
 (keyed to Table 2)
- Map or report issued by the Geological
 Branch in 1977 (keyed to Table 1)
 - P - Preliminary Map
 - 2362 - Coloured Map
 - OFR - Open File Report
 - GR - Geoscience Report
- ▨ Boundary of Resident Geologist's
 District



Adjoins Figure 1

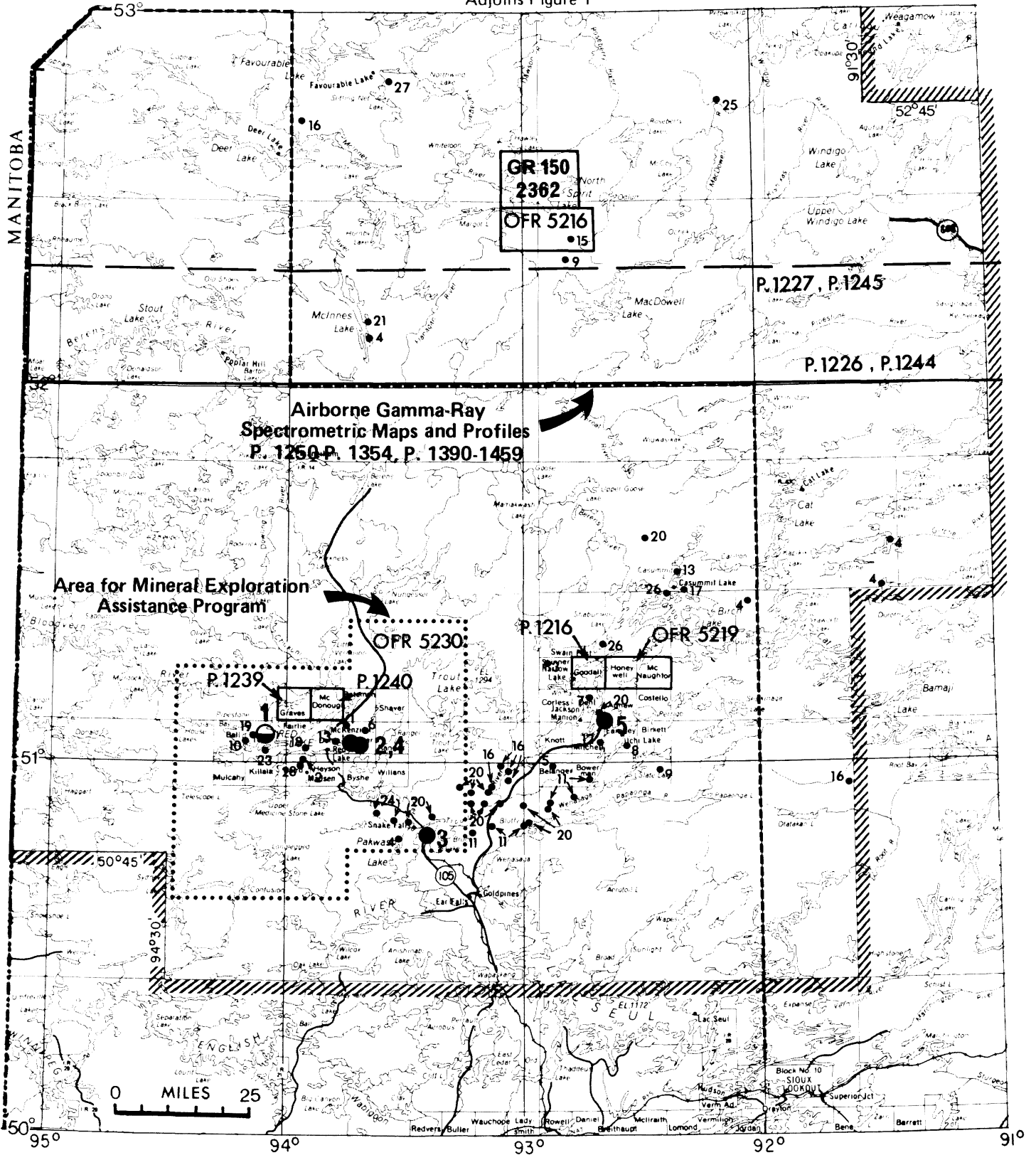


Figure 2

Selco Mining Corporation Limited

The South Bay Division of Selco Mining Corporation Limited operates a zinc-copper-silver mine located at the south end of Confederation Lake, 80 km northeast of Ear Falls. In 1977, a total of 181,601 tons were milled at a head grade of 1.68 percent copper, 9.87 percent zinc and 2.24 ounces per ton of silver, to yield 10,430 tons of copper concentrate and 30,242 tons of zinc concentrate. Metal produced totalled 5,709,711 pounds of copper, 33,222,828 pounds of zinc and 329,517 ounces of silver. The mine employed 130 men. D.W. Thompson is the manager.

Development of the No.12 orebody was completed with the introduction of a cut-and-fill plus a shrinkage stope on the 1350 level. A longhole and a shrinkage stope on the 850 and 950 foot levels, respectively, were brought into operation to complete the mining of the No.11 orebody.

The shaft was deepened by 96.6 m, to a total depth of 634 m (2079 feet), and an exploration drift was started on the 1950 foot level.

Mount Jamie Mines (Quebec) Limited

Mining operations were suspended by the company during 1977 on their Todd Township property (the former Gold Frontier Mines Limited property). Results reported by the company for 1976 operations were 1,224 tons grading 0.49 ounces gold per ton (cut) mined, 552.4 tons grading 0.48 ounces gold per ton milled, overall recovery of 78.8 percent, gold recovery of 209.34 ounces and an average concentrate grade of 99.82 ounces gold per ton (The Northern Miner, April 21, 1977, p.22).

EXPLORATION ACTIVITY

An overall increase in mineral exploration activity was noted in 1977.

Mining claims recorded during the year numbered 2,324, a decrease of 381 from the 2,705 claims recorded in 1976, but were still in excess of other previous years' recordings since 1970. Staking activity was concentrated in the general Karas Lake and Gerry Lake areas, the Coli Lake area, the McInnes Lake area, the Armstrong Lake area, and the Avis Lake area (Red Lake Mining Recorder's Files).

Assessment work filed in 1977 increased to 59,196 days, up from the 46,544 days recorded in 1976. Geophysical work (45,080 days) and diamond drilling (12,994 days) were the main types of activity reported.

The above noted activity was mostly directed toward base-metal exploration and represented both the con-

tinuation of existing programs and the initiation of new programs by major companies engaged in long-term, "grassroots" exploration.

Major companies active in the district included Cominco Limited, Dome Exploration (Canada) Limited, Gulf Minerals Canada Limited, The Hanna Mining Company, Kerr Addison Mines Limited (joint venture partner), Mattagami Lake Mines Limited, New Jersey Zinc Exploration Company (Canada) Limited, Noranda Exploration Company Limited, Shell Canada Resources Limited, Sherritt Gordon Mines Limited, St. Joseph Explorations Limited, Union Miniere Exploration and Mining Corporation Limited, and Utah Mines Limited-McIntyre Mines Limited (joint venture).

Of special note was the discovery, by Selco Mining Corporation Limited, of another zone of base-metal mineralization, located some 10 km to the northwest of the Troutlake River find announced in April, 1976 (The Northern Miner, November 3, 1977, p.6), and about 29 km north of Ear Falls.

Several gold properties underwent small-scale exploration programs in the Red Lake area and the Confederation-Birch Lakes area.

Uranium exploration was limited to ground surveys in the Carb Lake area and the Deer Lake area, and reconnaissance examinations in the Sydney Lake area.

A summary of mineral exploration activities known to have been carried out in the Red Lake Resident Geologist's District is given in Table 2; locations are shown in Figures 1 and 2. Assessment and other work data received in 1977 are given in Table 3.

RECOMMENDATIONS FOR EXPLORATION

1. The base-metal potential of felsic to intermediate metavolcanics extending from the South Bay mine in Dent Township, south and southwest and west, to the general vicinity of Bug Lake and Pakwash Lake continues as one of the most attractive targets in the district. Reports of recent finds by Selco Mining Corporation Limited (noted above under "Exploration Activity", and described below under "Mineral Exploration Assistance Program") add to the potential of the belt(s).

2. In the Birch Lake area, Thurston (1977) noted a potential for syngenetic base-metal massive sulphide deposits associated with distal facies felsic metavolcanics throughout the area, and identified felsic metavolcanics centered on Birch Point as possible proximal facies (of higher potential).

3. In the Hewitt Lake and North Spirit Lake areas, Wood (1977a, b, c) and Gibson and Wood (1977), emphasize a potential (i) for copper-nickel mineralization in ultramafic rocks (some of which are metavolcanic), (ii) for copper-zinc mineralization in felsic metavolcanics, which have received little exploratory attention

in the past, (iii) for iron and gold deposits in chemical metasediments, additional to major iron deposits currently held and known occurrences of gold, and (iv) for porphyry copper-molybdenum type mineralization in certain granitic rocks in the area.

4. With currently rising gold prices, and probable continuing market strength, exploration for gold should enjoy a revival, particularly in the Red Lake belt and the Birch-Confederation-Uchi Lakes belt. Former production in the Favourable Lake and Sachigo River areas, a known deposit in the Lingman Lake area, and numerous major gold occurrences, are guides suggesting further exploration is warranted in the metavolcanic-metasedimentary belts in the northern part of the Red Lake district.

In the Confederation Lake area, in Honeywell and McNaughton Townships, Johns (1977) recommended prospecting for structurally controlled gold mineralization along the Trout Lake-Springpole Lake break and the Swain Lake Fault.

In Balmer and Bateman Townships, in the Red Lake belt, Pirie (1977) suggested that the gold deposits of the area may be commonly syngenetic in origin though subsequently largely remobilized. The unresolved interplay of ultramafic, exhalative and hydrothermal relationships in the probable multi-stage genesis of economic gold deposits requires a broad approach to gold exploration, with possible continuing emphasis on classical structural controls (Henderson 1978; Karvinen 1977; Kerrich *et al.* 1977; Kuo and Wilson 1976, 1977).

5. Uranium exploration, on the basis of known occurrences and the Federal-Provincial airborne radiometric survey results released in August, 1977, is indicated for the Sydney Lake Cataclastic Zone and the northern margin of the Berens River Subprovince. Airborne survey results, for NTS sheets 53C, North Sprit Lake, and 53F, Opasquia Lake, flown in 1977, when released will provide further target information in the northern part of the district.

6. The availability of detailed lake bottom contour plans for most of the major lakes in the Province should be noted, and their use is recommended in structural interpretations and offshore extension of surface geological mapping, lake bottom geochemical sample site selection, geophysical survey interpretation, and drill hole planning. The plans are commonly 1:15 840 scale, with a contour interval of 10 feet.

MINERAL EXPLORATION ASSISTANCE PROGRAM

The Ontario Government's Mineral Exploration Assistance Program (MEAP) has operated in the Red Lake area since 1971. To the end of 1977, Provincial Government payments totalled \$480,000 on 55 con-

tracts approved for support.

A summary of fiscal year 1976-1977 MEAP activities is given in OFR 5230 (see List of Publications, back pocket). Seven contracts were approved under the 1977-78 program, as compared to four in 1976-77.

Four contracts were completed in 1977, as follows:

1. Aiken-Russet Red Lake Mines Limited drilled 34.1 m in one hole in Baird Township to test a geophysical anomaly. Peridotite and a variety of metasediments were intersected; no significant gold, silver or zinc values were determined (MEAP RL-49, Toronto file no. 63.3473).

2. Abino Gold Mines Limited did 357.5 m of diamond drilling in three holes in the northeast corner of Dome Township. Two holes testing a gradient low magnetic anomaly intersected fractured diorite and some low gold values. The third hole investigated a quartz porphyry intrusive and intersected gold values, the best mineralization assaying 0.34 ounces gold per ton over .46 m (MEAP RL-50, Toronto file no. 63.3483).

3. C.W. Peterson drilled 1,007.6 m in nine holes in Fairlie Township, at three locations on the southernmost of the Fisher Islands, immediately to the west of the Dome stock, testing for gold mineralization (Gerstner, 1977). No significant values were intersected (MEAP RL-51, Toronto file no. 63.3490).

4. Selco Mining Corporation Limited (Selco) drilled seven holes totalling 642.5 m in the south of Otter Lake area to explore a number of ground electromagnetic conductors which have been outlined by previous Selco exploration work. The best mineralized length intersected was 4.3 m of 0.43 percent copper, 15.44 percent zinc and 0.61 ounces silver per ton in hole no. 150-18-4. Though the base metal mineralization discovered is of apparently limited extent, the work done heightens the potential for the occurrence of base metal ore zones in the vicinity (MEAP RL-52, Toronto file no. 63.3472).

The boundaries of the area in which exploration assistance is available are outlined on Figure 2.

GEOLOGICAL BRANCH ACTIVITIES

Five geological mapping projects, geophysical work and continuing geochronological investigations were the main studies carried out within the Red Lake district in 1977.

Bateman and Balmer Townships were mapped in detail by J. Pirie (1977), and after the mapping of a few townships in the central and southeast part of the camp, it is expected that an interpretation of the entire Red Lake belt will be initiated in the near future (Milne 1977).

In the Birch Lake area, P.C. Thurston (1977) began compilation mapping to extend recent mapping in the Confederation Lake area to the south.

NORTHWESTERN – RED LAKE

In the Bamaji Lake area, H. Wallace (1977) commenced detailed mapping directed mainly to establishing the molybdenum-copper potential of the area. Most of the mapping was done in the eastern part of the area, within the Sioux Lookout Resident Geologist's district.

Some detailed mapping was continued on the Sydney Lake Cataclastic Zone (Stone 1977), within the framework of the English River Subprovince reconnaissance mapping program. The regional coverage of the western half of the English River Gneiss Belt, to Savant Lake from the Manitoba border, was completed in 1977. The relationship between uranium and lithium mineralization, and metamorphism and anatexis within the belt is being studied (Breaks and Bond 1977a, 1977b).

Northwestern Ontario's physiography and surficial geology, for the area north of 50° Latitude, were the subject of mapping by geologists and geomorphologists of the Ontario Centre for Remote Sensing (O.C.R.S.) and the Geological Branch in commencement of a three year project (Cowan 1977).

Airborne gamma-ray spectrometer reconnaissance surveys were done in the district during 1977, to cover NTS sheets 53C, North Spirit Lake; and 53F, Opasquia Lake. (Note further such coverage in 1977, listed below in "Research by Other Agencies").

Joint Federal-Provincial airborne radiometric survey results released in August, 1977, covering the Red Lake district, comprised 1:250 000 scale maps and profiles of NTS sheets 52K, Lac Seul; 52L, Pointe Du Bois; 52M, Carroll Lake; 52N, Trout Lake; and 53D, Deer Lake (Barlow 1977).

Interpretation of gravity surveys, done in the Red Lake area in 1976, was underway in 1977 (Runnalls 1977; Gupta *in* Bolton 1977).

Samples for geochronological studies were collected in three metavolcanic-metasedimentary areas, the North Spirit Lake, Birch Lake, and Uchi-Woman Lakes area. The radiometric dating program is being conducted by P. Nunes of the Royal Ontario Museum, with the assistance of the Geological Branch (Barlow 1977).

The Mineral Deposits Section published maps of gold deposits and of molybdenum deposits in Ontario, including the Red Lake District, in 1977; J.A. Robertson visited uranium showings in the Favourable Lake area (Robertson 1977).

RESEARCH BY OTHER AGENCIES

Geological Survey of Canada

1. J.M. Franklin, continuing studies of regional metallogeny in the Superior Province, undertook a major sampling program in the Campbell Red Lake and Dickenson gold mines, assisted by W.E. MacRae of McMaster University. Host rocks and ore zones material collected

will be subjected to whole rock and trace element analyses.

2. V. Ruzicka (1978) visited the Bear Head Lake area uranium showings in the Favourable Lake area, with J.A. Robertson and others of the Geological Branch.

3. G. Bernius did gamma-ray spectrometric surveys in selected anomalous areas covered by the Federal-Provincial radiometric surveys release of August, 1977.

4. Jointly with the Province of Manitoba, Federal-Provincial airborne gamma-ray spectrometric surveys were flown in 1977, largely within Manitoba, but also covering the Ontario portions of NTS sheets 53E, Island Lake; and 53K, Stull Lake. Release of survey results is anticipated on about March 31, 1978 (personal communication, J. Stephenson, Department of Mines, Resources and Environmental Management, Manitoba).

Centre for Precambrian Studies

The Centre for Precambrian Studies at the University of Manitoba reported on recent investigations within or relevant to the Red Lake district, as given by Ayres (1977a, b), Ayres *et al.* (1977), Beakhouse (1977), Cerny (1976), Cerny and Trueman (1977), Findlay (1976), Findlay and Ayres (1977), Gordanier (1976), Hillary (1976), Kuo and Wilson (1977, 1976), and Wilson *et al.* (1976).

Superior Geotraverse

The University of Toronto's Precambrian Research Group sponsors the Superior Geotraverse which has concentrated on studies within a corridor to the east of the Red Lake district. Recent work of note to this area, as given at the 1977 Geotraverse Conference, is reported by Breaks and Bond, Krogh *et al.*, Runnalls, Schwerdtner and Goodwin, Stone and Urquhart (all 1977).

University Theses

Geological theses related to the Red Lake area, known to be in progress during 1977, were as follows:

1. D. Stone (University of Toronto, Ph.D. thesis project) carried on with a large-scale regional structural study of the Sydney Lake Fault system. The study is part of a larger investigation of the kinematic significance of three mylonitic zones in the Canadian Precambrian Shield (Schwerdtner *et al. in* Bolton, 1977).

2. D. Andrews (University of Manitoba, M.Sc. thesis project) began a study of sulphide mineralization and character of wall rock of the Dixie property (Selco

Mining Corporation Limited), (the former Newmont/Caravelle property), located south of Red Lake.

3. S.M. Dykes (Queen's University, M.Sc. thesis project) started a study of the geology of the South Bay Mine, Dent Township.

4. D.J. Findlay (University of Manitoba, M.Sc. thesis project) neared completion of a study of porphyry-type copper-molybdenum mineralization in the Lang Lake area.

5. W.D. Gordanier (University of Manitoba, M.Sc. thesis project) was completing a study of a conglomerate-greywacke formation within the Favourable Lake volcanic complex.

6. E.M. Hillary (University of Manitoba, M.Sc. thesis project) was finishing investigations of parts of the North Trout Lake batholith in the Favourable Lake area. Contained remnants of deformed trondhjemitic material are indicated to pre-date Early Precambrian volcanism.

7. W.E. MacRae (McMaster University, M.Sc. thesis project) continues with a genetic study, by neutron activation analysis, of gold in Archean greenstone belts. MacRae's work has focussed on Northeastern Ontario, but will be complimentary to that of Franklin (noted above).

8. J. Kita (University of Toronto, B.Sc. thesis) did field work on a study of felsic volcanic rocks located on the south shore of Hoyles Bay in Bateman and McDonough Townships.

Recently completed theses of interest, not previously listed, describe considerable research in the Birch Lake-Confederation Lake area (Barclay 1976; Dykes 1976; Falls 1974; Koschal 1975; Seccombe 1973; Sopuck 1971), and work elsewhere within the Red Lake district (Carter 1976; Hunter 1971; Makepeace 1977; Muir 1972; Saxby 1977).

Other research work of note, largely university-based, is reported by Anderson (*in* Bolton 1977), Brooks and Gelinis (1977), Dales *et al.* (*in* Bolton 1977), Donaldson and Ojakangas (1977), Shieh and Schwarz (1977), Urquhart and West (1977), and Williams and Trueman (*in press*).

RECENT PUBLICATIONS AND REFERENCES

- Annis, R.C., Cranstone, D.A., and Vallee, M.
1976: A Survey of Known Mineral Deposits in Canada that are Not Being Mined; Energy, Mines and Resources Canada, 92p. Addendum; May 27, 1977, 43p.
- Ayres, L.D.
1977a: Importance of Stratigraphy in Early Precambrian Volcanic Terranes Cyclic Volcanism at Setting Net Lake, Northwestern Ontario; p.243-264 *in* Volcanic Regimes in Canada, edited by W.R.A. Baragar, L.C. Coleman, and J.M. Hall, Geol. Assoc. Canada Special Paper 16, 475p.

- 1977b: Metamorphism in the Superior Province of northwestern Ontario and its relationship to crustal development; Centre for Precambrian Studies, Publication No. 24, Univ. of Manitoba, Winnipeg. To be published in Metamorphism in the Canadian Shield, Geol. Surv. Canada Symposium (Paper series).

- Ayres, L.D., Averill, S.A. and Wolfe, W.J.
1977: An Early Precambrian porphyry molybdenum deposit at Setting Net Lake, northwestern Ontario, Canada; Centre for Precambrian Studies, Publication No.25, Univ. of Manitoba, Winnipeg. To be submitted to Econ. Geology.

- Barclay, J.E.
1976: Archean Variolitic Lavas from the Birch-Uchi Greenstone Belt, Ontario; unpublished B.Sc. thesis, Carleton Univ., Ottawa, 67p.

- Barlow, R.B.
1977: Geophysical, Geochemical and Geochronological Surveys, 1977; p.170-171 *in* Summary of Field Work, 1977 by the Geological Branch, edited by V.G. Milne, O.L. White, R.B. Barlow, and J.A. Robertson, Ontario Geol. Surv. MP75, 208p.

- Beakhouse, G.P.
1977: A subdivision of the western English River subprovince; Canadian J. Earth Sci., vol.14, no.7, p.1481-1489.

- Bolton, T.E. (compiler)
1977: Current research in the Geological Sciences in Canada May 1976-April 1977; Geol. Surv. Canada, Paper 77-5, 137p.

- Breaks, F.W., and Bond, W.D.
1977a: Manifestations of Recent Reconnaissance Investigations in the English River Subprovince; p.170-211 *in* Proceedings of the 1977 Geotraverse Conference, Precambrian Research Group, Univ. of Toronto, 234p.
1977b: English River Subprovince (Marchington Lake Area), District of Kenora; p.18-28 *in* Summary of Field Work, 1977 by the Geological Branch, edited by V.G. Milne, O.L. White, R.B. Barlow, and J.A. Robertson, Ontario Geol. Surv. MP75, 208p.

- Brooks, C., and Gelinis, L.
1977: The Relationship of Base Metal Mineralization to Chemostratigraphic Divisions in Volcanic Rocks of Canadian Archean Greenstone Belts; Mineral Exploration Research Institute, Research Paper 77-1, McGill Univ.-Ecole Polytechnique, Montreal, 32p.

- Carter, T.R.
1976: Archean Sedimentary Rocks and Associated Mineralization in the North Spirit Lake area, Northwestern Ontario; unpublished B.Sc. thesis, Univ. of Western Ontario, London, 90p.

- Cerny, P.
1976: Pegmatite studies; p.22-44 *in* Centre for Precambrian Studies 1976 Annual Report-Research, Univ. of Manitoba, Winnipeg, 150p.

- Cerny, P., and Trueman, D.L.
1977: Distribution and Petrogenesis of Lithium Pegmatites in the Western Superior Province of the Canadian Shield; Centre for Precambrian Studies, Publication No.29,

NORTHWESTERN – RED LAKE

- Univ. of Manitoba, Winnipeg, 31p.
- Cowan, W.R.
1977: Physiography and Surficial Geology of Northwestern Ontario; p.159 in Summary of Field Work, 1977 by the Geological Branch, edited by V.G. Milne, O.L. White, R.B. Barlow, and J.A. Robertson, Ontario Geol. Surv. MP75, 208p.
- Donaldson, J.A., and Ojakangas, R.W.
1977: Orthoquartzite Pebbles in Archean Conglomerate, North Spirit Lake, Northwestern Ontario: Canadian J. Earth Sci., vol.14, p.1980-1990.
- Dryden Observer, The
1978: Land use study set for West Patricia; (article) January 25, 1978, p.18.
- Dykes, S.M.
1976: A Study of a Quartz-Feldspar Porphyry Body in the Birch-Uchi Lakes Volcanic Belt, Northwestern Ontario; unpublished B.Sc. thesis, Queen's Univ., Kingston, 83p.
- Falls, R.M.
1974: A Breccia in Metavolcanic Rocks of the Uchi Lake Area, District of Kenora, Northwestern Ontario; unpublished B.Sc. thesis, Carleton Univ., Ottawa, 80p.
- Findlay, D.J.
1976: An Early Precambrian Porphyry Copper-Molybdenum Deposit at Lang Lake, Northwestern Ontario: A Summary; p.97-98 in Centre for Precambrian Studies 1976 Annual Report-Research, Univ. of Manitoba, Winnipeg, 150p.
- Findlay, D.J., and Ayres, L.D.
1977: Lang Lake-an Early Precambrian Porphyry Copper-Molybdenum Deposit in Northwestern Ontario; p.25-28 in Report of Activities, Part B, Geol. Surv. Canada, Paper 77-1B, 350p.
- Gerstner, J.
1977: Prospecting Gold with Charlie Peterson (and 'Deere John'); JD journal, Vol.6, p.6-9. Published by Deere & Company, Moline, Illinois.
- Gibson, H.L., and Wood, J.
1977: Petrology and Geologic Setting of Peridotitic Komatiites in the North Spirit Lake Area, Ontario: Abstract, p.20 in Program with Abstracts, Vol.2, Geol. Assoc. Canada, 68p.
- Gordaniér, W.D.
1976: The Depositional Environment of Formation K, Favourable Lake Volcanic Complex, Northwestern Ontario; p.73-84 in Centre for Precambrian Studies 1976 Annual Report-Research, Univ. of Manitoba, Winnipeg, 150p.
- Henderson, J.B.
1978: Age and Origin of the Gold-Bearing Shear Zones at Yellowknife, Northwest Territories; p.259-262 in Report of Activities, Part A, Geol. Surv. Canada, Paper 78-1A, 558p.
- Hillary, E.M.
1976: Evidence for Primary Igneous Origin of an Ancient Crustal Remnant, Favourable Lake Area, Northwestern Ontario; p.65-72 in Centre for Precambrian Studies 1976 Annual Report-Research, Univ. of Manitoba, Winnipeg, 150p.
- Hogan, J.J.
1976: Gold; Mineral Review Preprint No.19, Canadian Minerals Yearbook 1975, Energy, Mines and Resources Canada, 18p.
- Hunter, J.A.
1971: Crustal Seismic Studies in Northern Ontario and Manitoba from Project Early Rise Data; unpublished Ph.D. thesis, Univ. of Western Ontario, London.
- Jeffries, J.D.
1977: Submission to the Royal Commission on the Northern Environment by the Griffith Mine, presented at Red Lake on Nov.15, 1977; Commission file no. 00117, exhibit no. 68, 9p.
- Johns, G.W.
1977: Geology of Honeywell and McNaughton Townships, District of Kenora, Patricia Portion, Ontario; Ontario Geol. Surv. Open File Report 5219, 103p.
- Karvinen, W.O.
1977: Distribution of Carbonate-Rich Rocks, Porphyries and Gold Deposits, Timmins Area, Ontario; Abstract, p.28 in Program with Abstracts, vol.2, Geol. Assoc. Canada, 68p.
- Kerrich, R., Fyfe, W.S., and Allison, I.
1977: Iron Reduction Around Gold-Quartz Veins, Yellowknife District, Northwest Territories, Canada; Econ. Geology, Vol.72, p.657-663.
- Koschal, G.
1975: Petrology of the Wall-Rock Alteration of the Uchi Orebody, Confederation Lake, Ontario; unpublished M.Sc. thesis, Wright State University, Dayton, 94p.
- Krogh, T.E., Davis, G.L., Ermanovics, I., and Harris, N.B.W.
1977: U-Pb Isotopic Ages of Zircons from the Berens Block and English River Gneiss Belt; p.41 in Proceedings of the 1977 Geotraverse Conference, Precambrian Research Group, Univ. of Toronto, 234p.
- Kuo, H.Y., and Wilson, H.D.B.
1976: Some Observations on Gold Distribution in Archean Volcanic Rocks; p.45-51 in Centre for Precambrian Studies 1976 Annual Report-Research, Univ. of Manitoba, Winnipeg, 150p.
1977: Gold in Archean Ultramafic Rocks and Associated Volcanic Rocks from the Canadian Shield; Centre for Precambrian Studies, Publication No.22, Univ. of Manitoba, Winnipeg. (Submitted to Econ. Geology).
- Makepeace, D.K.
1977: The Geology of the Aerofoil Lake Pluton, Northwestern Ontario; unpublished B.Sc. thesis, Queen's Univ., Kingston.
- Meadows, D.R.
1977: Submission to the Royal Commission on the Northern Environment by the Red Lake Businessmen's Association, presented at Red Lake on Nov. 15, 1977; Commission file no. 00049, exhibit no. 69, 10p.

- Milne, V.G.
1977: Precambrian Geology Section Surveys, 1977; p.2-3 *in* Summary of Field Work, 1977 by the Geological Branch, edited by V.G. Milne, O.L. White, R.B. Barlow, and J.A. Robertson, Ontario Geol. Surv. MP75, 208p.
- Ministry of Natural Resources, Ontario
1977: Submission to the Royal Commission on Northern Environment by the Ministry of Natural Resources, presented at Sioux Lookout on Nov.8, 1977; Commission file no. 00036, exhibit no. 23, 49p.
- Muir, T.L.
1972: Petrographic Study of the Hammell Lake Anorthositic Gabbro Complex; unpublished B.Sc. thesis, Queen's Univ., Kingston.
- Pirie, J.
1977: Bateman-Balmer Townships Area, District of Kenora, Patricia Portion; p.12-17 *in* Summary of Field Work, 1977 by the Geological Branch, edited by V.G. Milne, O.L. White, R.B. Barlow, and J.A. Robertson, Ontario Geol. Surv. MP75, 208p.
- Reid, S.M.
1977: Submission to the Royal Commission on the Northern Environment by Campbell Red Lake Mines Limited, presented at Red Lake on Nov. 15, 1977; Commission file no. 00048, exhibit no. 63, 12p.
- Robertson, J.A.
1977: Uranium Deposits of Ontario; p.185-187 *in* Summary of Field Work, 1977 by the Geological Branch, edited by V.G. Milne, O.L. White, R.B. Barlow, and J.A. Robertson, Ontario Geol. Surv. MP75, 208p.
- Runnalls, R.J.
1977: Gravity Interpretation of the Red Lake Area: Preliminaries; p.73-76 *in* Proceedings of the 1977 Geotraverse, Precambrian Research Group, Univ. of Toronto, 234p.
- Ruzicka, V.
1978: Evaluation of Selected Uranium-Bearing Areas in Canada; p.269-274 *in* Report of Activities, Part A, Geol. Surv. Canada, Paper 78-1A, 558p.
- Saxby, R.
1977: Petrology, Alteration and Sulphides of the Dixie Prospect; unpublished B.Sc. thesis, Queen's Univ., Kingston, 68p.
- Schwerdtner, W.M., and Goodwin, A.M.
1977: Structural Geology of the Geotraverse Region; p.10-24 *in* Proceedings of the 1977 Geotraverse Conference, Precambrian Research Group, Univ. of Toronto, 234p.
- Secombe, P.K.
1973: Sulfur Isotope and Trace-Element Geochemistry of Sulfide Mineralization in the Birch-Uchi Greenstone Belt, Northwestern Ontario; unpublished Ph.D. thesis, Univ. of Manitoba, Winnipeg.
- Shieh, Y.N., and Schwarz, H.P.
1977: An Estimate of the Oxygen Isotope Composition of a Large Segment of the Canadian Shield in Northwestern Ontario; Canadian J. Earth Sci., Vol.14, p.927-931.
- Sopuck, V.J.
1971: Structural Geology in the Birch Lake-Uchi Lake Meta-volcanic-Metasedimentary Belt, Mitchell Township, Ontario; unpublished M.Sc. thesis, Univ. of Manitoba, Winnipeg, 69p.
- Stone, D.
1977: The Sydney Lake Fault Zone; p.94-108 *in* Proceedings of the 1977 Geotraverse Conference, Precambrian Research Group, Univ. of Toronto, 234p.
- Thom, G.G.W. and Wilson, K.
1976: New SL/RN Direct Reduction Plant at Griffith Mine; I & SM, Oct. 1976, p.30-34.
- Thurston, P.C.
1977: Birch Lake Area, District of Kenora, Patricia Portion; p.9-11 *in* Summary of Field Work, 1977 by the Geological Branch, edited by V.G. Milne, O.L. White, R.B. Barlow, and J.A. Robertson, Ontario Geol. Surv. MP75, 208p.
- Urquhart, W.E.S.
1977: Investigation of the Geological Significance of Linear Aeromagnetic Anomalies in the English River Gneiss Belt; p.5-6 *in* Proceedings of the 1977 Geotraverse Conference, Precambrian Research Group, Univ. of Toronto, 234p.
- Urquhart, W.E.S., and West, G.F.
1977: Aeromagnetic Anomaly Pattern in the English River Gneiss Belt, Superior Province; Abstract, p.54 *in* Program with Abstracts, Vol.2, Geol. Assoc. Canada, 68p.
- Wallace, H.
1977: Slate Falls Area, District of Kenora; p.4-8 *in* Summary of Field Work, 1977 by the Geological Branch, edited by V.G. Milne, O.L. White, R.B. Barlow, and J.A. Robertson, Ontario Geol. Surv. MP75, 208p.
- Williams, C.T., and Trueman, D.L.
in press: An Estimation of Lithium Resources and Potentials of Northwestern Ontario, Manitoba, and Saskatchewan, Canada.
- Wilson, H.D.B., Morrice, M.G., Ziehke, D.V., and Beakhouse, G.P.
1976: Development of greenstone-granite and gneissic terrains in Archean shields; p.2-21 *in* Centre for Precambrian Studies 1976 Annual Report-Research, Univ. of Manitoba, Winnipeg, 150p.
- Wilson, K.
1977: The SL/RN Process at the Griffith Mine; p.4-1 to 4-12 *in* Proceedings: A.I.M.E. 50th Ann. Meeting, the World of Iron Ore; 38th Ann. Mining Symposium, 50 Years of Progress in Minnesota, Univ. of Minnesota, Duluth.
- Wood, J.
1977a: Stratigraphic Framework and Depositional Environments of Archean Clastic Metasediments in the North Spirit Lake Area, Ontario; Abstract, p.56 *in* Program with Abstracts, Vol.2, Geol. Assoc. Canada, 68p.
1977b: Geology of the Hewitt Lake Area, District of Kenora, Patricia Portion, Ontario; Ontario Geol. Surv. Open File Report 5216, 236p.

NORTHWESTERN -- RED LAKE

1977c: Geology of North Spirit Lake Area, District of Kenora (Patricia Portion); Ontario Div. Mines, GR150, 60p. Accompanied by Map 2362, scale 1 inch to ½ mile (1:31,680).

TABLE 1 | MAPS AND REPORTS PERTAINING TO THE RED LAKE MINING DIVISION, ISSUED BY THE GEOLOGICAL BRANCH OF THE ONTARIO MINISTRY OF NATURAL RESOURCES IN 1977. SEE "LIST OF PUBLICATIONS" (BACK POCKET) FOR DETAILS.

GEOSCIENCE REPORT
GR 150

MINERAL DEPOSITS CIRCULAR
MDC 15

MINERAL POLICY BACKGROUND PAPER
MPBP 3 (Issued by the Mineral Resources Branch)

MISCELLANEOUS PAPERS
MP 70
MP 71
MP 73
MP 74
MP 75

OPEN FILE REPORTS
OFR 5216
OFR 5219
OFR 5230

MISCELLANEOUS PUBLICATIONS
Rocks and Minerals Information, 1977
Statistical Report On the Mineral Industry of Ontario
1971-1973. Volume IV-VI (Issued by the Mineral
Resources Branch)

COLOURED MAPS
Map 2362

PRELIMINARY MAPS
P. 1216
P. 1226
P. 1227
P. 1239
P. 1240
P. 1244
P. 1245
P. 1250-1354
P. 1390-1459

TABLE 2

Exploration activity in 1977.

The following is a list of individuals and companies known to be engaged in exploration within the Red Lake Mining Division in 1977, and the type of work undertaken in each case. The numbers correspond to the numbered areas on Figure 1.

INDIVIDUAL OR COMPANY	ACTIVITY
1. Abino Gold Mines Ltd.	Diamond drilling in Balmer Tp.
2. Aiken-Russet Red Lake Mines Ltd.	Diamond drilling in Baird Tp.
3. All Canadian Mining and Exploration	Exploration and trenching in Skinner Tp.
4. Cominco Ltd.	Geological reconnaissance in Casummit Lake, Stoughton Lake, Meen Lake and surrounding areas; airborne Mag. and EM, ground Mag. and EM, geology and lake bottom geochemistry in McInnes Lake and adjacent areas; ground Mag. and EM, and geology in Dixie Lake area.
5. Consolidated Copper-Lode Developments Inc.	Ground geophysics and diamond drilling in Fredart Lake area.
6. Dome Exploration (Canada) Ltd.	Diamond drilling in Balmer Tp.
7. Frank, R.A.	Exploration in Dent Tp.
8. Gulf Minerals Canada Ltd.	Geological reconnaissance in Earngey, Agnew, Mitchell, and Dent Tps.
9. Hanna Mining Co., The	Exploration in Avis Lake area; diamond drilling in Mattson Lake area.
10. Hermiston, W.L.	Diamond drilling in Ball Tp.
11. Hudson Bay Exploration and Development Co. Ltd.	Geology and ground EM in Gerry Lake, Karas Lake and Bluffy Lake areas; diamond drilling in Karas Lake and Fredart Lake areas.
12. Kerr Addison Mines Ltd. - Hudson Bay Exploration and Development Co. Ltd. (Joint Venture)	Ground EM in Mitchell Tp.
13. Kostynuk, A.	Diamond drilling in Dome Tp. and Brownstone Lake area.
14. Mattagami Lake Mines Ltd.	Ground Mag. and radiometry in Yelling Lake and Ellard River areas.
15. New Jersey Zinc Exploration Co. (Canada) Ltd.	Airborne Mag. and EM, geology and ground geophysics in Hewitt Lake, Mattson Lake and surrounding areas.
16. Noranda Exploration Co. Ltd.	Exploration in Stull Lake area; geology and ground radiometric surveys in Deer Lake area; ground Mag. and EM in Gerry Lake and Root Lake areas.
17. Ogden, M.	Geology in Casummit Lake area.
18. Peterson, C.W.	Diamond drilling in Fairlie Tp.
19. Rivard, O'Brien	Ground EM and diamond drilling in Todd Tp.
20. Selco Mining Corporation Ltd.	Ground Mag. and EM and diamond drilling in Dixie Lake, Gerry Lake and adjacent areas; exploration and diamond drilling in vicinity of South Bay Mine (Dent, Mitchell Tps.).
21. Sherritt Gordon Mines Ltd.	Diamond drilling in McInnes Lake area.
22. Silveroc Mines Ltd.	Diamond drilling in Vanderbrink Lake area.
23. Soltermann, R.H.	Diamond drilling in Todd Tp.
24. St. Joseph Explorations Ltd.	Geology in Slate Lake and Avis Lake areas; ground Mag. and EM in Dixie Lake area.
25. Union Miniere Exploration and Mining Corp. Ltd. (UMEX)	Exploration in West of Riordon Creek area.
26. Utah Mines Ltd. - McIntyre Mines Ltd. (Joint Venture)	Geological reconnaissance in Shabumeni Lake, Casummit Lake areas.
27. Vantreal Resources Ltd.	Ground geophysics in Setting Net Lake area.
28. Vihonen, B.	Diamond drilling in Baird Tp.
29. Wright, R.J., and others	Ground Mag. and EM in Matthews Lake area.

NORTHWESTERN — RED LAKE

TABLE 3 Assessment work and other information received in 1977.

Abbreviations								
Assess.	-	Assessment Work	GL.	-	Geological Survey			
Asb.	-	Asbestos	Mag.	-	Magnetometer Survey			
Au	-	Gold	MEAP	-	Mineral Expl. Assistance Program			
BM	-	Base Metals	O.S.C.	-	Ontario Securities Commission			
DDH(3) 1173'	-	3 diamond drill holes totalling 1173'	Tr.	-	Trenching			
EM	-	Electromagnetic Survey						
Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work	Year	Toronto File No.	Local File No.
Agnew, Dent Tp.	52N/2	Kerr Addison Mines Ltd.	BM	Assess.	Mag., EM	1976	2.2248	Agnew Tp.
Baird Tp.	52K/13	Aiken-Russet Red Lake Mines	Au	MEAP (RL-49)	DDH(1) 112'	1977	63.3473	Baird Tp.
Baird, Heyson Tp.	52K/13	Selco Mining Corp. Ltd.	BM	Assess.	Mag., EM	1975	2.2154	Baird/Heyson Tp.
Ball Tp.	52M/1	Hermiston, W.L.	Au	Assess.	DDH(1) 103'	1977		Ball Tp.
Belanger Tp.	52K/15	Consolidated Copper-Lode Dev. Inc.	BM	O.S.C.	Prospectus	1977	63.3480	Belanger Tp.
Bowerman Tp.	52K/15 52N/2	Kerr Addison Mines Ltd.	BM	Assess.	Mag., EM	1975-6	2.2178	Bowerman Tp.
Brownstone Lake	52N/9	Selco Mining Corp. Ltd.	BM	Assess.	Mag., EM Mag., EM Mag., EM DDH(1) 199'	1975 1975-6 1976 1977	2.2199 2.2197 2.2305	52N/NE
Bruce Lake	52K/14	Selco Mining Corp. Ltd.	BM	Assess.	Mag., EM	1975	2.2151	52K/NW
Byshe Tp.	52K/13	Selco Mining Corp. Ltd.	BM	Assess.	Mag., EM	1976	2.2323	Byshe Tp.
Casummit Lake	52N/8	McIntyre Mines Ltd.	BM	Assess.	Mag., EM	1976	2.2260	52N/SE
		Selco Mining Corp. Ltd.	BM	Assess.	Mag., EM	1976	2.2196	52N/SE
Corless Tp.	52N/5	McIntyre Mines Ltd.	BM	Assess.	GL	1975	2.2432	52N/SW
Dixie Lake, South of Byshe & Willans Tp.	52K/14	Selco Exploration Co. Ltd.	BM	Assess.	Mag., EM	1975	2.2130	52K/NW
Dome, Balmer, Bateman, McDonough Tp.	52N/4	Abino Gold Mines Ltd.	Au	MEAP (RL-50)	DDH(3) 1173'	1977	63.3483	Dome, Balmer, Bateman, McDonough Tp.
Dome Tp.	52N/4	Kostynuk, A.	Au	Assess.	DDH(2) 135'	1977		Dome Tp.
Fairlie Tp.	52N/4	Peterson, C.W.	Au	Assess. MEAP (PL-51)	DDH(9) 3305.7'	1977	63.3490	Fairlie Tp.
Faulkenham Lake	52K/13	Selco Mining Corp. Ltd.	BM	Assess.	Mag., EM Mag., EM	1975 1975-6	2.2153 2.2187	52K/NW
Gerry Lake	52K/14	Noranda Expl. Co. Ltd.	BM	Assess.	Mag., EM	1977	2.2381	52K/NW
		Selco Mining Corp. Ltd.	EM	Assess.	Mag., EM Mag., EM DDH(2) 532'	1976 1976-7 1977	2.2312 2.2413	52K/NW
Gerry, Karas Lakes	52K/14	Selco Mining Corp. Ltd.	BM	Assess.	Mag., EM	1976	2.2188	52K/NW
Hewitt, Armstrong, Buckett, Mattson, Wapiskowamik Lakes	53C/7 53C/10	New Jersey Zinc Expl. Co. (Canada) Ltd.	BM	Assess.	Airborne Mag.	1977	2.2422	53C/SE 53C/NE
Karas Lake	52K/14	Hudson Bay Expl. & Dev. Co. Ltd.	BM	Assess.	DDH(7) 3049'	1973, 1977		52K/NW
		Selco Mining Corp. Ltd.	BM	Assess.	Mag., EM DDH(12) 4088'	1975 1976	2.2155	52K/NW
Karas, Bruce, South of Otter Lakes	52K/14	Selco Mining Corp. Ltd.	BM	Assess.	Mag., EM	1975-6	2.2150	52K/NW
Mattson Lake	53C/7	Hanna Mining Co., The	BM	Assess.	Mag.	1976	2.2390	53C/SE
McInnes, McInnes (South Part), Cleveland, Culverson, Grist Lakes	53C/4,5, 6	Cominco Ltd.	BM	Assess.	Mag.	1977	2.2477	53C/SW
Mitchell Tp.	52N/2	Selco Mining Corp. Ltd.	BM	Assess.	DDH(1) 400'	1977		Mitchell Tp.
Mitchell Tp., Uchi Lake, Earngey Tp.	52N/2	Selco Mining Corp. Ltd.	BM	Assess.	DDH(2) 1052'	1976		Mitchell Tp.

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work	Year	Toronto File No.	Local File No.
Passmore Lake	53K/2	Conwest Expl. Co. Ltd. (E. Sandborn et. al. option)	Asb.	Assess.	Mag. DDH(3) 1200'	1976 1976	2.2133	53K/SE
Riordon Creek	53C/16	Union Minière Exploration and Mining Corp. Ltd. (UMEX)	BM	Assess.	DDH(1) 515'	1977		53C/NE
Shabumeni Lake	52N/7	McIntyre Mines Ltd.	BM	Assess.	Mag., EM	1975	2.2125	52N/SE
	52N/8	McIntyre Mines Ltd.	Au & BM	Assess.	GL	1975	2.2431	52N/SE
Skinner Tp.	52N/5	Alcock, G.	Au	Assess.	Tr.	1976-7		Skinner Tp.
		Bertram, A.	Au	Assess.	Tr.	1977		Skinner Tp.
South of Byshe & Willans Tp.	52K/13	Selco Mining Corp. Ltd.	BM	Assess.	Mag., EM	1975-6	2.2152	52K/NW
South of Otter Lake	52K/14	Selco Mining Corp. Ltd.	BM	Assess. MEAP (RL-52)	DDH(6) 1840' Mag., EM DDH(7) 2108'	1976-7 1977 1977	63.3472	52K/NW
South of Otter, Gerry, Karas, Bruce Lakes	52K/14	Selco Mining Corp. Ltd.	BM	Assess.	Mag., EM	1976	2.2140	52K/NW
Todd Tp.	52M/1	Rivard, O.	Au	Assess.	DDH(2) 282'	1977		Todd Tp.
		Soltermann, R.H.	Au	Assess.	DDH(2) 275'	1977		Todd Tp.
Upper Goose Lake (East Pt.)	52N/9	Selco Mining Corp. Ltd.	BM	Assess.	Mag., EM	1975-6	2.2198	52N/NE
Vanderbrink Lake	53F/14	Silveroc Mines Ltd.	Au	Assess.	DDH(1) 125'	1977		53F/NW
Wavell Lake	52N/10	Selco Mining Corp. Ltd.	BM	Assess.	Mag., EM	1976	2.2311	52N/NE

1977 Report of Sioux Lookout Resident Geologist

A.A. Speed¹

CONTENTS

Introduction	28
Resident Geologist's Activities	28
Mining Activity	28
Mineral Exploration Activity	29
Gold Exploration	29
Base Metal Exploration	29
Uranium Exploration	32
Recommendations for Exploration	32
Geological Branch Activities	32
Research by Other Agencies	32
Recent Publications and References	33

TABLES

1— Maps and Reports Issued by the Geological Branch . . .	33
2— Exploration Activity in 1977	34
3— Assessment Work and Other Information Received in 1977	35

FIGURES

1,2—Sioux Lookout Resident Geologist's District	30,31
---	-------

INTRODUCTION

The staff in the Sioux Lookout office consisted of P.A. Palonen, Resident Geologist, A.A. Speed, Resource Geologist, and E. Fraser, Secretary.

A sharp increase in the number of claims staked occurred in the second half of the year due principally to the completion of the Marchington Road connecting Sioux Lookout with Highway 599 at a point 19 km north of Savant Lake. This road crosses a previously inaccessible band of metavolcanics in the Farrington-Hough Lakes area.

Major exploration activity continued to be confined to the search for base metal deposits, although some additional staking took place in connection with uranium exploration. The continued interest in uranium exploration is the result of the release the second phase

of the joint Federal-Provincial airborne gamma-ray spectrometer survey in the Kenora-Lac Seul area (see Figure 2).

RESIDENT GEOLOGIST'S ACTIVITIES

Consultation on various aspects of the geology, mineral and aggregate potential and exploration activities in the Sioux Lookout district was carried out with prospectors, and personnel of mining companies, universities and government. Visits were made to two operating mines, the Thierry mine (Union Miniere Explorations and Mining Corporation Limited), and the Sturgeon Lake mine (Falconbridge Copper Limited and NBU Mines Limited). Visits were also made to the Goldlund Mines Limited property in Echo Township and Beth-Canada Mining Company's recently staked claim group in McAree Township. In addition, five inactive properties were visited. Short visits were made to four field parties of the Geological Branch's Precambrian Geology Section.

The office staff became increasingly involved in strategic land-use planning by providing geoscience input to lake development plans, proposed remote airport sites, proposed wilderness park areas, park reserves, forest management units and district land-use plans.

Ten data series compilation maps were prepared and subsequently published by the Geological Branch. Geological and mineral identification lectures were given to three school groups and one Junior Ranger camp. Office staff also performed judicial duties at two school group's Science Fairs.

MINING ACTIVITY

Three mines are currently in production, the Thierry mine, the Sturgeon Lake mine and the Mattabi mine. The Lyon Lake Division of Mattagami Lake Mines Limited suspended development operations, including work on the Creek Zone orebody, in December, 1977

¹Resource Geologist, Ontario Ministry of Natural Resources, 18½ 4th Avenue North, Sioux Lookout, P0V 2T0.

(M.W. Airth, Managing Director, Mattagami Lake Mines Limited, personal communication, 1978).

The Thierry mine, owned by Union Miniere Explorations and Mining Corporation Limited, at Pickle Lake, has been operating since August, 1976. Production was reduced from 4,000 tons per day to 2,000 tons per day in 1977 (The Northern Miner, June 30 and Oct. 20, 1977). Production from the open pits was terminated in mid-August, 1977. The pits were carried down by five 11 m benches for approximately 53 m. Total combined production from the open pits amounted to approximately 1.4 million tons of ore and 4 million tons of waste (The Northern Miner, October 20, 1977). Mining operations continue underground.

Sturgeon Lake Mines Limited continued production from its operation at Sturgeon Lake. The open pit is now down 61 m on its way to its proposed depth of 113 m. Ore reserves are reportedly sufficient to maintain the present milling rate of 1,200 tons per day for up to 2.5 years (The Northern Miner, October 20, 1977).

Mattabi Mines Limited continued steady production in 1977. The open pit, currently at a depth of approximately 100 m, will reach a maximum depth of 140 m. The access decline has been completed to a depth of 915 m and 915 m of drifting has been completed on the 850 foot level (The Northern Miner, October 20, 1977). Underground production is expected by mid-1980 (M.W. Airth, Managing Director, Mattagami Lake Mines Limited, personal communication, 1978).

The Lyon Lake Division of Mattagami Lake Mines Limited continued development, completing shaft sinking to a depth of 396 m (1,300 feet), and establishing levels at 400, 600, 1,000 and 1,200 feet. A crusher and an ore conveyor system is presently being installed at the 1,000 foot level. The installation of the conveyor system and underground crusher is expected to be completed by the end of June, 1978. At that time, the operation will be placed on a care and maintenance basis until underground development at the Mattabi Mine is completed and additional ore is required for the mill (M.W. Airth, personal communication, 1978).

No new exploration was conducted on the iron ore deposits at Lake St. Joseph, owned jointly by Lake St. Joseph Iron Limited (The Algoma Steel Corp. Ltd. option) and Steep Rock Iron Mines Limited (Soules Bay deposit).

W.M. Thompson's silver-copper-lead property near the CNR siding of Rosnel remained on a standby basis in 1977 (W.M. Thompson, personal communication, 1978).

MINERAL EXPLORATION ACTIVITY

A slight increase in exploration activity was evident in the Sioux Lookout Resident Geologist's district in

1977. Claims recorded during the year numbered 1,261 compared to 1,185 in 1976, a 6 percent increase. Assessment work was down slightly in 1977, with 34,663.1 days of assessment credit recorded, down 14 percent from the 40,676.76 days recorded in 1976 (Mining Recorder's files, Sioux Lookout).

A number of major mining companies are engaged in multi-year exploration programs in several areas. The large area made accessible by the newly completed Marchington Road, connecting Sioux Lookout and Highway 599, has initiated a great deal of staking activity by individual prospectors and major mining companies. The presence of favourable geology for mineralization, as well as opening up an entirely unexplored area has precipitated this interest. Other areas that have received considerable exploration activity are: the Minnitaki Lake-English River area southeast of Sioux Lookout; the Lake St. Joseph area; the Sturgeon Lake area; and the Claw Lake area northeast of Savant Lake.

Gold Exploration

Goldlund Mines Limited continued testing geophysical anomalies for base metal mineralization, as well as outlining additional gold mineralization in its known gold-bearing zone. Two diamond drill holes located 1250 m and 30 m north of the main gold-bearing granodiorite dike, intersected a conductor which consists of massive pyrite containing copper-zinc mineralization over narrow sections. In the search for new gold-bearing zones a diamond drill hole collared 520 m east of the shaft, encountered a 3 m gold-bearing section with some visible gold (The Northern Miner, August, 1977).

Exploration for gold mineralization continued in the Opapimiskan Lake area. Dome Exploration (Canada) Limited completed geophysical surveys and follow-up diamond drilling in an area of folded iron formation. The resulting anomalies from the geophysical surveys were penetrated by 17 diamond drill holes totalling 1021 m. Numerous gold-bearing intersections were noted in the sulphide-bearing phase of the iron formation (Resident Geologist's files, Ontario Ministry of Natural Resources, Sioux Lookout).

Base Metal Exploration

Major companies engaged in exploration programs in the Sioux Lookout District included Union Miniere Explorations and Mining Corporation Limited (UMEX), Noranda Exploration Company Limited, Geophysical Engineering Limited, Falconbridge Copper Limited, Mattagami Lake Mines Limited, Dome Exploration (Canada) Limited, Selco Mining Corporation Limited, Rio Tinto Canadian Exploration Limited, and Sherritt

NORTHWESTERN – SIOUX LOOKOUT

EXPLANATION

- Producing mines, 1977
 1. Mattabi Mines Ltd. Zn,Cu,Pb,Ag
 2. Sturgeon Lake Mines Ltd. Zn,Cu,Pb,Ag
(owned by Falconbridge Copper Ltd. & NBU Mines Ltd.)
 3. Union Miniere Explorations and Mining Corp. Ltd. (UMEX) Cu

- Mines under development
 1. Mattagami Lake Mines Ltd.* . Zn,Cu,Ag,Au
(Lyon Lake Division)

- ▲ Properties under evaluation and/or active exploration
 1. Goldlund Mines Ltd. Au
 2. Lake St. Joseph Iron Ltd. Fe
(optioned to The Algoma Steel Corp. Ltd.-Algoma Ore Division)
 3. Steep Rock Iron Mines Ltd. Fe
 4. Thompson, W.M. Ag,Cu,Pb

- Exploration activity in 1977
(keyed to Table 2)

- * Exploration activity with assessment work filed in 1977
(keyed to Table 2)

- ==== Map or report issued by the Geological Branch in 1977
(keyed to Table 1)
 - P - Preliminary map
 - GR - Geoscience Report
 - OFR - Open File Report

- Federal-Provincial Uranium Reconnaissance Program

- ▨ Boundary of Resident Geologist's district

*Ceased development December 30, 1977

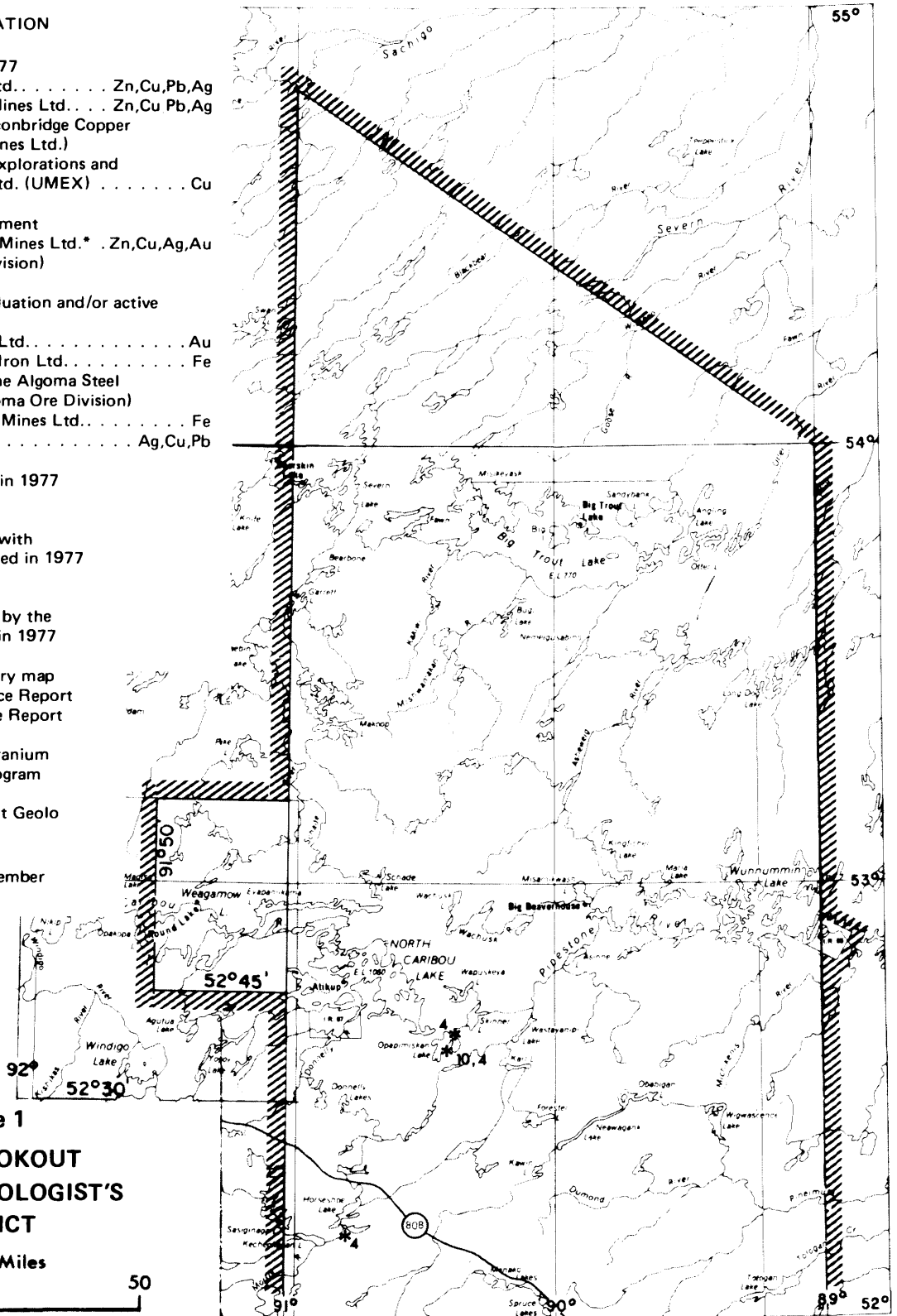
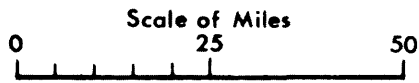


Figure 1
SIOUX LOOKOUT
RESIDENT GEOLOGIST'S
DISTRICT



Adjoins Figure 2

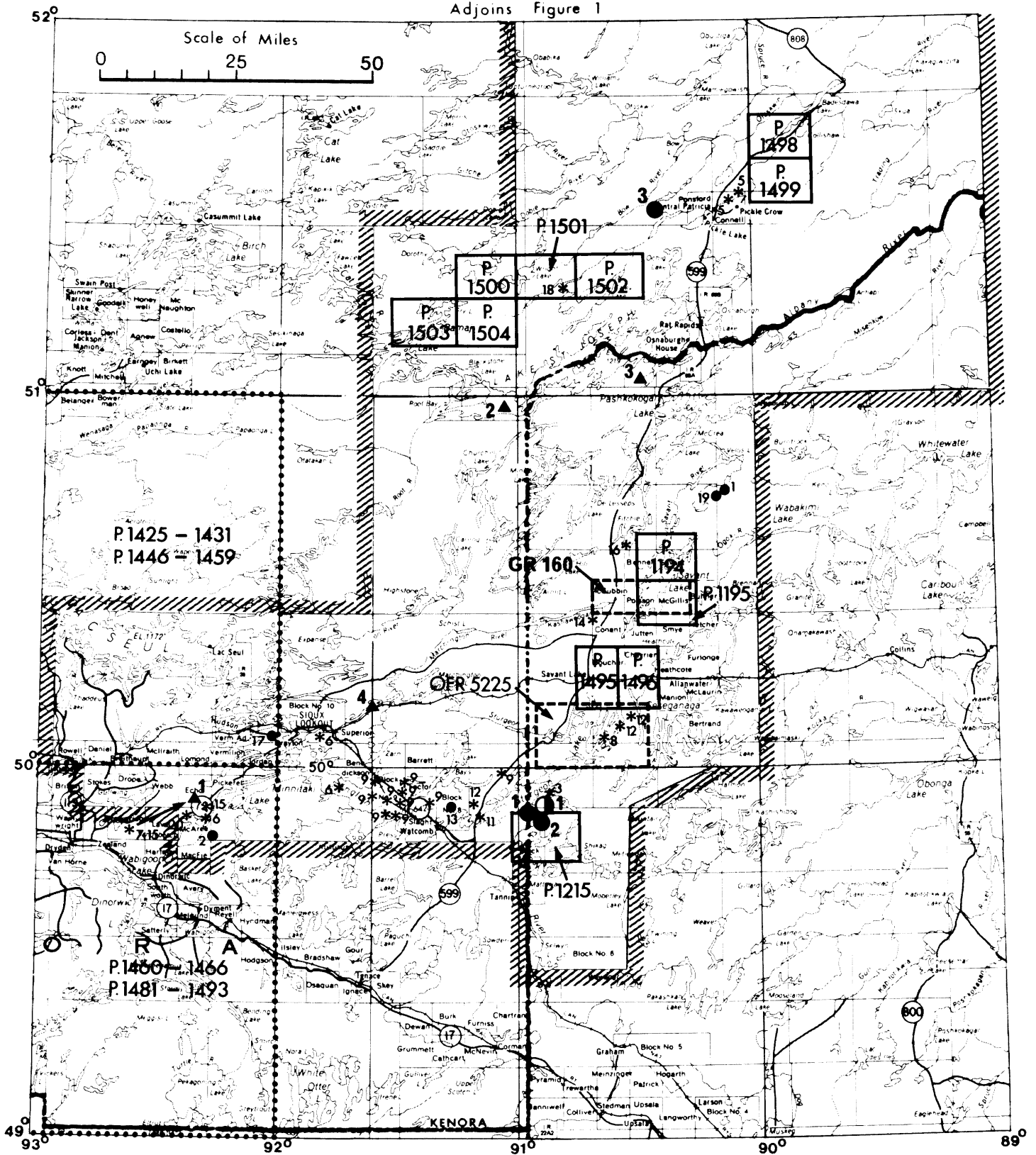


Figure 2

Gordon Mines Limited.

Considerable interest was noted in the Houghton-Hough Lakes area due to the completion of the Marchington Road, initiating a flurry of staking activity.

Exploration programs in various stages of completion were also noted in the Lake St. Joseph, Sturgeon Lake and Minnitaki Lake-English River areas.

Several companies, including Canadex Mining Corporation Limited, New Insco Mines Limited, The Price Company Limited, Beth-Canada Mining Company and Surveymin Limited, as well as individual prospectors, carried out basic exploration programs on specific showings or mining properties in the district.

Uranium Exploration

Several major mining companies and a number of individual prospectors performed additional exploration work on their claims situated in the Claw Lake area northeast of Savant Lake. This activity was related to a radiometric anomaly originally defined by the 1976 Federal-Provincial airborne radiometric survey.

RECOMMENDATIONS FOR EXPLORATION

Geological mapping in the Swimit Lake area has revealed an intrusive complex, ultramafic to gabbroic in composition, which may contain copper-nickel mineralization. In the same area, the presence of mafic and felsic pyroclastic rocks suggest the area should be explored for possible base metal sulphide deposits. Reconnaissance magnetometer traverses over the gabbroic intrusive and felsic pyroclastic rocks detected several anomalies (Beth-Canada Mining Company, field personnel, personal communication, 1978).

The presence of sulphide mineralization in Laval Township, occurring in a number of quartz-feldspar porphyry and felsite dikes within mafic flows and intercalated mafic and felsic tuffaceous rocks, warrants further investigation for base metal sulphide deposits. No ground geophysical surveys are known to have been performed in this area. Previous prospecting in the area was limited to gold.

Other recommended areas for exploration have been outlined by geologists of the Precambrian Geology Section in the Summary of Field Work, 1977 (Miscellaneous Paper 75, see list of publications in back pocket).

GEOLOGICAL BRANCH ACTIVITIES

Reconnaissance scale mapping of the western half of the English River Gneiss Belt, extending from the Manitoba border to Savant Lake, was completed by

F.W. Breaks and W.D. Bond of the Precambrian Geology Section. The work during the 1977 field season was concentrated in the Sioux Lookout-Marchington Lake area.

Detailed mapping was started in the Bamaji-Fry Lakes area by H. Wallace, principally as a basis for determining the molybdenum-copper potential of the area.

N.F. Trowell continued a synoptic study in the Sturgeon Lake-Sioux Lookout-Minnitaki Lake area, while R.H. Sutcliffe performed a similar study in the Savant Lake area. Both projects are part of a special regional study incorporating the stratigraphy, structure and economic geology of the western section of the Wabigoon Belt extending from Crow Lake to Savant Lake.

Detailed mapping of a section of the iron formation through Eagle, Fish and Wolf Islands in Lake St. Joseph was initiated by H.D. Meyn of the Mineral Deposits Section and P.A. Palonen, Resident Geologist.

R.P. Sage, of the Precambrian Geology Section, completed a field study on the Big Beaver House carbonatite complex as part of a program to evaluate the economic potential of alkalic rock and carbonatite complexes in Ontario.

Detailed mapping by the Sioux Lookout staff was completed in the northwest corner of McAree Township and in the area surrounding Swimit Lake, south of Minnitaki Lake, as part of the Sandybeach Lake Project. Several previously unmapped intrusive bodies of gabbroic composition were found, located at the lateral facies change from volcanic flow rocks to pyroclastic and epiclastic rocks.

Results of an airborne gamma-ray spectrometric survey, a joint project of the Geological Survey of Canada and the Geological Branch, Ontario Ministry of Natural Resources, were released August 24, 1977. The 1976-1977 survey covers an area along the Ontario Manitoba border north to Latitude 53°, covering NTS quadrangles 52 E, 52 F, 52 L, 52 M, 53 D, and part of 52 K.

RESEARCH BY OTHER AGENCIES

Field work for graduate and undergraduate theses projects in the Sioux Lookout area was conducted by students of several universities. Some of the projects which have resulted in published reports are listed below.

Masters Theses

Hinzer, J.C.: Geological and geochemical study of Lyon Lake and Creek ore zones, Sturgeon Lake area, northwestern Ontario. University of Western Ontario.

McCarter, P.C.: Geology and mineralization of the Lateral Lake Stock, District of Kenora, Oregon State

University.

Turner, C.C.: Archean sedimentation: alluvial fan and turbidite deposits, Little Vermilion Lake, northwestern Ontario. McMaster University.

Urquhart, W.E.S.: Investigation of the geological significance of linear aeromagnetic anomalies in the English River Gneiss Belt. University of Toronto.

Bachelors Thesis

Higgins, C.S.: Petrography and petrology of the Schryburt Lake carbonatite intrusion. Carleton University.

Smith, D.A.: The geology of the Lake St. Joseph layered mafic intrusive complex, northwestern Ontario. Queen's University.

RECENT PUBLICATIONS AND REFERENCES

Birk, D. and McNutt, R.H.

1977: Rb/Sr Isochrons for Archean Granitoid Plutons within the Wabigoon Greenstone Belt, Northwestern Ontario, a Preliminary Evaluation; p.161-167 *in* Report of Activities Part A, Geol. Surv. Canada, Paper 77-1A.

Breaks, F.W. and Bond, W.D.

1977: English River Subprovince (Marchington Lake Area) District of Kenora; p.18-28 *in* Summary of Field Work, 1977, by the Geological Branch, edited by V.G. Milne, O.L. White, R.B. Barlow, and J.A. Robertson, Ontario Geological Survey Misc. Paper 75, 208p.

Brooks, C. and Gelinas, L.

1977: The Relationship of Base Metal Mineralization to Chemostratigraphic Divisions in Volcanic Rocks of Canadian Archean Greenstone Belts; Research Paper 77-1, Mineral Exploration Research Institute, McGill University, 19p.

Page, R.O. and Clifford, P.M.

1977: Physical Volcanology of an Archean Vent Complex, Minnitaki Lake Area, Northwestern Ontario; p.441-443 *in* Report of Activities Part A, Geol. Surv. Canada, Paper 77-1A.

Palonen, P.A. and Speed, A.A.

1977: Sandybeach Lake Area, District of Kenora, Patricia Portion; p.55-56 *in* Summary of Field Work, 1977, by the Geological Branch, edited by V.G. Milne, O.L. White, R.B. Barlow, and J.A. Robertson, Ontario Geological Survey Misc. Paper 75, 208p.

Sage, R.P.

1977: Carbonatite-Alkalic Complexes: Big Beaver House Carbonatite Complex, District of Kenora, Patricia Portion; p.69-70 *in* Summary of Field Work, 1977, by the Geological Branch, edited by V.G. Milne, O.L. White, R.B. Barlow, and J.A. Robertson, Ontario Geological Survey Misc. Paper 75, 208p.

Trowell, N.F., Blackburn, C.E., Edwards, G., and Sutcliffe, R.H.

1977: Savant Lake-Crow Lake Special Project, Districts of Thunder Bay and Kenora; p.29-50 *in* Summary of Field

Work, 1977, by the Geological Branch, edited by V.G. Milne, O.L. White, R.B. Barlow, and J.A. Robertson, Ontario Geological Survey Misc. Paper 75, 208p.

University of Manitoba

1977: Centre for Precambrian Studies, 1976 Annual Report, Research; University of Manitoba, 150p.

University of Toronto

1977: Proceedings of the 1977 Geotraverse Conference; Precambrian Research Group, University of Toronto, 234p.

Wallace, H.

1977: Slate Falls area, District of Kenora, Patricia Portion; p.4-8 *in* Summary of Field Work, 1977, by the Geological Branch, edited by V.G. Milne, O.L. White, R.B. Barlow, and J.A. Robertson, Ontario Geological Survey Misc. Paper 75, 208p.

TABLE 1 | MAPS AND REPORTS PERTAINING TO THE PATRICIA MINING DIVISION, ISSUED BY THE GEOLOGICAL BRANCH OF THE ONTARIO MINISTRY OF NATURAL RESOURCES IN 1977. SEE "LIST OF PUBLICATIONS" (BACK POCKET) FOR DETAILS.

GEOSCIENCE REPORT
GR 160

MISCELLANEOUS PAPERS
MP 70
MP 71
MP 75

OPEN FILE REPORT
OFR 5225
OFR 5230

PRELIMINARY MAPS
P. 1194
P. 1195
P. 1215
P. 1226
P. 1227
P. 1244
P. 1245
P. 1425-1431
P. 1446-1459
P. 1495
P. 1496
P. 1498
P. 1499
P. 1500
P. 1501
P. 1502
P. 1503
P. 1504

MINERAL POLICY BACKGROUND PAPER
MPBP 3 (issued by Mineral Resources Branch)

TABLE 2 Exploration activity in 1977.

Number on Figure	Individual or Company	Activity
1.	Barry, H. V.	Diamond drilling in the Claw Lake area.
2.	Beth-Canada Mining Company	Ground Magnetometer reconnaissance survey in the McAree Township and Keikewabik Lake area.
3.	Canadex Mining Corporation Limited	Diamond drilling in the Six Mile Lake area.
4.	Dome Exploration (Canada) Limited	Diamond drilling in the Skinner Lake area and a geological survey in the Kecheokagan Lake area.
5.	Great National Corporation (Rio Tinto Canadian Exploration Limited)	Diamond drilling in the Tarp Lake area.
6.	Geophysical Engineering Limited	Diamond drilling in Drayton Township and Parnes Lake area.
7.	Goldlund Mines Limited	Diamond drilling and ground magnetometer and electromagnetic survey in Echo Township.
8.	Higgins, W. H.	Diamond drilling in the Squaw Lake area.
9.	Mattagami Lake Mines Limited	Diamond drilling in the Penassi Lake area, ground electromagnetic and magnetometer surveys in the Flying Loon, Press, Smock and Wyatt Lake areas.
10.	Musselwhite, W. H. and A. L.	Ground electromagnetic and magnetometer surveys in the Zeemel Lake area.
11.	New InSCO Mines Limited	Induced polarization survey and diamond drilling in the Valora Lake area.
12.	Noranda Exploration Company Limited	Ground electromagnetic and magnetometer surveys in the Beckington Lake area, diamond drilling in the Penassi Lake area.
13.	Price Company Limited, The	Geological survey in the Penassi, Valora Press, and Wyatt Lakes areas.
14.	Ramsay, R. G.	Stripping in the Grebe Lake-McCubbin Township area.
15.	Selco Mining Corporation Limited	Ground magnetometer and electromagnetic surveys in the Solitude Lake area.
16.	Surveymin Limited	Ground electromagnetic and magnetometer surveys in the Solitude Lake area.
17.	Thompson, W. M.	Diamond drilling in Drayton Township.
18.	Union Miniere Explorations and Mining Corporation Limited (UMEX)	Diamond drilling in the Wright Lake area.
19.	Urangesellschaft Canada Limited	Geological and radiometric surveys in the Claw Lake area.
20.	Wilkinson, D.	Diamond drilling and rock trenching in McAree Township.

TABLE 3

Assessment work and other information received in 1977.

PATRICIA MINING DIVISION								
SYMBOLS AND ABBREVIATIONS								
Au-gold				rtr-rock	trenching			
Ag-silver				tr-trace	amounts			
Cu-copper				DD 3-1500-Diamond	drilling 3 holes 1500 foot total			
Pb-lead				Assess-Assessment	Data			
Zn-zinc				Non-assess-Non-assessment	Data			
Fe-iron				Rad-Radiometric	Survey			
Mn-manganese				Geol-Geological	Survey			
py-pyrite				IP-Induced Polarization	Survey			
cp-chalcopyrite				Mag-Ground Magnetometer	Survey			
po-pyrrhotite				VEM-Vertical Loop	Survey			
sp-sphalerite				VLF-Very Low Frequency	Survey			
gn-galena				HEM-Horizontal Loop	Survey			
mag-magnetite				AEM-Airborne Electromagnetic	Survey			
sTr-soil trenching or stripping				OSC-Ontario Securities Commission				
Location	NTS	File Name	Commodity Found	Type of Report	Type of Work	Year	Toronto File No.	Local File No.
Beckington Lake	52 J/2 NE	Noranda Exploration Company Limited		Assess.	Mag & VLF	1976	2.2237	42
	52 J/2 NE	Noranda Exploration Company Limited		Assess.	Mag, VEM & HEM	1977	2.2281	43
Claw Lake	52 J/9 NE	Barry, H. V.		Assess.	DD 2-423	1977		3
	52 J/9 NE	Urangesellschaft Canada Limited		Assess.	Geol. & Rad.	1977	2.2404	4
Drayton Township	52 J/4 SW	Geophysical Engineering Limited		Assess.	DD 1-302	1977		19
	52 J/4 SW	Thompson, W. M.	po, py	Non-assess.	DD 1-221	1977		20
Echo Township	52 F/16 NW	Goldlund Mines Limited	py, po, mag, sp, Zn, Au, Ag	Assess.	DD 2-566	1976		28
	52 F/16 NW	Goldlund Mines Limited (Selco Mining Corporation Limited)		Assess.	Mag & VLF	1977	2.2366	31
Echo & McAree Townships	52 F/16 SW	Selco Mining Corporation Limited		Assess.	Mag & HEM	1977	2.2148	30
	52 F/16 NW							
Flyingloon Lake	52 G/13 SE	Mattagami Lake Mines Limited		Assess.	Mag & HEM	1977	2.2347	1
	52 G/13 SE	Mattagami Lake Mines Limited	Cu, Zn, Fe, Mn, Ni, po, py, cp	Assess.	DD 2-843	1977		2
Grebe Lake & McCubbin Township	52 J/7 NE	Ramsay, R. G.	Fe	Assess.	sTr	1976		32
Kechekagan Lake	53 B/2 NW	Dome Exploration (Canada) Limited		Assess.	Geol.	1977	2.2173	7
McAree Township	52 F/16 SW	Geophysical Engineering Limited	py, po	Assess.	DD 2-521.5	1977		24
	52 F/16 SW	Wilkinson, D.	po, py, mag	Assess.	DD 1-497	1976		16
	52 F/16 SW	Wilkinson, D.	po, py	Assess.	rTr	1977		23
Parnes Lake	52 G/13 NW	Geophysical Engineering Limited	py, po, cp	Assess.	DD 3-1, 130	1977		24
Penassi Lake	52 G/14 NE	Mattagami Lake Mines Limited	Cu, Zn, Fe, Mn, Ni, po, py	Assess.	DD 3-1, 067	1977		65
	52 G/14 NE	Noranda Exploration Company Limited	Cu, Zn, Au (tr), Ag, po, py	Assess.	DD 1-358	1976		66
Press Lake	52 G/14 SW	Mattagami Lake Mines Limited		Assess.	Mag & Hem	1977	2.2350	15
Sixmile Lake	52 G/15 NW	Canadex Mining Corporation Limited	Cu, Zn, Au (tr), po, py	Assess.	DD 1-440	1975		100
Skinner Lake	53 B/9 NW	Dome Exploration (Canada) Limited	Fe, po, py, mag	Assess.	DD 1-192	1976		4

NORTHWESTERN – SIOUX LOOKOUT

Location	NTS	File Name	Commodity Found	Type of Report	Type of Work	Year	Toronto File No.	Local File No.
Smock Lake	52 G/13 NE	Mattagami Lake Mines Limited		Assess.	Mag & HEM	1977	2.2348	38
	52 G/13 NE	Mattagami Lake Mines Limited		Assess.	Mag & HEM	1977	2.2351	39
	52 G/13 NE	Mattagami Lake Mines Limited		Assess.	Mag & HEM	1977	2.2352	40
	52 G/13 NE	Mattagami Lake Mines Limited	Cu,Zn,Fe,Mn, Ni,Au,py,po	Assess.	DD 4-1,833	1977		41,42,43
Solitude Lake	52 J/10 SE	Surveymin Limited		Assess.	Mag & HEM	1977	2.2186	18
Squaw Lake	52 J/2 SE	Higgins, W. H.	py,cp	Assess.	DD 2-823	1976		44
Tarp Lake	52 O/9 SE	Great National Corporation (Rio Tinto Canadian Exploration Limited)	po,py	Assess.	DD 4-1,888	1977		32,34
	52 O/9 SE	New Force Crae Mines Limited		OSC	Prospectus	1976		33
Valora Lake	52 G/14 SE	New InSCO Mines Limited		Assess.	IP	1976	2.2227	90
	52 G/14 SE	New InSCO Mines Limited	Cu,Zn,py	Assess.	DD 1-505	1977		91
Wyatt Lake	52 G/14 NW	Mattagami Lake Mines Limited		Assess.	Mag & HEM	1977	2.2346	16
	52 G/14 NW	Mattagami Lake Mines Limited		Assess.	Mag & HEM	1977	2.2349	17
	52 G/14 NW	Mattagami Lake Mines Limited		Assess.	DD 3-1,151	1977		18
Wright Lake	52 O/7 SW	Union Miniere Explorations & Mining Corporation Limited	cp,sp,py	Assess.	DD 1-401	1977		11
Zeemel Lake	53 B/9 SW	Dome Exploration (Canada) Limited	Fe,mag,py, po	Assess.	DD 16-3,159.2	1976		12
	53 B/9 SW	Musselwhite, W.H. and A.L.	Au,Fe,po	Assess.	Mag & VEM	1976	2.2268	13

1977 Report of North Central Regional Geologist

K.G. Fenwick¹ and J.F. Scott²

CONTENTS

Introduction	37
Regional Geologist's Activities	37
Mining and Exploration Activity	37
Property Visits	41
Craddock Cove Occurrence	41
New Inco Mines Ltd.	41
Ontario Gem Co.	42
Inco Ltd.-Shebandowan Mine	42
Halonen Occurrence	42
International Mogul Mines Ltd.	42
Gulf Minerals Canada Ltd.	43
McKellar Creek Diatreme	43
Recommendations for Exploration	43
Peat Moss and Peat	43
Uranium	44
Good Morning Fault Area.	44
Diatremes	44
Geological Branch Activities.	44
Research by Other Organizations	44
Recent Publications and References	45

TABLES

1— Claims recorded and assessment work received	41
2— Dead Horse Creek diatreme assays	43
3— Maps and reports issued by the Geological Branch	47
4— Exploration activity in 1977.	47
5— Assessment work and other information received in 1977.	49

FIGURES

1,2,3—North Central Region.	38,39,40
-------------------------------------	----------

INTRODUCTION

The Regional Geologist's office is staffed by K.G. Fenwick, Regional Geologist; J.F. Scott, Resource Geologist; J.K. Mason and G. Chabot, Geological Assistants and I. Balcombe, Secretary.

¹Regional Geologist, Ontario Ministry of Natural Resources, Ontario Government Buildings, 435 James Street S., Box 5,000 Thunder Bay, P7C 5G6.

²Resource Geologist.

REGIONAL GEOLOGIST'S ACTIVITIES

Consultation on various aspects of geology, mineral and aggregate potential and exploration activities in the region was carried out with the general public, prospectors, and personnel from mining companies, universities, and government agencies. Visits were made to four field parties of the Geological Branch and familiarization tours of the operations of the Thunder Bay amethyst mine, Caland mine, Steep Rock mine, Shebandowan mine, Ontario Gem Company amethyst mine and Diamond Willow amethyst mine were undertaken.

The office staff continued to be involved in strategic land-use planning by providing geological input to lake development plans, proposed land and park reserves, environment assessment plans, road placements, proposed hydro generating sites, earth science inventories, proposed townsites and park master plans.

A survey of unique geological features in the Thunder Bay area was completed under the "Experience 77" program. An unedited report which provides an accurate location of the sites and information on the physical description and geology can be viewed in the Regional Geologist's office.

The Regional Geologist's office assisted in co-ordinating a two-day field trip to examine the Middle and Late Precambrian rocks of the Thunder Bay area for the Institute on Lake Superior Geology and a prospector's certification examination for the Prospectors and Developers Association.

Lectures and field trips on regional geology were provided to one Junior Ranger camp and five school groups.

MINING AND EXPLORATION ACTIVITY

Table 1 indicates the decrease in the number of claims staked and in the amount of assessment work credits filed during the period 1970 to 1977. The amount of diamond drilling recorded is at its lowest peak since 1964.



Figure 1
NORTH CENTRAL REGION

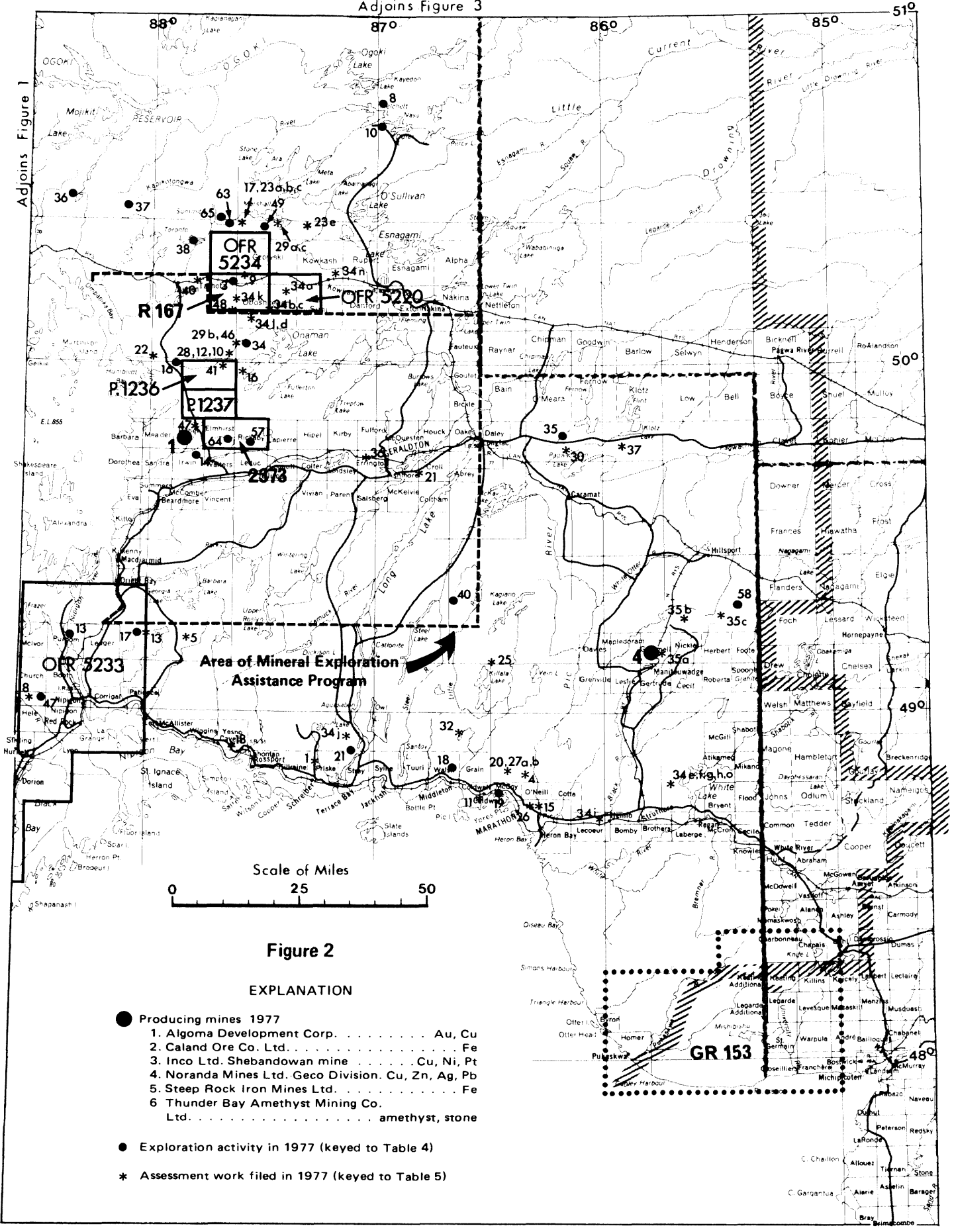
Scale of Miles
0 25 50

Area of Mineral Exploration Assistance Program

EXPLANATION

- | | |
|--|---|
| <ul style="list-style-type: none"> ●●●●● Map or report issued by the Geological Branch in 1977 (keyed to Table 3) P - Preliminary Map 2373 - Coloured Map GR - Geoscience Report R - Ontario Geol. Surv. Report OFR - Open File Report | <ul style="list-style-type: none"> ▨▨▨▨▨ Boundary of North Central Region ● Exploration activity in 1977 (keyed to Table 4) * Assessment work filed in 1977 (keyed to Table 5) |
|--|---|

Adjoins Figure 1



Area of Mineral Exploration Assistance Program

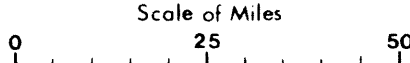


Figure 2

EXPLANATION

- Producing mines 1977
 1. Algoma Development Corp. Au, Cu
 2. Caland Ore Co. Ltd. Fe
 3. Inco Ltd. Shebandowan mine Cu, Ni, Pt
 4. Noranda Mines Ltd. Geco Division. Cu, Zn, Ag, Pb
 5. Steep Rock Iron Mines Ltd. Fe
 6. Thunder Bay Amethyst Mining Co. Ltd. amethyst, stone
- Exploration activity in 1977 (keyed to Table 4)
- * Assessment work filed in 1977 (keyed to Table 5)

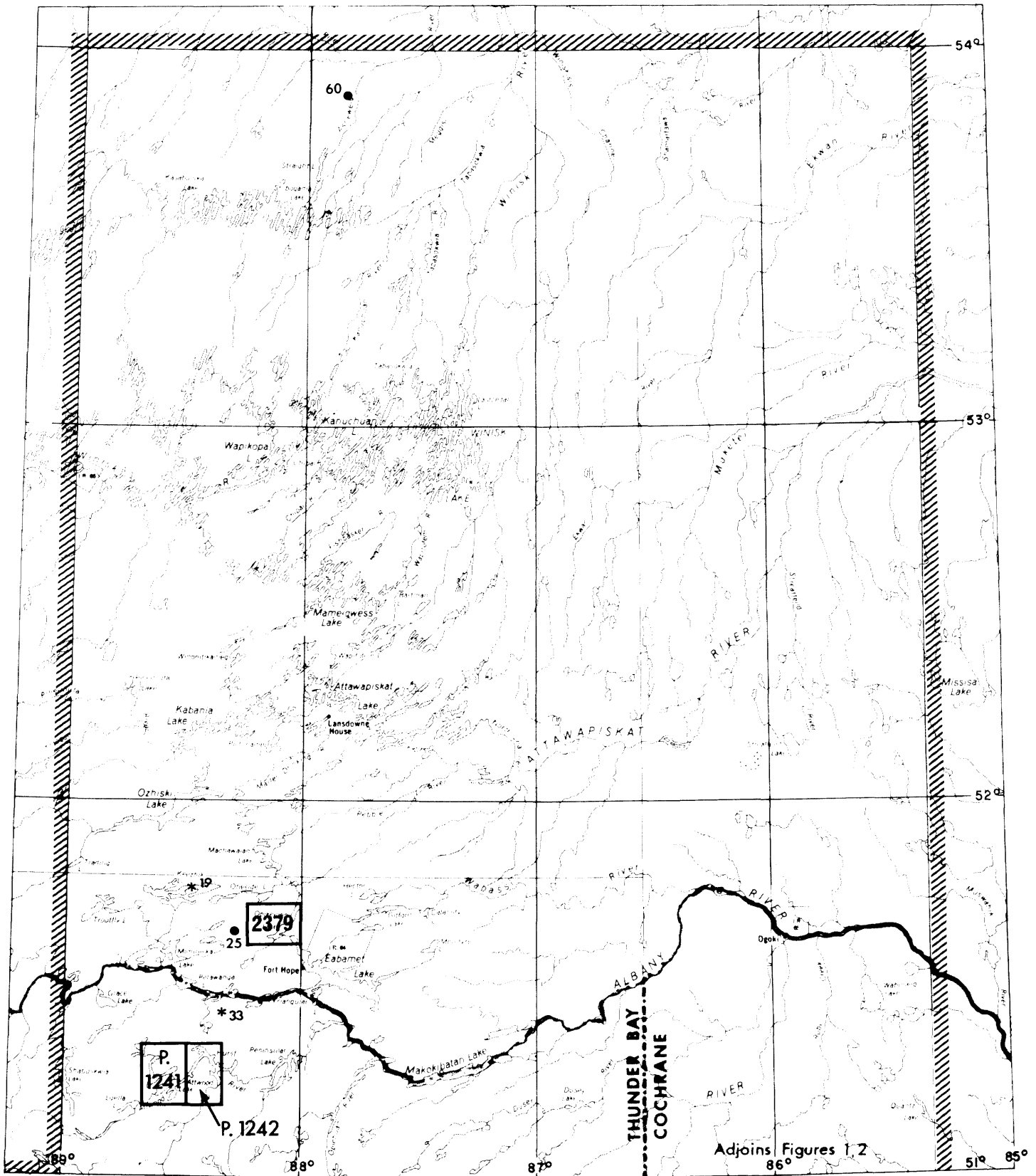
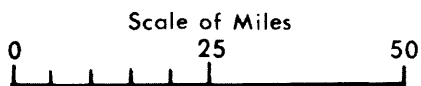


Figure 3

NORTH CENTRAL REGION



EXPLANATION

- Exploration activity in 1977 (keyed to Table 4)
- * Assessment work filed in 1977 (keyed to Table 5)
- ▨ Boundary of North-Central Region
- Map issued by the Geological Branch in 1977 (keyed to Table 3)
- P - Preliminary Map
- 2379 - Coloured Map

TABLE 1 SUMMARY OF CLAIMS RECORDED AND ASSESSMENT WORK CREDIT RECEIVED THUNDER BAY MINING DIVISION.

Year	Claims Recorded	Diamond Drilling (Man Days)	Geophysical Surveys (Man Days)	Geological Surveys (Man Days)
1977	1,964	24,879	25,601	4,870
1976	2,364	52,551	29,504	4,600
1975	3,436	38,652	52,020	4,700
1974	3,305	37,130	26,061	4,300
1973	2,253	49,575	24,320	7,450
1972	3,442	61,512	53,757	4,776
1971	4,627	63,775	53,028	7,456
1970	5,830	103,559	83,389	6,078

The location of the assessment work credits (Table 5) and exploration activity (Table 4) can be seen on Figures 1, 2 and 3. Areas receiving the most attention were Burchell Lake, Marshall-Gripp Lakes and the area underlain by the Late Precambrian sedimentary rocks of the Sibley Group.

Six mines were in operation in 1977 (see Figures 2 and 3).

The Thunder Bay Amethyst Mining Company Limited commenced mining operations shortly after spring break-up and continued until early November. The mine, located in central McTavish Township, is a popular tourist attraction, visited by more than 21,000 people in 1977. An estimated 5000 tons of amethystine material was mined; twelve persons were employed at the mine (R. Hartviksen, personal communication). Plans to build manufacturing facilities are being held in abeyance until such time as control of the mine becomes Canadian (R. Hartviksen, personal communication).

Great Lakes Nickel Limited's copper-nickel property in Pardee Township was placed on standby in 1974. In 1976, Boliden Canada Limited became its largest shareholder. In 1977, an updated feasibility study by Boliden Canada Limited recommended no change in the standby position of the mine-mill project because of currently low metal prices and uncertain world economic outlook (The Northern Miner, October 20, 1977, p.A17).

The privately owned Algoma Development Company operated a small gold-copper property in Pifher Township for one month during the summer of 1977. Logistical problems associated with the operation of a small mill in relative isolation has revised the company's thinking with respect to the Pifher Township property. Algoma Development has decided to set up a 5 ton per day custom mill in the Thunder Bay area. Mill feed would consist of hand cobbled ore from various high grade gold properties in the region, including the company property. Ore from the Pifher Township property assays approximately 7 ounces gold per ton (S. Cowan, personal communication). It is estimated that the actual operation of the mill would employ 3 or 4 people.

Copper concentrate would be shipped to Noranda for smelting (S. Cowan, personal communication).

PROPERTY VISITS

Craddock Cove Occurrence

In 1976, Gulf Minerals Canada Limited staked 34 claims covering a uranium-columbium-cerium-zinc occurrence in McCoy Township. The occurrence, formerly the Potvine property, is located 0.8 km northeast of Craddock Cove, Lake Superior, and was described as follows by Lang (1952, p.120).

Radioactive fractures have been found in red syenite dykes cutting amygdaloidal lava [now called a gabbro by Currie 1976, p.158]. The fracture systems average about 3 inches in width and about 200 feet in length. Widths up to 8 inches have been noted, and the longest showing is about 500 feet. The radioactive mineral has not been identified but samples taken by the owners have shown up to 0.19 percent U_3O_8 .

The main showing occurs along radioactive fractures in a syenite dike of the Port Coldwell alkalic complex. The dike trends approximately east, varies in width from 1.5 to 6 m and has been traced for a strike length of 420 m. The Mineral Research Branch, Division of Mines identified the following minerals in a grab sample from one of the fractures: garnet (andradite), calcite, feldspar, limonite and sphalerite. Two grab samples, taken by the senior author, assayed 0.42 and 1.0 pounds U_3O_8 , 0.92 and 1.27 percent Cb_2O_5 and 0.45 and 0.5 percent cerium respectively; the first sample assayed 0.45 percent zinc (assays by Mineral Research Branch).

New InSCO Mines Limited

New InSCO Mines Limited initiated a diamond drilling program in 1977 to further evaluate a uranium-columbium occurrence, located in the Prairie Lake carbonatite-alkalic complex, northwest of Marathon. Fifteen drill holes, totalling 1571 m were drilled with some encouraging results. Drill hole P-16 intersected 14 m of 1.98 pounds per ton U_3O_8 and 5.6 pounds per ton Cb_2O_5 at a vertical depth of 73 m (Regional Geologist's files, Ontario Ministry of Natural Resources, Thunder Bay). Previous drilling in 1969 by Newmont Mining Corporation of Canada Limited, did not attempt to intersect the mineralized zone below 23 m, however, the company estimated that the occurrence contained 109,024 tons grading 0.12 percent U_3O_8 (Sage 1975, p.64).

The uranium and columbium (niobium) are found in pyrochlore and betafite at the contact between ijolitic and carbonatite rocks. Because of the difficulty of extracting uranium from these two minerals, at least 10

NORTH CENTRAL

million tons of ore must be outlined in order to put the property into production (B. Sakrison, New InSCO Mines Limited, personal communication).

The Ministry of Natural Resources is currently constructing a forest access road, which when completed will traverse the Prairie Lake carbonatite complex. As of September 16, 1977, approximately 18.7 km of road were completed, beginning near the intersection of Dead Horse Creek and Highway 17 in Walsh Township.

Ontario Gem Company

In 1977, W. Miron purchased the AMRIC Amethyst Mine (leased claim TB 403879) a subsidiary of Rickaby Mines Limited, and changed its name to the Ontario Gem Company. The property is located in lot 12, McTavish Township, approximately 54 km northeast of the City of Thunder Bay. The company plans to mine 10 tons of rock per day for an approximate yearly gross value of \$100,000; reserves are sufficient for two years. The amethyst property was described in detail by Fenwick and Scott (1977, p.46).

Inco Limited-Shebandowan Mine

The Shebandowan Mine continued operations during 1977. The mill currently operates at 2250 tons per day, 5 days per week; the mine operates 10 hour shifts, 4 days per week. Employees number 224. Approximately 150,000 tons of concentrate, containing 4 percent copper and 6 percent nickel are shipped to Sudbury each year (Regional Geologist's files, Ontario Ministry of Natural Resources, Thunder Bay).

The ore zone occurs along the north contact between serpentized peridotite and mafic metavolcanics; it varies in width from 0.6 to 15 m over a strike length in excess of 1.5 km. The orebody is erratic, pinching and swelling over short distances and contains large inclusions of unmineralized peridotite. The erratic nature of the orebody has caused serious mining problems. Initially designed to be mined by the blast hole method, the mine now uses the cut and fill stoping method because of ore control problems. The mine dilution rate is 45 percent (D. Moses, mine geologist, personal communication).

Chromite layers, found along the south contact of the peridotite, range up to 12 m in thickness. Locally, a 3 m thickness contains 30 to 40 percent chromite. Chromium is not being produced at present, but could be selectively mined if warranted.

The ore varies in grade and character, both from west to east and to depth indicating a plunge downward to the east. In the upper western levels of the mine, the ore occurs in stringers and disseminations and has a

Cu:Ni ratio of 1:1. In the lower and eastern levels, the ore is more massive, occurring in zones up to 12 to 15 m wide. Cu:Ni ratios here are 1:2 to 1:3. Cut-off grade in October, 1977, was 2.75 percent combined (1.75 percent nickel and 1.0 percent copper). Palladium-platinum content is worth approximately \$2.50 per ton of ore (D. Moses, mine geologist, personal communication).

Halonen Occurrence

A fluorite-barite-amethystine quartz vein in the Wabasta Lake area was staked by J. Halonen in 1977. It is located 4.8 km by road west of the Pays Plat River in Yesno Township and is 80 m south of Highway 17. The vein strikes east-west and dips approximately 80S. It is 0.6 to 1.5 m wide and has an exposed strike length of 8 m. The east end of the vein is barite-rich while the west end is fluorite-rich. Amethystine quartz is mainly pale purple in color; fluorite varies from deep purple to greenish yellow. One large vug, 23 cm high, 30 cm wide and 100 cm deep is exposed. A grab sample from the west end of the vein submitted to Mineral Research Branch, assayed 8.31 percent total barium, 26.4 percent total calcium and 25.5 percent total fluoride; a sample from the east end assayed 41.7 percent total barium.

In 1973, Asarco Exploration Company of Canada Limited completed a reconnaissance geological mapping and silt and water sampling program in the Wabasta Lake area. Results of the program indicate the general area to be underlain by an igneous complex of granite and pegmatite. Three major fluorite-bearing veins and a few minor veins were located, although the Halonen occurrence was not reported (Regional Geologist's files, Ontario Ministry of Natural Resources, Thunder Bay).

International Mogul Mines Limited

In 1968, 336 claims were staked jointly in the Juneau Lake area by North Coldstream Mines Limited and International Mogul Mines Limited. Magnetometer, electromagnetic and geological surveys were conducted (Regional Geologist's files, Canadian Dyno Mines Limited, Ontario Ministry of Natural Resources, Thunder Bay) and many anomalies were outlined. In 1969, diamond drilling (27,047 feet total) located mineralization on the currently leased claims PA39127 and PA39128. Drill hole 69-25 intersected massive to disseminated sulphide mineralization (pyrrhotite, pyrite and chalcocopyrite) in gabbro from 238.8 to 281.7 m (Regional Geologist's files, North Coldstream Mines Limited, Ontario Ministry of Natural Resources, Thunder Bay). Metallurgical tests indicated that a commercial operation was not feasible and exploration was suspended in

December of 1969 (Canadian Mines Handbook 1970-1971, p.182). Of the original 336 claims, two leased claims, PA39127 and PA39128 remain in good standing, owned by International Mogul Mines Limited.

Annis *et al.* (1976, p.27) stated that 2,200,000 indicated tons of 0.59 percent copper and 0.87 percent nickel were outlined in the Juneau Lake area.

The regional geology of the area was described by Pye (1968). The area of the occurrence is swampy and devoid of outcrop. A body of mafic intrusive rocks is shown on Pye's map, on the east and west sides of the occurrence. Diamond drilling by the two companies intersected gabbro, pyroxenite and mafic metavolcanics at depth, indicating, in the author's opinion, a continuous, east-trending gabbro sill cutting mafic metavolcanics.

Gulf Minerals Canada Limited

In 1977, Gulf Minerals Canada Limited staked 25 claims in Walsh Township on a radioactive diatreme. The occurrence is 45 km by road east of the town of Terrace Bay and 3 km north of Highway 17 on the Dead Horse Creek forest access road. The geology of the diatreme has been briefly described by Mitchell and Platt (1977, p.11) as follows.

Two small explosion diatremes (Dead Horse Creek and McKellar Creek) are located in the Archean greenstone belt just west of the Coldwell alkaline complex The Dead Horse Creek diatreme crosscuts Archean metavolcanics and pyroclastics.

The matrix of the diatreme, when unweathered, is dark green in color and consists of carbonate and a greenish amphibole. Embedded in this are clasts of varying size and angularity. By far the most prominent are fragments from the greenstone belt. Of regional geological interest are occasional clasts of orthoquartzite. Similar clasts, together with red-purple shales, are found in greater abundance in the McKellar Creek diatreme. These clasts closely resemble rocks formed extensively in the paleohelikian Sibley Group. Until now, the most easterly extension of this group of rocks was thought to be some forty miles to the west in the vicinity of Rosspoint.

A reconnaissance survey of the area by the author with a TV-1 scintillometer traced the Dead Horse Creek diatreme for approximately 520 m in the north-south direction, 275 m west of and 400 m northeast of Dead Horse Creek. Assays of grab samples taken by the author and submitted to the Mineral Research Branch are listed in Table 2. Pyrrhotite and pyrite (3 to 5 percent) were noted as disseminated grains throughout the matrix and rimming and replacing some clasts. Galena was identified in one hand specimen by the author. A white fibrous mineral, replacing the felsic clasts, was identified, using X-ray diffraction, as scapolite by the Mineral Research Branch.

TABLE 2 ASSAYS OF GRAB SAMPLES FROM DEAD HORSE CREEK DIATREME BY MINERAL RESEARCH BRANCH.

Sample No.	F-114	F-115	F-116	F-117	F-96
U ₃ O ₈	.003%	.004%	.004%	65 ppm	80 ppm
Th	NA	NA	NA	390 ppm	430 ppm
Ag	3 ppm	3 ppm	3 ppm	3 ppm	4.36 oz/ton
Pb	300 ppm	73 ppm	60 ppm	120 ppm	140 ppm
Cu	NA	NA	NA	NA	153 ppm
Ni	NA	NA	NA	NA	110 ppm

NA - not assayed.

McKellar Creek Diatreme

The McKellar Creek diatreme is located 43 km by road east of the town of Terrace Bay and 300 m north of Highway 17. Access is provided by a winter lumber road beginning 75 m west of the Highway 17 bridge over McKellar Creek.

Walker (1967, p.24) described the diatreme as a conglomerate (breccia?) containing angular pebbles of granite porphyry, slate, tuff, and sugary quartz in a red quartzitic matrix. The diatreme was also briefly described by Mitchell and Platt (1977).

A reconnaissance survey of the area by the author with a TV-1 scintillometer traced the radioactive diatreme for approximately 60 m in a north-south direction and 60 m in an east-west direction. Two grab samples, taken by the author, and submitted to the Mineral Research Branch, assayed 15 and 85 ppm U₃O₈, 85 and 190 ppm thorium, 70 and 80 ppm nickel and 76 and 55 ppm copper. Readings over the diatreme, recorded by the author with a TV-1 instrument gave T-1 = 20,000 cpm, T-2 = 750 cpm and T-3 = 400 cpm. Background on total count was 2000 cpm.

RECOMMENDATIONS FOR EXPLORATION

Peat Moss and Peat

The demand for horticultural grade peat moss has been steadily increasing since 1952. Recent research in Minnesota has indicated that peat is potentially suitable for the production of energy, either as direct fuel sources or for conversion to synthetic gas (Farnham 1977, p.21-9), and for a pelletizing binder (Glumac 1977, p.22-1). Graham (1977a, b) investigated twelve selected bog areas in northwestern Ontario, close to transportation routes and markets. He stated (1977b, p.VI) that the Stedman Township deposit, located 5 km west of Upsala via Highway 17, has definite potential as horticultural-grade peat moss, estimated at 3,390,000 bales (1 bale = 0.17 m³ or 6 cubic feet). This deposit

NORTH CENTRAL

also has the best potential for peat, estimated at more than 1 024 000 m³ with several untested extensions.

Uranium

GOOD MORNING FAULT AREA

J.M. Franklin (1978, p.277) stated that hematized breccia float with several thousand parts per million uranium has been found in the Innes Lake area. The float is located in a northwest-trending valley, locally known as the "Good Morning Fault", approximately 0.4 km northwest of the road to Innes Lake (Franklin, personal communication). McIlwaine and Tihor (1975) indicated that stocks of quartz monzonite and irregularly shaped masses and dikes of diabase occur in the general area.

Outcrops of radioactive, hematized breccia have been located within the fault valley 1.2 km northwest of and approximately at the location of the float occurrence (J. Ternowsky, personal communication). Three grab samples from the latter outcrop, submitted to Mineral Research Branch, assayed 0.01, 0.005 and 0.13 percent U₃O₈ respectively.

The Good Morning Fault, which has a strike length of 11 km (Pye *et al.* 1973) should be investigated for uranium.

DIATREMES

In 1977 two diatremes were recognized in the Dead Horse Creek area; both were found to contain associated uranium mineralization (discussed under Property Visits). Pyrrhotite and pyrite (5 to 3 percent) were also noted in the Dead Horse Creek diatreme.

Ruzicka (1978, p.273) reported a 10 cm wide radioactive carbonate vein occurring in the vicinity of the McKellar Creek diatreme, approximately 200 m west of McKellar Creek, in a road-cut along Highway 17.

R.P. Sage (geologist, Precambrian Geology Section, personal communication) suggested that Harcourt's "explosion breccia" (1938, p.10), east of Schreiber, and Walker's "boulder lamprophyres" (1967, p.28) in the McKellar Harbour area of Lake Superior, be checked as possible diatremes and for uranium possibilities. Harcourt (1938, p.10) noted that the matrix of the explosion breccia "is now composed very largely of quartz and sulphides, which penetrate fractures crossing the fragments."

The Neys Diatreme, in Neys Provincial Park, is located approximately 10.5 km south-southeast of the Dead Horse Creek diatreme. Balint (1977, p.75) stated that the sulphide (pyrite and pyrrhotite) component (in the matrix) is significant.

Walker (1956, p.6) stated that radioactivity had been reported at two locations in his map-area, one near the granite-metavolcanic contact approximately 0.8 km northeast of Jackfish Lake; and a second occurrence in mafic tuff 0.8 km west of Owl Lake, along the north edge of a gabbro sill.

R.P. Sage (1974, p.83) reported diatreme structures, or megabreccias on the Slate Islands in Lake Superior.

Ruzicka (Geological Survey of Canada, personal communication) stated that an airborne radiometric anomaly, more intense than the anomaly over the New Insko occurrence (see Property Visits), was noted on the small creek that flows north from Prairie Lake.

It is suggested that the area bounded by Latitudes 48°45' and 49°07'N and Longitudes 86°30' and 87°30'W, may contain widespread and abundant radioactive diatremes. It is recommended that this area be flown and prospected for uranium.

GEOLOGICAL BRANCH ACTIVITIES

The Little Marshall Lake area, 34 km northeast of the village of Auden, was mapped in detail by S.E. Amukun. M.W. Carter carried out a one month reconnaissance mapping project of the Greenwich Lake area, located 50 km northeast of the City of Thunder Bay. W.O. Mackasey continued a special project entitled "The Stratigraphy and Structure of the Sturgeon River Area" which includes a regional analyses and correlation of the detailed mapping already completed in the area. The Heron Bay area was mapped in detail by T.L. Muir.

A field examination of eight peat bogs adjacent to major transportation corridors in Northwestern Ontario (Lyon, Gibbard, Trewartha, McNevin and Meinzingen Townships) was completed by B. Graham.

A four day practical fieldwork course was held in May at Thunder Bay by E.B. Freeman of the Geoscience Information Office.

RESEARCH BY OTHER ORGANIZATIONS

Graduate theses in progress in the region include:

1. Genesis of the ore at the Shebandowan mine, by P. Morton, Carleton University; Ph.D. thesis.
2. Environmental problems, Long Lake Diversion by S. Peat, University of Waterloo; M.Sc. thesis.
3. Geological study of Archean iron formation at Kaministikwia by F. Stolzenberg, McMaster University; M.Sc. thesis.
4. Geological study of the Gunflint Formation rocks in the Kakabeka Falls area, by C. Muencheberg, University of Hamburg, West Germany; M.Sc. thesis.
5. Geological study of the Gunflint Formation rocks in the Loon Lake area, by Rudiger Gunther, University of

Hamburg, West Germany; M.Sc. thesis.

6. Archean stratigraphy in the Blackwell-Conacher Townships area, by H.K. Poulsen, University of Duluth; M.Sc. thesis.

J.M. Franklin, Regional and Economic Geology Section, Geological Survey of Canada, is researching the potential for uranium in the Thunder Bay-Nipigon areas (Franklin, in preparation).

RECENT PUBLICATIONS AND REFERENCES

Annis, R.C., Cranstone, D.A. and Vallee, M.

1976: A Survey of Known Mineral Deposits in Canada that are Not Being Mined; Energy, Mines and Resources Canada, 92p.

Aubut, A.J.

1977: The Geology of the Southwest Margin of the Coldwell Complex; unpublished B.Sc. Thesis, 115p., Lakehead University, Thunder Bay, Ontario.

Balint, F.

1977: The Neys Diatreme, Coldwell Alkaline Complex, Northwestern Ontario; unpublished B.Sc. Thesis, 111p., Lakehead University, Thunder Bay, Ontario.

Barghoorn, E.S.

1977: Variations in Stable Carbon Isotopes in Organic Matter From Gunflint Iron Formation; *Geochimica et Cosmochimica Acta*, Vol.41, p.425-430.

Bathe, D.E.

1977: The Geology and Petrogenesis of the Killala Lake Alkaline Complex; unpublished B.Sc. Thesis, 74p., Carleton University, Ottawa, Ontario.

Biczok, J.

1976: The Petrography and Geochemistry of the Chipman Lake Alkaline-Carbonatite Complex; unpublished B.Sc. Thesis, 128p., Lakehead University, Thunder Bay, Ontario.

Blackburn, C.E. and Mackasey, W.O.

1977: Nature of the Quetico-Wabigoon Boundary in the DeCoursey-Smiley Lakes Area, Northwestern Ontario: Discussion; *Canadian Jour. Earth Sci.*, Vol.14, p.1959-1961.

Brooks, C. and Gelinas, L.

1977: The Relationship of Base Metal Mineralization to Chemostratigraphic Divisions in Volcanic Rocks of Canadian Archean Greenstone Belt; Research Paper 77-1, Mineral Exploration Research Institute, 19p.

Cameron, E.M. and Jonasson, I.R.

1972: Mercury in Precambrian Shales of the Canadian Shield; *Geochimica et Cosmochimica Acta*, Vol.36, p.985-1005.

Carter, T.R.

1976: Archean Sedimentary Rocks and Associated Mineralization in the North Spirit Lake area, Northwestern Ontario; unpublished B.Sc. Thesis, 90p., Lakehead University, Thunder Bay, Ontario.

Chabot, G.E.

1977: Fabric of Archean Turbidites in the Hazelwood Lake area, Thunder Bay; unpublished B.Sc. Thesis, 59p., Lakehead University, Thunder Bay, Ontario.

Cunningham-Dunlop, P.K.

1967: Geology of the Economic Uraniferous Pegmatites in the Bancroft Area, Ontario; unpublished Ph.D. Thesis, 160p., Princeton University, Princeton, New Jersey.

Currie, K.L.

1976: The Alkaline Rocks of Canada; *Geol. Surv. Can., Bull.* 239, 228p.

Farnham, R.S.

1977: Status of Peat Research in Minnesota; A.I.M.E. 50th Annual Meeting, Proceeding, in *The World of Iron Ore*, University of Minnesota, Duluth, p.21-1 to 21-11.

Fenwick, K.G. and Scott, J.F.

1977: Report of the North Central Regional Geologist; p.38-56 in *Annual Report of the Regional and Resident Geologists, 1976*, edited by C.R. Kustra, Ontario Geological Survey Misc. Paper 71, 142p.

Floran, R.J.

1975: Mineralogy and Petrology of the Sedimentary and Contact Metamorphosed Gunflint Iron Formation, Ontario-Minnesota; unpublished Ph.D. Thesis, 336p., State University of New York, Stony Brook, New York.

Franklin, J.M.

1978: Uranium Mineralization in the Nipigon area, Thunder Bay District, Ontario; Current Research, Part A, *Geol. Surv. Canada, Paper 78-1A*, p.275-282.

1976: Role of Laharic Breccia in Genesis of Volcanogenic Massive Sulphide Deposits; Report of Activities, Part A, *Geol. Surv. Canada, Paper 76-1A*, p.293-300.

Franklin, J.M., Gibb, W., Poulsen, K.H. and Severin, P.

1977: Archean Metallogeny and Stratigraphy of the South Sturgeon Lake Area; *Inst. Lake Superior Geology*, May, 1977, 73p.

Franklin, J.M. and Mitchell, R.H.

1977: Lead-Zinc-Barite Veins of the Dorion Area, Thunder Bay District, Ontario; *Canadian Jour. Earth Sci.*, Vol. 14, No.9, p.1962-78.

Glumac, George

1977: Peat as a Pelletizing Binder; A.I.M.E. 50th Annual Meeting, Proceeding, in *The World of Iron Ore*, University of Minnesota, Duluth, p.22-1 to 22-3.

Goodwin, A.M.

1977: Proceedings of the 1977 Geotraverse Conference; Sponsored by the Precambrian Research Group, University of Toronto, Feb. 28 and March 1, 1977, 234p.

Graham, R.B.

1977a: Peat and Peat Moss Deposits in the Thunder Bay-Ignace Area, Northwestern Ontario; p.188-189 in *Summary of Field Work, 1977* by the Geological Branch, edited by V.G. Milne, O.L. White, R.B. Barlow, and J.A. Robertson, Ontario Geological Survey Misc. Paper 75, 208p.

NORTH CENTRAL

- 1977b: Some Peat and Peat Moss Deposits, Thunder Bay-Ignace Area, District of Thunder Bay; Ontario Geological Survey OFR 5233, 89p.
- Grieve, R.A.F. and Robertson, P.B.
1977: The Slate Island Structure: A Partially Submerged Impact Crater in Lake Superior; GEOS, p.15-17.
- Gunn, C.B.
1967: Provenance of Diamonds in the Glacial Drift of the Great Lakes Region, North America; unpublished M.Sc. Thesis, 132p., University of Western Ontario, London, Ontario.
- Hall, D.H. (Introduction)
1976: Centre for Precambrian Studies; Annual Report, University of Manitoba, 150p.
- Harcourt, G.A.
1938: The Southwestern Part of the Schreiber Area; Ontario Dept. Mines, Vol.47, Pt.9, p.1-28. Accompanied by Map 47j, scale 1 inch to ½ mile.
- Herdman, D.J.
1974: Chemical Petrology of the Port Coldwell Alkali Intrusive, Marathon, Ontario; unpublished M.Sc. Thesis, 88p., McMaster University, Hamilton, Ontario.
- Irvine, T.N.
1977: Origin of Chromitite Layers in the Muskox Intrusion and Other Stratiform Intrusions: A New Interpretation; Geology, Vol.5, p.273-277.
- Kehlenbeck, M.M. (editor)
1977a: Abstracts and Proceedings; Inst. Lake Superior Geology, May, 1977, 53p.
1977b: The Barnum Lake Pluton, Thunder Bay, Ontario; Canadian Jour. Earth Sci., Vol.14, p.2157-2167.
- Kuryliw, C.J.
1963: The Geology of the Trout Bay Nickel Deposits, Red Lake District, Northwestern Ontario; unpublished M.Sc. Thesis, 108p., University of Manitoba, Winnipeg, Manitoba.
- Kustra, C.R., McIlwaine, W.H., Fenwick, K.G. and Scott, J.
1977: Proterozoic Rocks of the Thunder Bay Area, Northwestern Ontario; Field Excursion Guide, Inst. Lake Superior Geology, May, 1977, 47p.
- Lang, A.H.
1952: Canadian Deposits of Uranium and Thorium (Interim Account); Geol. Surv. Canada, Econ. Geol. Ser. No.16, No.2504, 173p.
- Lawrence, G.K.
1977: Wall Rock Chemistry and Sulphide Mineralization of the No.1 Zone, Onaman Joint Venture, Northwestern Ontario; unpublished B.Sc. Thesis, 113p., University of Windsor, Windsor, Ontario.
- Leach, A.S. Jr.
1977: Moving Coal to Market: The Thunder Bay Terminal's Perspective; Engineering Digest, Nov.-Dec., p.35-38.
- Listerud, W.H. and Meineke, D.G.
1977: Mineral Resources of a Portion of the Duluth Complex and Adjacent Rocks in St. Louis and Lake Counties, Northeastern Minnesota; Minnesota Dept. Natural Resources, Hibbing, Minnesota, 74p.
- Lum, H.K.
1973: Petrology of the Eastern Gabbro and Associated Sulphide Mineralization of the Coldwell Alkalic Complex; unpublished B.Sc. Thesis, 70p., Carleton University, Ottawa, Ontario.
- McIlwaine, W.H. and Tihor, L.A.
1975: Dorion-Wolf Area (Western Part), District of Thunder Bay; Ontario Div. Mines, Prelim. Map P.994, Geol. Ser., scale 1 inch to ¼ mile or 1:15,840, Geology 1972.
- Mitchell, R.H. and Platt, R.G.
1977: Field Guide to Aspects of the Geology of the Coldwell Alkalic Complex; Inst. Lake Superior Geology, May, 1977, 34p.
- Morning, John L.
1977: Chromium-1977; Bur. Mines, U.S. Dept. Interior, MCP-1, 14p.
- Pye, E.G.
1968: Geology of the Crescent Lake Area, District of Thunder Bay; Ontario Dept. Mines, Geol. Report 55, 72p. Accompanied by Map 2100, scale 1 inch to 1 mile.
- Pye, E.G., Carter, M.W., McIlwaine, W.H. and Wisbey, P.A.
1973: Nipigon-Schreiber, Thunder Bay District; Ontario Dept. Mines, Geological Compilation Series, Map 2232, scale 1 inch to 4 miles.
- Ruzicka, V.
1978: Evaluation of Selected Uranium-Bearing Areas in Canada; Current Research, Part A, Geol. Surv. Canada, Paper 78-1A, p.269-274.
1977a: Conceptual Models for Uranium Deposits and Areas Favorable for Uranium Mineralization in Canada; Report of Activities, Part A, Geol. Surv. Canada, Paper 77-1A, p.17-25.
1977b: Assessment of Selected Uranium Occurrences and Areas Favorable for Uranium Mineralization in Canada; Report of Activities, Part A, Geol. Surv. Canada, Paper 77-1A, p.27-29.
- Sage, R.P.
1975: Carbonatite-Alkalic Complexes; p.58-69 in Summary of Field Work, 1975 by the Geol. Branch, edited by V.G. Milne, D.F. Hewitt, K.D. Card, and J.A. Robertson, Ontario Div. Mines, MP63, 158p.
1974: Geology of the Slate Islands, District of Thunder Bay; p.80-86 in Summary of Field Work, 1974 by the Geological Branch, edited by V.G. Milne, D.F. Hewitt, and K.D. Card, Ontario Div. Mines, MP59, 206p.
- Van Lewen, M.C.
1957: The Geology of St. Ignace Island, Ontario and a Correlation of the Keweenaw Series of the Lake Superior Region; unpublished M.Sc. Thesis, 66p., Michigan College of Mining and Technology, Sault Ste. Marie, Michigan.
- Walker, J.W.R.
1967: Geology of the Jackfish-Middleton Area, District of Thunder Bay; Ontario Dept. Mines, Geol. Report 50, 41p. Accompanied by Map 2107, scale 1 inch to ¼ mile.

1956: Geology of the Jackfish-Middleton Area, Preliminary Report; Ontario Dept. Mines, Geol. Circ. No.4, 6p.

TABLE 3 MAPS AND REPORTS PERTAINING TO THE THUNDER BAY MINING DIVISION, ISSUED BY THE GEOLOGICAL BRANCH OF THE ONTARIO MINISTRY OF NATURAL RESOURCES IN 1977.

GEOSCIENCE REPORTS

GR 153
GR 164

ONTARIO GEOLOGICAL SURVEY REPORT
Report 167

MISCELLANEOUS PAPERS

MP 70
MP 71
MP 75

OPEN FILE REPORTS

OFR 5220
OFR 5223
OFR 5233
OFR 5234

COLOURED MAPS

2372
2373
2379

PRELIMINARY MAPS

P. 1226
P. 1227
P. 1228
P. 1236
P. 1237
P. 1241
P. 1242
P. 1516
P. 1519

TABLE 4

Exploration activity in 1977.

Number on Figure	Individual or Company	Type of Work
1.	Algoma Steel Corporation Limited, The	Claim staking, ground geophysical and geological survey on iron deposit, Ware and Conmee Townships
2.	Algoma Steel Corporation Limited, The	Exploration work, Shillabeer Lake area
3.	Amax Potash Limited	Claim staking, Tashota area
4.	Amoco Canada Petroleum Company Limited (optioned from Shield Development Co. Ltd., The)	Diamond drilling, E.M. survey, Burchell Lake area
5.	Asarco Exploration Company of Canada Limited	Claim staking, Shillabeer Lake area
6.	Boliden Canada Limited	Updated feasibility study on copper-nickel property of Great Lakes Nickel Limited, Pardee Township
7.	Camflo Mines Limited	Optioned gold occurrence, Moss Lake area
8.	Cominco Limited	Exploration work, Melchett Lake area
9.	Conwest Exploration Company Limited	Claim staking, prospecting, Lac des Mille Lacs area
10.	Dominion Foundries and Steel Limited	Feasibility study, of iron deposit, Melchett Lake area
11.	Dome Exploration (Canada) Limited	Airborne radiometric survey, rocks of Sibley Group
12.	Essex Minerals Company	Exploration work on iron deposit, Conmee Township
13.	Falconbridge Nickel Mines Limited	Airborne radiometric survey, ground geophysical and geochemical surveys, Jessie Lake area, Purdom Township
14.	Falconbridge Nickel Mines Limited	Exploration work in Dorothea, Sandra, Irwin, Elmhirst, Rickaby and Lapierre Townships
15.	Fournier, Elwood	Prospecting in Dog River area
16.	Geophysical Engineering Limited	Field checking geophysical anomalies, Onaman River area
17.	GRC Exploration Company	Assessed lithium deposit, west of Cosgrave Lake.
18.	Gulf Minerals Canada Limited	Claim staking, linecutting on uranium occurrence, Dead Horse Creek area, Walsh Township.
19.	Gulf Minerals Canada Limited	Exploration work on uranium-cerium-niobium occurrence, McCoy Township.
20.	Halverson, Ralph	Bulldozing, Leckie Lake area
21.	HBOG Mining Limited	Exploration work north of Terrace Bay.
22.	HBOG Mining Limited	Exploration work, Sandstone-North lakes area.
23.	HBOG Mining Limited	Airborne radiometric survey, Sibley Group rocks

NORTH CENTRAL

Number on Figure	Individual or Company	Type of Work
24.	HBOG Mining Limited	Exploration work, MacGregor, Gorham, and Ware Townships.
25.	Henry, Tom	Prospecting, Opikeigen Lake area.
26.	Inco Limited	Geochemical survey, prospecting, Wolfe Lake area.
27.	Jerome, Elmer	Claim staking, Greenwich Lake area.
28.	Kerr Addison Mines Limited	Claim staking, McTavish Township.
29.	Kondrat, John	Diamond drilling, Tib Lake area.
30.	Kuhner, Knut	Stripping, blasting and geophysical survey, Strange Township.
31.	Kuhner, Knut	Claim staking, Puddy Lake area.
32.	Kuhner, Knut	Claim staking, Greenwich Lake area.
33.	Kuhner, Knut and Nelson, E	Diamond drilling, assaying on palladium-platinum-copper-nickel occurrence, Tib Lake area.
34.	Lynx-Canada Explorations Limited	Re-assessment of old Tashota-Nipigon Mine, Onaman Lake area.
35.	Mattagami Lake Mines Limited	Diamond drilling, Switzer Lake area.
36.	Mattagami Lake Mines Limited	Geophysical surveys, Crescent Lake area.
37.	Mattagami Lake Mines Limited	Geophysical surveys, Falcon Lake area.
38.	McAdam Mining Corporation Limited	Geophysical and geological survey, asbestos occurrence Toronto Lake area.
39.	McAteer, William	Road construction, marble occurrence, Eaglehead Lake area.
40.	Michon, Robert	Prospecting, Steel Lake area.
41.	Murray, Bill	Prospecting, south of Bennett Township.
42.	New Jersey Zinc Exploration Company (Canada) Limited	Exploration work, Tommyhow Lake area.
43.	New Jersey Zinc Exploration Company (Canada) Limited	Exploration work, Garden Lake area.
44.	Nisbet, Jim	Prospecting, Crooks Township.
45.	Noranda Exploration Company Limited	Claim staking, Dorion Township
46.	Noranda Exploration Company Limited	Geophysical survey, Conmee Township
47.	Noranda Exploration Company Limited	Claim staking, Hele Township
48.	Noranda Exploration Company Limited	Linecutting and ground geophysical survey, Tinto Lake area, Lamport Township
49.	N.W.T. Copper Mines Limited	Claim staking, Marshall Lake area.
50.	Protoshield Exploration Services	Claim staking, and exploration work, Tommyhow Lake area.
51.	Q.C. Explorations Limited	Diamond drilling, Silver Islet
52.	Redden, J.W.	Bulldozing and prospecting, Lybster Township
53.	Rennick, Melville W.	Claim staking, McTavish Township
54.	Rio Tinto Canadian Exploration Limited	Airborne E.M., Burchell-Powell Lakes area
55.	Robertson, David S. and Associates	Exploration work, Greenwich Lake area
56.	Shell Canada Resources Limited	Exploration work, Finlayson Lake area
57.	Shell Canada Resources Limited	Exploration work, Rickaby Township
58.	Sperle, Kasper	Prospecting, trenching, Poppy-Fields Lakes area
59.	Strickland, Jack	Trenching, Crooks Township
60.	Suganaqueb, Solomon	Prospecting, claim staking, Sourdough Rapids area
61.	Sutcliffe, H. Limited	Surveying and line cutting, Moss Township
62.	Ternowsky, John	Prospecting, trenching and bulldozing, uranium-copper-lead-amethyst occurrence, old Enterprise Mine, McTavish Township
63.	Ternowsky, John	Prospecting and trenching, Gripp Lake area
64.	Texasgulf Incorporated	Exploration work, Rickaby-Elmhirst Townships
65.	Thorsteinson, Dave	Prospecting, trenching, Gripp Lake area
66.	Union Carbide Exploration Corporation	Airborne radiometric survey and exploration work, Sibley Group rocks
67.	Utah Mines Limited	Exploration work, Shebandowan Lakes area
68.	Wilson, George R.	Trenching, Sapawe Lake area

TABLE 5 Assessment work and other information received in 1977.

		<u>Abbreviations</u>							
Air	- Airborne	Au	Gold						
Assess	- Assessment Work	Ag	Silver						
5 DDH(620')	- 5 Diamond Drill Holes Totalling 620'	Amy	Amethyst						
E.M.	- Electromagnetic Survey	BA	Barite						
MAG.	- Magnetometer Survey	BM	Base Metals (Cu,Zn,Pb)						
Geol.	- Geological Survey	Cu	Copper						
Geochem.	- Geochemical Survey	Ni	Nickel						
IP	- Induced Polarization Survey	Fe	Iron						
RAD.	- Radiometric Survey	Ti	Titanium						
SP.	- Self Potential Survey	Li	Lithium						
Res.	- Resistivity Survey	PT-grp	Platinum Group						
Tr.	- Trenching	st	stone						
M.E.A.P.	- Mineral Exploration Assistance Program	Fl	Fluorite						
Benif.	- Benification Study	W	Tungsten						
Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work	Year	Toronto File No.	Map No.	
Priske Twp (M1932)	42D14	Acker, Walter	Au	Assess	Tr.	1977		1	
Whitebirch Lk. (2944) Kashishibog Lk (M2799)	52H13	Amex Exploration Inc.	BM	Assess	5 DDH(1925')	1976		2	
Moss Twp. (M1826)	52B10	Amoco Canada Petroleum Co. Ltd.	Cu,Au	Assess	2 DDH(872')	1977		3	
Seeley Lake (M1861)	42D16	Anaconda Canada Ltd.	BM	Assess	drill sections	1976		4	
Cosgrave Lk (M1684)	42E4	Aspen Exploration Inc.	BM	Assess	7 DDH(2289')	1977		5	
McCaul Twp. (M2382)	52B14	Atiko Gold Mines Corp.	Au	M.E.A.P. A-11	Geol.	1976		6	
Dorion Twp. (M1701)	52A15	Bayko, H. John	Amy	Assess	Tr.	1977		7	
Hele Twp. (M1748)	52H2	B P Minerals Ltd.	BM, U	Assess	Rad., Geochem.	1977		8	
Gzowski Twp. (M1939)	42L6	Cummer, W.J.	BM	Assess	Mag., Geol.	1976	2.2202	9	
South Onaman (M1850)	42L3	Dejour Mines Ltd.	Cu, Ag	M.E.A.P. GB-61		1976		10	
Seeley Lk (M1861)	42D15	Denison Mines Ltd.	neph.	other	Geol., DDH benif.	1960		11	
Coughlan Lk (M1409)	42L4	Derry, Michener & Booth	BM	Assess	Mag	1976	2.2296	12	
Hanson Lk (M2565)	52H1	Donner, John	li	Assess	Tr.	1974	2.2118	13	
McTavish Twp. (M1812)	52A10	Dzuba, Nick	Amy	Assess	Tr.	1977		14	
O'Neil Twp. (M1861)	42D16	Falconbridge Nickel Mines Ltd.	BM	Assess	3 DDH(1300')	1963		15	
Castlewood Lk (M1850)	42E13	Geophysical Engineering Ltd.	BM	Assess	EM., Mag. 1 DDH-(325')	1976	2.2246	16	
Summit Lk. (M1406)	42L5	Giant Gripp Mines Inc.	BM	Assess	Geol., Tr., 3 DDH(1424)	1976-77		17	
Middle Fox Lk (Yesno Twp.) (M2797)	42D13	Halonen, John	Amy, ba, Fl	Assess	Tr	1977		18	
Keezhik Lk. (M2330)	52P15	Hamilton, John	Cu, W	Assess	13 DDH(2312')	1977		19	
Seeley Lk. (M1861)	42D16	Head of the Lakes Iron Ltd.	BM	other	E.M., Geol., DDH Hole loc.	1959		20	

NORTH CENTRAL

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work	Year	Toronto File No.	Map No.
Ashmore Twp. (M1636) Croll Twp. (M1687)	42E10	Holm, Hilda	Cu	Assess	Tr.	1976		21
Elbow Lk (M 1404)	42L4	Hopkins,Albert	Au	M.E.A.P. GB 63	E.M., Mag		2.2266	22
Summit Lk. (M1406)	42L5	Imperial Oil Ltd.	BM	Assess	IP., Geol.	1976	2.2263	23a
Summit Lk. (M1406)	42L5	Imperial Oil Ltd.	BM	Assess	17 DDH(6450')	1976		23b
Summit Lk. (M1406)	42L5	Imperial Oil Ltd.	BM	Assess	IP	1976	2.2264	23c
Summit Lk. (M1406)	42L5	Imperial Oil Ltd.	BM	Assess	IP	1976	2.2262	23d
Sollas Lk. (M1411)	42L5	Imperial Oil Ltd.	BM	Assess	Mag. E.M.	1977	2.2304	23e
Norway Lk. (M2385)	52G3	Kerr Addison Mines Ltd.	BM	Assess	E.M., Mag.	1976	2.2247	24a
Norway Lk. (M2385)	52G3	Kerr Addison Mines Ltd.	BM	Assess	Geochem.	1976	2.2225	24b
Sandspit Lk. (M 2849)	42E2	Killala Lake Mines Ltd.	Cu,Ni	Other	11 DDH(4178')	1954		25
Pic Twp. (M1860)	42	Kinascow Exploration & Mining Ltd.	Cu,Ni	Other	8 DDH(5339')	1960		26
Seeley Lk. (M1861)	42D16	Lakehead Mines Ltd	Cu,Ni,Fe,Ti apatite,U.	Other	Geol.,DDH,Rad.	1967		27a
Seeley Lk. (M1861)	42D16	Lakehead Mines Ltd.	Cu,Ni,U.	Other	Mag., Geol.	1977		27b
Coughlan Lk. (M1409)	42L3	Lynx--Canada Explorations Ltd.	Cu,Zn,Ag.	Assess	15 DDH(3486')	1976		28
Deeds & Sollas Lk. (M1412,M1411)	42L5	Mattagami Lake Mines Ltd.	BM	Assess	E.M.,Mag.,	1976	2.2200	29a
Coughlan Lk (M1409)	42L4	Mattagami Lake Mines Ltd.	Cu,Ag	Assess	4 DDH (1315')	1976		29b
Sollas Lk. (M1411)	42L5	Mattagami Lake Mines Ltd.	BM	Assess	2 DDH(587')	1976		29c
Pagwachuan Lk. (M2294)	42E9	Morrow,Leonard	BM	Assess	1 DDH(70')	1976		30
MacGregor Twp. (M1813)	52A10	Nelson,J. & Dutchak, C.	Amy	Assess	Tr.	1976		31
Killala Lk. (M2681)	42E2	New Inscow Mines Ltd.	Li	Assess	Rad., Tr.	1976		32
Petawanga Lk. (M1859)	52P2 52P7	New Jersey Zinc Exploration Co, (Canada) Ltd.	BM	Assess	6 DDH(688')	1976		33
Wigwas Lk. (M1413)	42L4	Noranda Exploration Co. Ltd.	BM	Assess	E.M., Mag.	1976		34
Oboshkegan Twp. (M1413)	42L4	Noranda Exploration Co. Ltd.	BM	Assess	5 DDH(1698')	1977		34b
Oboshkegan Twp. (M1413)	42L4	Noranda Exploration Co. Ltd.	BM	Assess	Geochem.	1976	2.2236	34c
Oboshkegan Twp. (M1413)	42L4	Noranda Exploration Co. Ltd.	BM	Assess	Geol.	1976	2.2391	34d
White Lk. (M18) Wabikoba (M34)	42C13	Noranda Exploration Co. Ltd.	BM	Assess	E.M., Mag.	1976	2.2338	34e
White Lk. (M18)	42E13	Noranda Exploration Co. Ltd.	BM	Assess	E.M., Mag.	1976	2.2337	34f
Wabikoba Lk. (M34)	42C13	Noranda Exploration Co. Ltd.	BM	Assess	E.M., Mag	1976	2.2241	34g
Wabikoba Lk. (34)	42C13	Noranda Exploration Co. Ltd.	BM	Assess	E.M., Mag.	1976	2.2386	34h
Rous Lake (M1602)	42D9	Noranda Exploration Co. Ltd.	BM	Assess	E.M., Mag.	1976	2.2356	34i

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work	Year	Toronto File No.	Map No.
Lower Aguasabon (M2518)	42D14	Noranda Exploration Co. Ltd.	BM	Assess	E.M.	1976	2.2276	34j
Oboshkegan Twp. (M1413)	42L4	Noranda Exploration Co. Ltd.	BM	Assess	Mag.	1976	2.2382	34k
Oboshkegan Twp. (M1413)	42L4	Noranda Exploration Co. Ltd.	BM	Assess	E.M., Mag	1976	2.2325	34L
Blackwell Twp. (M1658) Laurie Twp. (M1792)	52A12	Noranda Exploration Co. Ltd	BM	Assess	E.M., Mag	1975-1976	2.2097	34m
Kowkash Twp (M1633)	42L6	Noranda Exploration Co. Ltd	BM	Assess	E.M., Mag.	1976	2.2365	34n
White Lake (M18) Wabikoba Lk (M34)	42C13	Noranda Exploration Co. Ltd	BM	Assess	E.M. Mag.			34o
Loken Lake (M2381)	42F4	Noranda Mines Ltd.	BM	Assess	Air Mag., Air E.M.	1976	2.2331	35
Olie Lake (M2298)	42F5	Noranda Mines Ltd.	BM	Assess	E.M. Mag.	1976	2.2357	35b
Flanders Lake (M31)	42F5	Noranda Mines Ltd.	BM	Assess	E.M. Mag. Geol., Geochem.	1976	2.2359	35c
Errington Twp (M1706)	42E11	Oster, Joseph	BM	Assess	Power Stripping	1977		36
Klotz, Lk (M2868)	42F12	Otto, Harold	BM	Assess	4 DDH(567')	1977		37
Greenwich Lk. (M2621)	52A15	Rio Tinto Canadian Explorations Ltd.	U	Assess	Rad., Geol., 3 DDH(1761')	1976	2.2295	38a
Burchell Lk. (M2446)	52B	Rio Tinto Canadian Explorations Ltd.	BM	Assess	Air Mag.	1976	2.2355	38b
Jean Twp. (M1765)	52B1	Hodgers, B.		Assess	Tr	1976		39
Metcalfe Lk. (M1408)	42L4	Ross, Cameron Murray	BM	Assess	Tr	1976		40
Lynn Lk. & Martin Lk. (M1839)	42E13	Sherritt Gordon Mines Ltd.	BM	M.E.A.P. GB-65	E.M., Mag. Geol.	1976		41
Sabawi Lk. (M2360)	52B14	Staines, Bruce L.	Au	Assess	3 DDH(1624')	1977		42
Dorion Twp. (M1701)	52A15	Ternowsky, John	U	Assess	Tr	1977		43
Orbit Lk. (M1731)	52A13	Texasgulf Canada Ltd.	Cu, Ni, Pt	Assess	Geol.	1975		44
McTavish Twp. (M1812)	52A10	Thompson, William, J	Amy.	Assess	Tr.	1977		45
Coughlin Lk. (M1409)	42L3	Thorsteinson, J	Cu, Ag	Assess	E.M. Mag.	1976		46
Tyrol Lk (M1863)	42E13	Wodian, John	BM	Assess	Tr	1977		47
Metcalfe Lk. (M1408)	42L4	Yzerdraat, Walter	BM	Assess	Mag., Rad.	1976	2.2283	48
MacGregor Twp	52A10	Zysko, Stephen	stone	Assess	Tr	1977		49

1977 Report of Northern Regional Geologist and Timmins Resident Geologist

L.A. Tihor¹ and D.S. Hunt²

CONTENTS

Introduction	52
Regional Geologist's Activities	52
Operating Mines	52
Precious Metals	52
Base Metals	53
Exploration Activity	53
Precious Metals	53
Base Metals	59
Uranium	59
Industrial Minerals	59
Geological Branch Activities	60

TABLES

1— Maps and reports issued by the Geological Branch . . .	60
2— Exploration activity in 1977	61
3— Assessment work and other information received in 1977	62

FIGURES

1, 2, 3, 4 — Timmins Resident Geologist's district	54,55, 56,57
5— Timmins area	58

INTRODUCTION

Exploration and development activity in the Northern Region was at a very low level in 1977. No new discoveries were made. Although exploration diamond drilling increased over last year, claims recorded by the Timmins Mining Recorder totalled only half the number recorded in 1976. Companies are completing established projects but are hesitant to pick up new ground.

The deteriorating market situation for base metals, especially nickel, has caused a severe cutback in base metal exploration and development. However, gold, behaving inversely in price to the world financial climate has risen steadily during the last half of the year. This,

combined with the added bonus provided by the recent devaluation of the Canadian dollar has greatly improved the viability of gold mines in the area.

Claim staking was quite widely scattered throughout the region. There were minor concentrations south of Cochrane in the region of Duff and Tully Townships, southwest of Timmins, in Bristol and Godfrey Townships, and northwest of Timmins, in Macdiarmid and Reid Townships.

Total claims recorded were 2,438, down from 5,837 in 1976.

REGIONAL GEOLOGIST'S ACTIVITIES

Staff at the Timmins office included: L.A. Tihor, Regional Geologist; D.S. Hunt, Resource Geologist; and K. Burke, Secretary.

In addition to routine office and field duties, staff members were involved in the following projects:

1. Continuation of a study begun in 1976 of the geochemistry of carbonate-rich rocks, porphyries and gold deposits in the Timmins area by W.O. Karvinen.
2. Completion of a study of granular aggregate resources in part of the City of Timmins by D.S. Hunt.
3. Mineral and granular aggregate potential studies in the Cochrane, Hearst and Kapuskasing areas, and, in Kettle Lakes Provincial Park by D.S. Hunt.
4. Retrieval and storage of representative samples from approximately 2,300 m of exploration diamond drill core by D.S. Hunt.

OPERATING MINES

Precious Metals

The low gold price in 1976 and the first half of 1977 caused serious cutbacks in underground exploration and development. The pressure was eased substantially toward the end of the year as the gold price increased. Production at *Dome Mines Limited* continued near

¹ Regional Geologist, Ontario Ministry of Natural Resources, 60 Wilson Avenue, Timmins, P4N 3W2.

² Resource Geologist.

capacity and averaged 1,985 tons per day over the year. Reserves were maintained at approximately 1,900,000 tons grading 0.223 ounces gold per ton (The Northern Miner, Oct. 20, 1977). By year-end underground exploration activities which had been curtailed the previous year were again at full strength. The workforce was increased slightly from 537 to 560. At the Dome mine, 60 percent of current production is from long-hole stopes and the remaining 40 percent comes from panel stopes in low grade material.

Of the Pamour Porcupine Mines Limited group of properties, the *No. 2 mine (Hallnor)* ceased operations during the year. However, the workings are being kept on care and maintenance.

The *No. 3 mine (Aunor-Delnite)* was scheduled to close early in 1977 but increased gold prices and improved mining performance have extended the reserves for at least two years.

The *Schumacher Division* of Pamour (formerly the McIntyre mine) is back to full production of 60,000 tons per month of copper-gold ore, 20,000 tons per month mined below the 3800 foot level. New developments below the 3800 foot level include a large copper stope and a trial stoping program for gold.

At the *Hollinger Division* (former Hollinger mine), at the beginning of the year, reserves were estimated at 1,348,360 tons with average grade 0.106 ounces gold per ton. A limited amount of exploration was carried out during the year but reserves were not maintained. An agreement was reached with Falconbridge Nickel Mines Limited to mine ore above the 200 level on the *Hoyle property*, adjoining to the east of No. 2 pit. New declines are being used here and at the No. 3 mine (Aunor) to reach 60-90 m below surface, rather than activating existing shafts. Surface pillars on the Hollinger mine property are being mined at a rate of 15,000 tons per month, with an average grade of 0.10 ounces gold per ton.

Ore from the Pamour group of mines is milled at two Pamour Porcupine Mines Limited mills (at the No. 1 mine and at the Schumacher Division). Total ore milled in 1977 was 1,986,000 tons grading 0.106 ounces gold per ton, 0.179 percent copper and 0.047 ounces silver per ton (Pamour Porcupine Mines Limited, personal communication).

Base Metals

Copper-gold production at the former McIntyre mine was discussed above under "Precious Metals".

Production from the *Kidd Creek* copper-zinc-silver mine of Texasgulf Canada Limited averaged 10,000 tons per day during the year. At present all production is from the 800 foot and 1200 foot levels of the No. 1 underground mine (The Northern Miner, Oct. 20, 1977).

Due to low prices and high inventories, the zinc smelter was shut down during August and has since operated at 75 percent capacity. A general slowdown of expansion plans has been announced. Plans to increase the current milling rate of 3,600,000 tons annually to 5,000,000 tons per year have been shelved. Construction of the shaft of the No. 2 mine will be completed, but no underground development work will be done. Engineering and design work on a copper smelter and refinery will be completed; however, construction will be at a reduced rate and completion dates have been pushed further into the future. Weak base metal markets, especially zinc, have forced Texasgulf to plan a temporary complete shutdown of operations for the month of July, 1978.

Production at the *Langmuir mine* continued at 750 tons per day grading about 1.6 percent nickel. At the beginning of the year ore reserves were 648,700 tons averaging 1.3 percent nickel (The Northern Miner, Oct. 13, 1977). Exploration for additional ore near the mine produced disappointing results and this work was suspended in August. Due to low reserves and poor market conditions for nickel it is planned to cease production at the Langmuir mine in the spring of 1978. During the year the workforce was reduced from 150 to 115. The Langmuir mine is owned jointly by Noranda Mines Limited and Inco Limited and is operated by the Pamour Group.

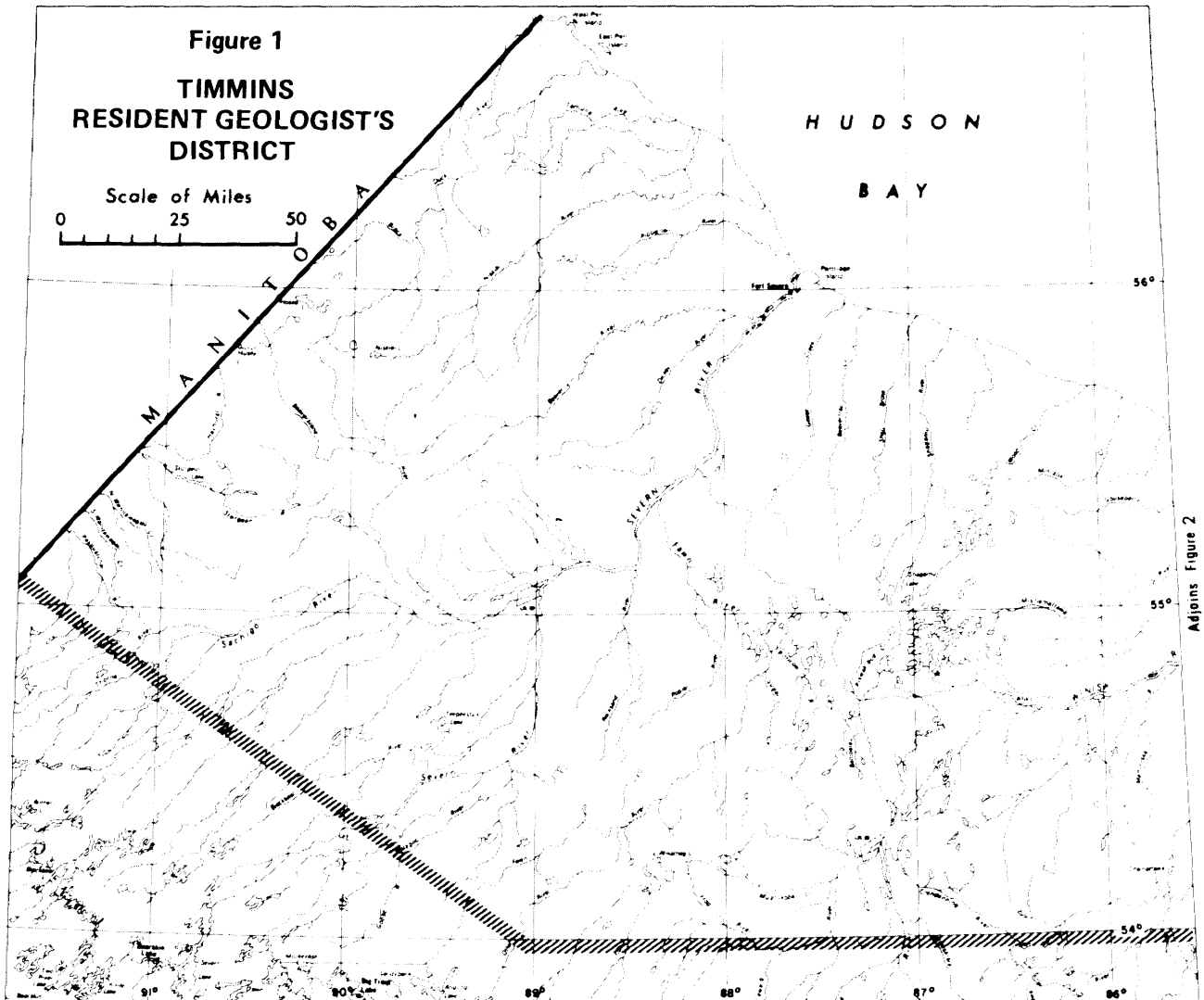
EXPLORATION ACTIVITY

Precious Metals

During the year Amoco Canada Petroleum Company Limited carried out an exploration program on its gold deposit in the Sunday Lake area, about 130 km north-east of Cochrane. The program involved driving a 760 m decline to the orebody, 300 m of drifting and cross-cutting, 9100 m of underground diamond drilling, and the removal of a 90 tonne bulk sample for mill testing. The bulk sample will be shipped from the property during winter via a winter road to LaSarre, Quebec. Previous surface exploration had outlined an orebody of 10,000,000 tons with a cut grade of 0.204 ounces gold per ton (The Northern Miner, Dec. 1, 1977).

Pamour Porcupine Mines Limited is planning to drive a 600 m decline to carry out underground exploration of the Porcupine Peninsular gold mine. This property is owned by Hydra Explorations Limited and has been held under option by Pamour for the past several years (The Northern Miner, Dec. 1, 1977).

Canadian Crest Gold Mines Limited is presently rehabilitating the shaft and underground workings of the former Young-Shannon gold mine in Chester Township about 30 km southwest of Gogama. Production at the rate of 200 tons per day grading about 0.4 ounces



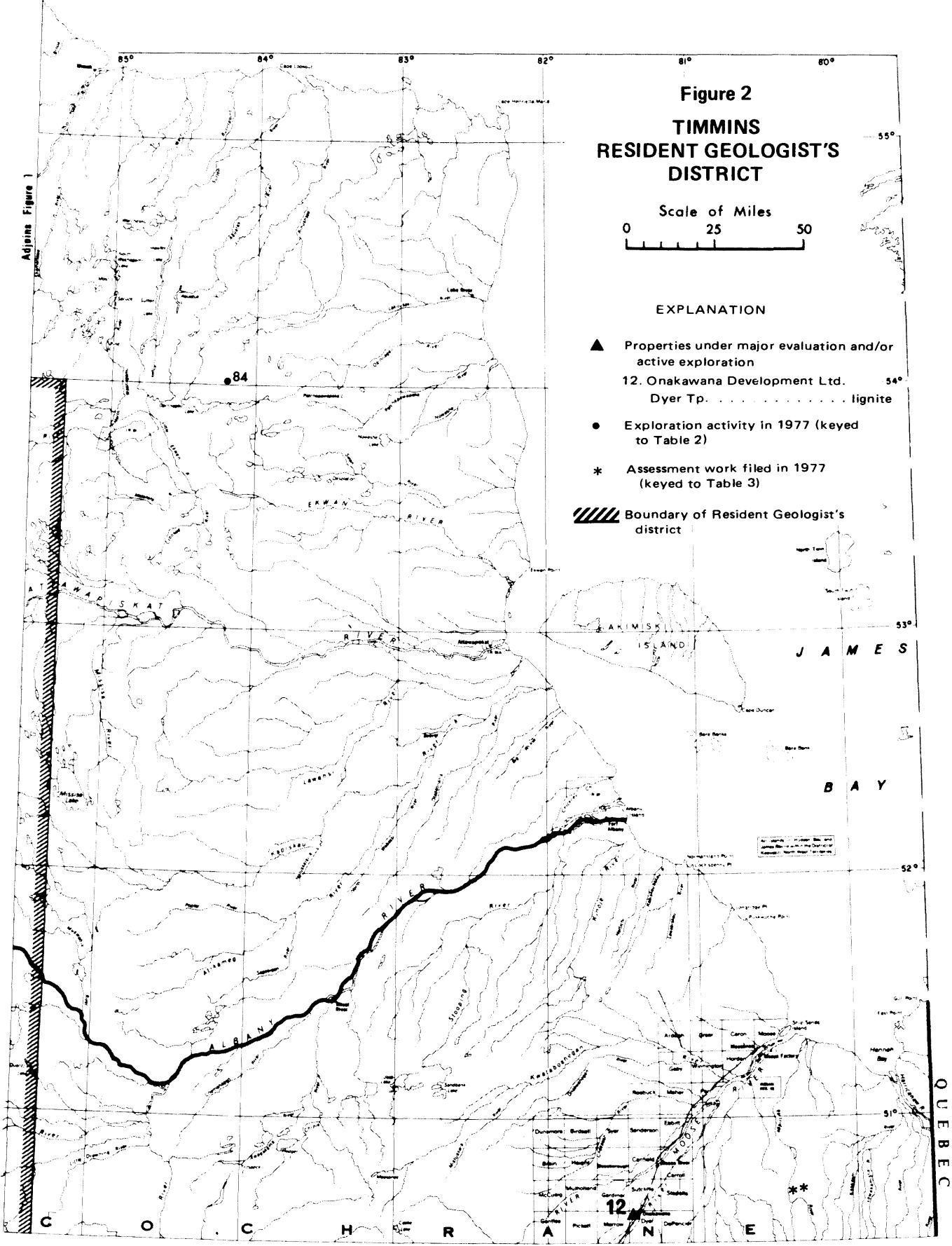
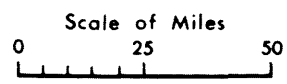


Figure 2
TIMMINS
RESIDENT GEOLOGIST'S
DISTRICT



EXPLANATION

- ▲ Properties under major evaluation and/or active exploration
- 12. Onakawana Development Ltd. Dyer Tp. lignite
- Exploration activity in 1977 (keyed to Table 2)
- * Assessment work filed in 1977 (keyed to Table 3)
- ▨ Boundary of Resident Geologist's district

Adjoins Figure 1

C

O

C

H

R

A

12

N

E

QUEBEC

Adjoins Figures 3 and 4

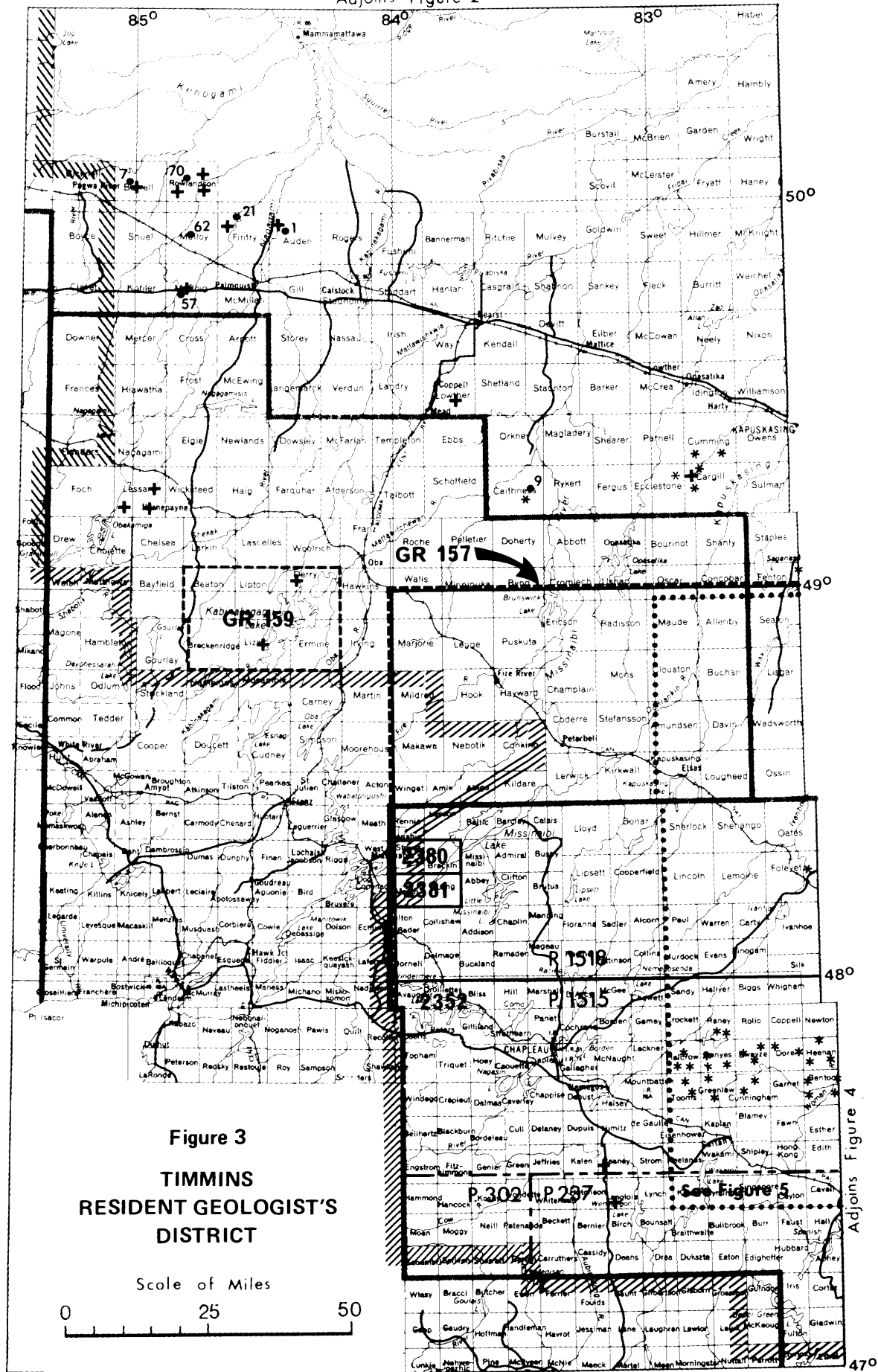
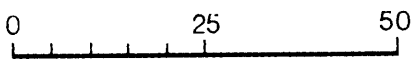


Figure 3
TIMMINS
RESIDENT GEOLOGIST'S
DISTRICT

Scale of Miles



Adjoins Figure 4

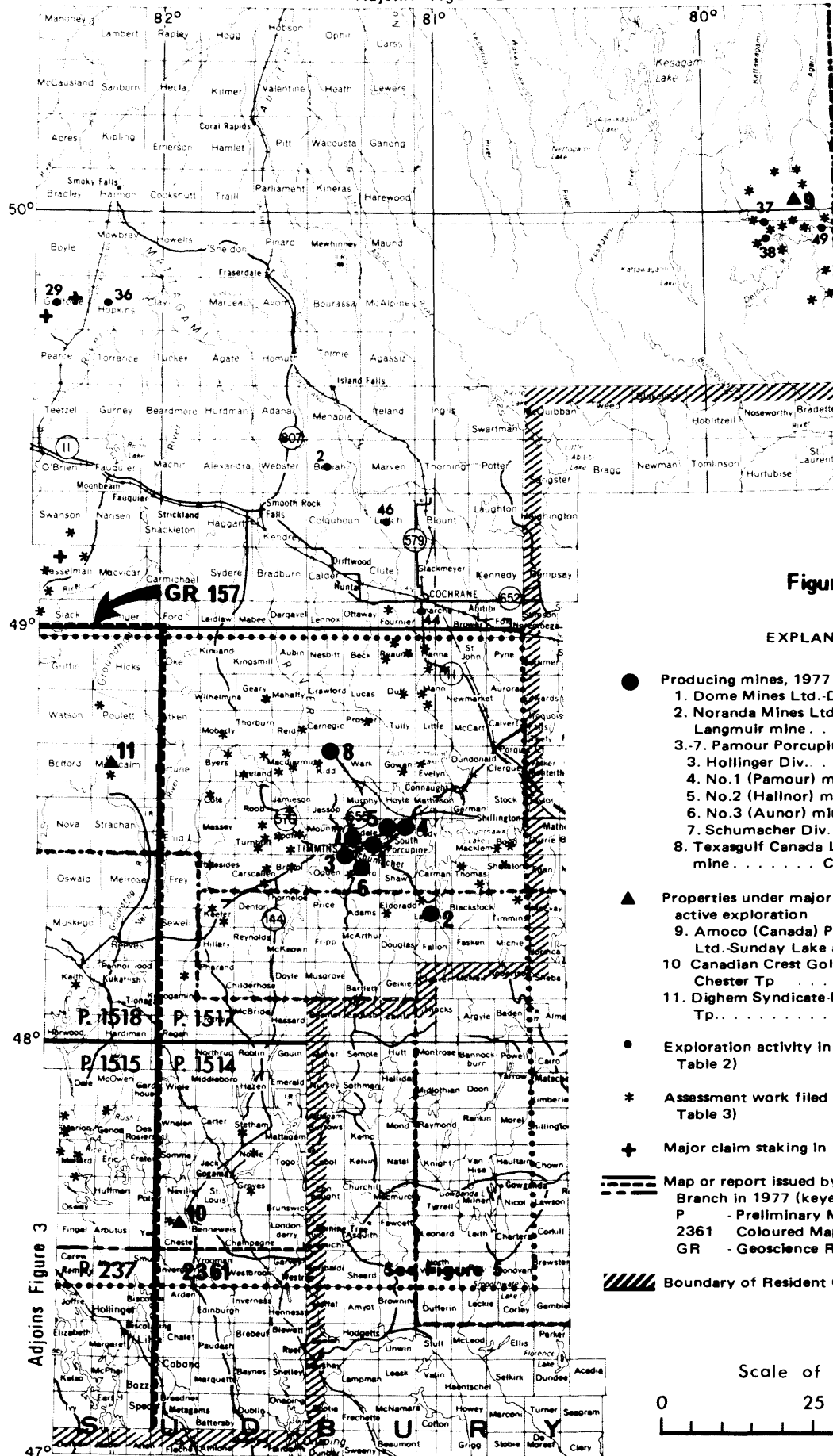
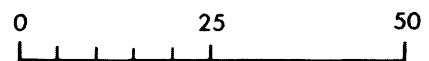


Figure 4

EXPLANATION

- Producing mines, 1977
 - 1. Dome Mines Ltd.-Dome mine . . . Au, Ag
 - 2. Noranda Mines Ltd., Inco Ltd.-Langmuir mine Ni
 - 3-7. Pamour Porcupine Mines Ltd.
 - 3. Hollinger Div. Au, Ag
 - 4. No.1 (Pamour) mine Au, Ag
 - 5. No.2 (Hallnor) mine Au, Ag
 - 6. No.3 (Aunor) mine Au, Ag
 - 7. Schumacher Div. Au, Ag, Cu
 - 8. Texasgulf Canada Ltd.-Kidd Creek mine Cu, Zn, Ag, Pb, Cd, Sn
- ▲ Properties under major evaluation and/or active exploration
 - 9. Amoco (Canada) Petroleum Co. Ltd.-Sunday Lake area Au Cu
 - 10. Canadian Crest Gold Mines Ltd. Chester Tp Au
 - 11. Dighem Syndicate-Montcalm Tp. Ni Cu
- Exploration activity in 1977 (keyed to Table 2)
- * Assessment work filed in 1977 (keyed to Table 3)
- ⊕ Major claim staking in 1977
- Map or report issued by the Geological Branch in 1977 (keyed to Table 1)
 - P - Preliminary Map
 - 2361 - Coloured Map
 - GR - Geoscience Report
- ▨ Boundary of Resident Geologist's district

Scale of Miles



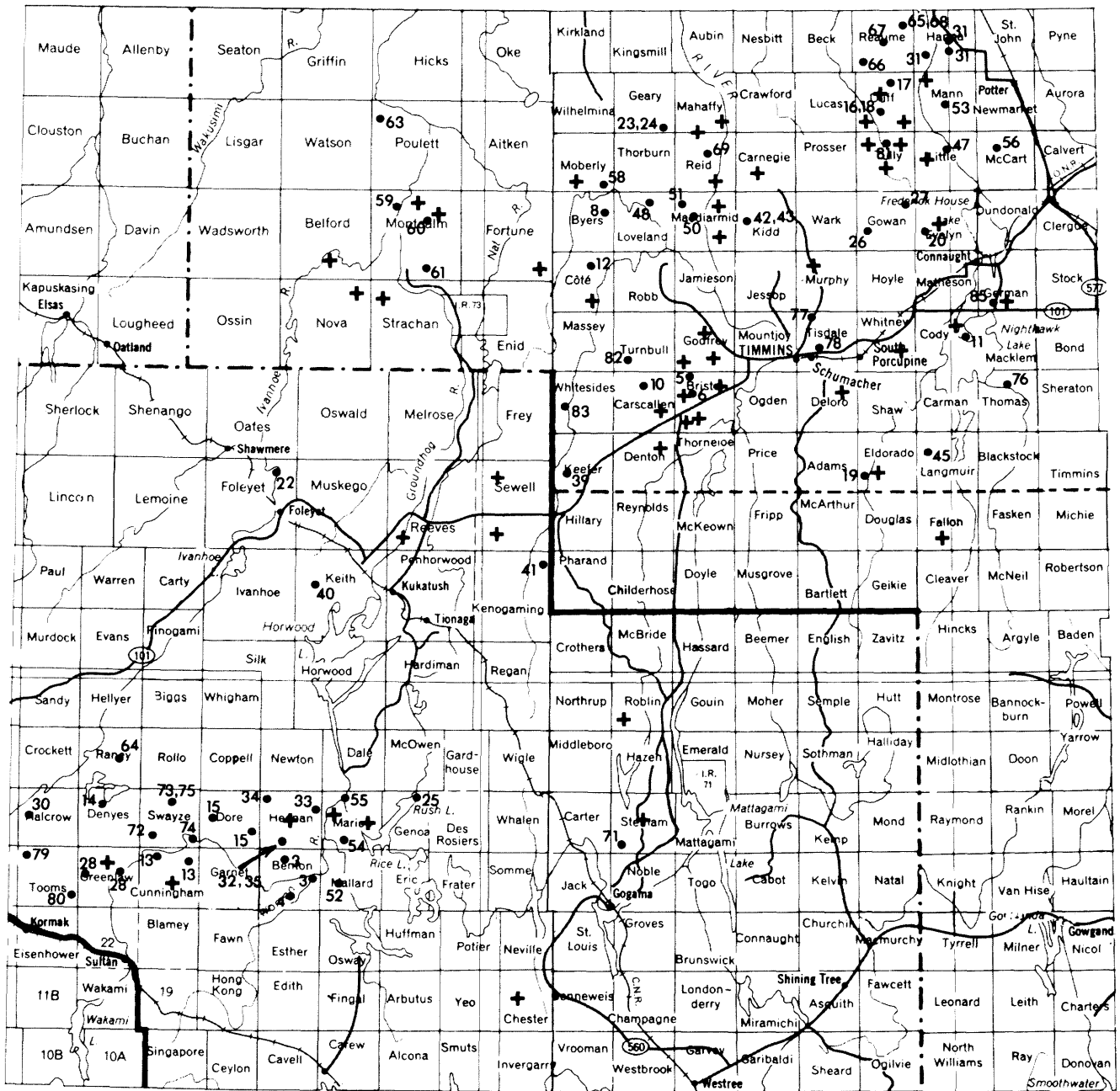


Figure 5

● Exploration activity in 1977 (keyed to Table 2)

+ Claim staking in 1977

gold per ton is planned for early spring of 1978. It is anticipated that gold recovery will be by heap-leaching (Canadian Crest Gold Mines Limited, personal communication).

Base Metals

During 1977 the Dighem Syndicate (Teck Corporation Limited, Metallgesellschaft Canada Limited and Domik Explorations Limited) carried out detailed surface diamond drilling, metallurgical testing and other feasibility studies on its nickel-copper deposit in Montcalm Township. Further extensive geophysical surveying and 600 m of diamond drilling are planned for this property for the winter of 1977-1978. However, plans for production have been shelved for the foreseeable future. Dighem Syndicate also carried out diamond drilling elsewhere on its extensive claim group in Montcalm Township.

In May Texasgulf Canada Limited announced that an exploratory diamond drill hole had intersected 4.6 m of 14.1 percent zinc, 1.96 percent lead and 4.64 ounces silver per ton at a vertical depth of 84 m approximately 2100 m northwest of the Kidd Creek mine site (The Northern Miner, May 12, 1977). It was soon discovered that, due to misplaced claim boundaries, the hole had actually been drilled on ground owned by Chance Mining and Exploration Company Limited, controlled by Conwest Exploration Company Limited. An option agreement was negotiated with Chance and Texasgulf carried out geophysical surveys and 3,295 m of diamond drilling in an effort to better define the mineralized zone originally intersected (The Northern Miner, Nov. 3, 1977). Results were discouraging and further work has been deferred for the present.

The interesting intersection on the Chance property and the earlier nickel discovery by the Dighem Syndicate in Montcalm Township encouraged exploration activity in the immediate Timmins area. Many areas unexplored since the original post-Texasgulf rush of the 1960s were re-evaluated. Among the most active townships were: Mann, Duff, Hanna, Reaume and Tully, northeast of Timmins; and the Montcalm Township area and Loveland, Macdiarmid and Godfrey Townships, northwest of Timmins. Geophysical Engineering Limited, Shell Canada Resources Limited, Dome Explorations (Canada) Limited, Western Mines Limited and Brascan Resources Limited were among the most active companies.

The "Swayze Volcanic Belt", about 150 km southwest of Timmins experienced considerable exploratory work, mainly on ground staked the previous year. Granges Explorations Aktiebolag drilled more than 40 holes in Tooms, Greenlaw, Denyes, Halcrow and Swayze Townships. Other companies active in the Swayze belt were Gulf Minerals Canada Limited, Noranda Explora-

tion Company Limited and Union Miniere Explorations and Mining Corporation Limited.

The Canadian Nickel Company Limited carried out an exploration program for gold and base metals on a large property in Bristol Township optioned from local prospector R. Allerston. Extensive geological and geophysical surveys were completed but no decision has been made regarding follow-up drilling.

Under various option agreements, Newmont Mining Corporation of Canada Limited, Alamo Petroleum Limited and Rosario Resources Canada Limited carried out detailed ground geophysical surveys and diamond drilling on a nickel-copper prospect in Gowan Township optioned from R. Allerston.

Shell Canada Resources Limited continued a base metals exploration program in migmatitic rocks in areas north of Cochrane, Kapuskasing and Hearst. Ground geophysical surveys and follow-up diamond drilling were performed.

Hudbay Mining Limited has applied for an exploration license for all minerals excluding fossil fuels in 416,000 acres east of Fraserdale (Mining Recorder's Files, Timmins).

Kerr Addison Mines Limited has applied for an exploration license for all minerals excluding fossil fuels in three parcels of land totalling 256,000 acres near Onakawana (Mining Recorder's Files, Timmins).

Uranium

Prospection Limited holds an exploration license to prospect primarily for uranium in Middle Precambrian rocks in the Sutton Lake-Hawley Lake Area. Work on this ground during 1977 has been mainly of a reconnaissance nature. More detailed exploration will follow next spring (Mining Recorder's Files, Timmins).

Beach Gold Mines Limited carried out an exploration program for uranium in Stetham Township. Five diamond drill holes totalling 550 m were drilled near a uranium occurrence previously drilled by Jonsmith Mines Limited in 1968. A preliminary estimate of grade is 0.5 pounds U₃O₈ per ton over a width of 12 m for a minimum length of 170 m (Regional Geologist's Files, Ontario Ministry of Natural Resources, Timmins).

Industrial Minerals

Rosario Resources Canada Limited is exploring a high-grade talc-magnesite deposit owned by R. Allerston in Whitney Township. Cominco Limited is testing some base metal occurrences elsewhere on this property.

Onakawana Development Limited has defined a large deposit of low-rank coal (lignite class) at Onakawana about 100 km south of Moosonee. Recoverable reserves

are estimated at 190 million tons of lignite with a heating value of 5,000 BTU's per pound. There are plans to develop the deposit as either a source of fuel for onsite generation of electricity in a thermal power plant, or, as a fuel to be used by industry in northeastern Ontario. July 1st, 1978, is the scheduled date by which a decision would be made to proceed with one or the other of these plans (Onakawana Development Limited, personal communication, November, 1977).

GEOLOGICAL BRANCH ACTIVITIES

G. Siragusa carried out geological mapping in Cunningham and Garnet Townships.

D.R. Pyke continued stratigraphic and structural studies of the Timmins-Kirkland Lake area in collaboration with L.S. Jensen. During 1977, efforts were concentrated in the Sinclair Lake area west of Matachewan.

In October 1977, three drill holes were put down east of the Abitibi River near Onakawana. The purpose of the drilling was to test several airborne electromagnetic anomalies and to determine the extent of occurrence of any lignite deposits. Small amounts of detrital lignite were intersected in one hole. Electromagnetic anomalies were in all probability caused by thick sequences of clays (H. Verma, Engineering and Terrain Geology Section, personal communication).

In 1977, an engineering geology terrain evaluation of about 165 000 km² in northern Ontario was begun. The results of this study will help in the planning of transportation corridors, exploration access roads and general trafficability of the area. They are also expected to show the resource potential of the Quaternary deposits of the area.

The Ontario Centre for Remote Sensing in co-operation with the Geological Branch undertook to map the physiographic features and surficial features of a large area encompassing Trout Lake, Big Trout Lake, Pickle Crow and Winisk Lake in northwestern Ontario. This survey included a small portion of the Northern Region north of Big Trout Lake.

These and other projects by the Geological Branch are described in Ontario Geological Survey Miscellaneous Paper 75 (see list of publications, back pocket).

TABLE 1 | MAPS AND REPORTS PERTAINING TO THE PORCUPINE MINING DIVISION, ISSUED BY THE ONTARIO GEOLOGICAL SURVEY IN 1976. SEE "LIST OF PUBLICATIONS" (BACK POCKET) FOR DETAILS.

GEOSCIENCE REPORTS

GR 157
GR 159

MISCELLANEOUS PAPERS

MP 48 (Reprint)
MP 71
MP 75

MINERAL DEPOSIT CIRCULAR

MDC 15

OPEN FILE REPORT

OFR 5232

COLOURED MAPS

2361
2380
2381

PRELIMINARY MAPS

P. 237 (1977 Rev.)
P. 302 (1977 Rev.)
P. 1062 (1977 Rev.)
P. 1226
P. 1227
P. 1228
P. 1244
P. 1245
P. 1246
P. 1514
P. 1515
P. 1517
P. 1518

TABLE 2

Exploration activity in 1977.

Number on Figure	Individual or Company	Activity	Number on Figure	Individual or Company	Activity
1	Shell Canada Resources Ltd.	GP	41	Canadian Johns-Manville Co.Ltd.	Mag, VEM
2	Shell Canada Resources Ltd.	GP	42	Hollinger Mines Ltd.	Mag
3	Granges Exploration AB	DD	43	Texasgulf Inc.	DD
3	Granges Exploration AB	DD	44	Geophysical Eng. Ltd.	DD
4	Noranda Explor. L.	DD	45	Noranda Explor.Co.Ltd.	HEM
5	Geophysical Eng. Ltd.	DD	46	Shell Canada Resources Ltd.	GP
6	Canadian Nickel Co. Ltd.	GL, IP	47	Amoco Canada Petroleum Co.Ltd.	GP, DD
7	Shell Canada Resources Ltd.	GP	47	Shell Canada Resources Ltd.	GP
8	Hollinger Mines Ltd.	DD	48	Geophysical Eng. Ltd.	DD
9	Vukmirovich, S.	DD	49	Noranda Explor. Co.Ltd.	DD
10	Conwest Exploration Co. Ltd.	DD	50	Canadian Johns-Manville Co.Ltd.	Mag, VEM
11	Pamour Porcupine Mines Ltd.	Exploration	51	Geophysical Eng. Ltd.	DD
12	Mattagami Lake Mines Ltd.	DD	52	Gulf Minerals Canada Ltd.	DD
13	Granges Exploration AB	DD	53	Dome Explor. (Canada) Ltd.	DD, GP
13	Granges Exploration AB	DD	53	Rosario Resources Canada Ltd.	GP
14	Gulf Minerals Canada Ltd.	DD	53	Shell Canada Resources Ltd.	GP
15	Granges Exploration AB	DD	54	Noranda Explor. Co.Ltd.	DD
15	Granges Exploration AB	DD	55	Noranda Explor. Co.Ltd.	DD
16	Amoco Canada Petroleum Co.Ltd.	GP, DD	56	Amoco Canada Petroleum Co.Ltd.	GP, DD
17	Geophysical Eng. Ltd.	DD	57	Shell Canada Resources Ltd.	GP
18	Shell Canada Resources Ltd.	GP	58	Hollinger Mines Ltd.	DD
19	Utah Mines Ltd.	DD	59	Derry, Michener & Booth	DD
20	Amoco Canada Petroleum Co.Ltd.	GP, DD	60	Geophysical Eng. Ltd.	DD
20	Newmont Explor. of Canada L.	Mag	61	Noranda Explor. Co.Ltd.	AMag
20	Shell Canada Resources Ltd.	GP	62	Shell Canada Resources Ltd.	GP
21	Shell Canada Resources Ltd.	GP	63	Noranda Explor. Co.Ltd.	AMag
22	Bruneau, C.	rTr	64	J-Dex Explor. Ltd.	DD
23	Dalhousie Oil Co.Ltd.	Mag, VEM	65	Geophysical Eng. Ltd.	DD
24	Young-Davidson Mines Ltd.	Mag, VEM, HEM	66	Geophysical Eng. Ltd.	DD
25	Texasgulf Inc.	DD	67	Shell Canada Resources Ltd.	GP
26	Allerston, R.	Mag	68	Western Mines Ltd.	DD, OVD
27	Newmont Explor. of Canada Ltd:	Mag, IP, seis, DD	69	Rosario Resources Canada Ltd.	GP
28	Granges Exploration AB	DD	70	Shell Canada Resources Ltd.	GP
28	Granges Exploration AB	DD	71	Beach Gold Mines Ltd.	DD
29	Shell Canada Resources Ltd.	GP	72	Granges Exploration AB	DD
30	Granges Exploration AB	DD	73	Granges Exploration AB	DD
31	Geophysical Eng. Ltd.	DD	74	Granges Exploration AB	DD
31	Shell Canada Resources Ltd.	GP	75	Gulf Minerals Canada L.	DD
31	Western Mines Ltd.	DD, OVD	76	Noranda Explor. Co. Ltd.	Mag, HEM
32	Granges Exploration AB	DD	77	Kavula, A.	DD
33	Gulf Minerals Canada Ltd.	DD	78	Lepic, A.	Manual Work
34	Gulf Minerals Canada Ltd.	DD	79	Granges Exploration AB	DD
35	Noranda Explor. Co.Ltd.	Mag, HEM	80	Granges Exploration AB	DD
36	Shell Canada Resources Ltd.	GP	81	Amoco Canada Petroleum Co. Ltd.	GP, DD
37	Noranda Explor. Co.Ltd.	DD	81	Shell Canada Resources Ltd.	GP
38	Noranda Explor. Co.Ltd.	DD	82	Conwest Exploration Ltd.	DD
39	Whitmarsh, B.	rTr	83	Canadian Nickel Co. Ltd.	DD
40	Dome Explor. (Canada) Ltd.	DD	84	Prospection Ltd.	Exploration
			85	Hollinger Mines Ltd.	DD

TABLE 3

Assessment work and other information received in 1977.

Dec. 1, 1976 to Nov. 30, 1977

Porcupine Mining Division

Abbreviations (Tables 1 & 2)

- AMag - airborne magnetometer survey
- ARA - airborne radiometric survey
- DD - diamond drilling
- GC - geochemical survey
- GL - geological survey
- GP - geophysical survey
- HEM - horizontal loop electromagnetic survey
- IP - induced polarization electromagnetic survey
- Mag - magnetometer survey
- OVD - overburden drilling
- rTr - rock trenching, blasting
- seis - seismic survey
- sTr - surface trenching, stripping
- VEM - vertical loop electromagnetic survey
- VLF - very low frequency electromagnetic survey

Commodities

- ap - apatite
- asb - asbestos
- Au - gold
- U - uranium
- verm - vermiculite

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work	Year	Toronto File No.	Local File No.
Atkinson Lake Area	32 E/13	Hudson Bay Exploration & Development Co. Ltd.	Base metals	Assessment	DD 4-1262 ft.	1976		T-1704
Atkinson Lake Area	32 E/13	Noranda Expl. Co. Ltd.	Base metals	Assessment	Mag., HEM	1976	2.2205	T-1763
Benton Twp.	410/16SW	Granges Expl. AB	Base metals	Assessment	DD 1-206 ft.	1977		T-1792
Benton Twp.	410/9NW	Granges Expl. AB	Base metals	Assessment	DD 4-1333 ft.	1977		T-1793
Benton Twp.	410/9	Noranda Expl. Co. Ltd.	Base metals	Assessment	DD 1-452 ft.	1977		T-2302
Benton Twp.	410/9, 410/16	W.G.Wahl Ltd.	Base metals	Assessment	VLF, GL, Mag, GC	1975	2.2085	T-2311
Bond Twp.	42A/7NE	Ont. Paper Co. Ltd. and Geomont Expl. Co. Ltd.	Base metals	Assessment	IP, Mag, GL	1975	2.2048	T-1745
Bristol Twp.	42A/5NE	Geophysical Eng. Ltd.	Base metals	Assessment	DD 4-1610.5 ft.	1976, 1977		T-1752
Bristol Twp.	42A/5NE	Int. Nickel Co. of Can. Ltd., The	Base metals, Au	Assessment	Mag.	1976	2.2300	T-1789
Byers Twp.	42A/12NW	Hollinger Mines Ltd.	Base metals	Assessment	DD 1-666 ft.	1977		T-1788
Caithness Twp.	42G/3NW	Vukmirovich, S.	Base metals	Assessment	DD 1-101 ft.	1977		T-2209
Cargill Twp.	42G/7SW	Int. Minerals & Chemical Corp. (Canada) Ltd.	ap, verm.	Assessment	OVD 106-31, 320 ft. assays	1975, 1976	2.6125	T-1731
Cargill Twp.	42G/7SW	Spruce Falls Power & Paper Co. Ltd.	ap, verm.	Assessment	AMag	1976	2.2159	T-1777
Carscallen Twp.	42 A/5NE	Conwest Expl. Co. Ltd.	Base metals	Assessment	DD 4-1230 ft.	1977		T-1658
Carscallen Twp.	42 A/5NE	Geophysical Eng. Ltd.	Base metals	Assessment	DD 2-629.4 ft.	1976		T-1748
Casselton Twp.	42 G/1SW	Mattagami Lake Mines Ltd.	Base metals	Assessment	DD 1-350 ft. Mag, HEM	1976	2.2315	T-1797
Casselton Twp.	42 G/1SW	Mattagami Lake Mines Ltd.	Base metals	Assessment	Mag, HEM	1976	2.2315	T-1802
Chester Twp.	41P/12SW	Barry, H.	Base metals, Au	Assessment	sTr, rTr	1976		T-1749
Chester Twp.	41P/12SW	Can. Crest Gold Mines Ltd.	Au, base metals	Assessment	sTr	1976		T-1751

Location	NTS	File Name	Commodity Sought	Type of Report	Type Work	Year	Toronto File No.	Local File No.
Cote Twp.	42A/12SW	Mattagami Lake Mines Ltd.	Base metals	Assessment	HEM, Mag, DD 2-1613 ft.	1976,1977	2.2208	T-1767
Cumming Twp.	42G/7SW	Int. Minerals & Chemical Corp. (Canada) Ltd.	ap, verm.	Assessment	OVD 106-31, 320 ft. assays	1975,1976	2.6125	T-1731
Cumming Twp.	42G/7SW	Spruce Falls Power & Paper Co. Ltd.	ap, verm.	Assessment	AMag	1976	2.2159	T-1777
Cunningham Twp.	410/15NE	Granges Expl.AB	Base metals	Assessment	DD 1-208 ft.	1977		T-1768
Cunningham Twp.	410/10NE	Granges Expl.AB	Base metals	Assessment	DD 1-180 ft.	1977		T-1775
Cunningham Twp.	410/10NE	Texasgulf Can. Ltd.	Base metals	Assessment	HEM, Mag.	1976	2.2251	T-1776
Deloro Twp.	42A/6NW	Aunor Gold Mines Ltd.	Au	Not assessment	DD 50-42, 537.6 ft.	1936-38, 1955,1965		T-251
Deloro Twp.	42A/6NW	Weir, L.	Au	Assessment	rTr	1976		T-1576
Denyes Twp.	410/15SW	Gulf Minerals Can. Ltd.	Base metals	Assessment	DD 1-507 ft.	1977		T-1779
Denyes Twp.	410/15SW	Mattagami Lake Mines Ltd.	Base metals	Assessment	HEM, Mag.	1976	2.2117	T-1720
Dore Twp.	410/15SE	Granges Expl. AB	Base metals	Assessment	DD 1-222 ft.	1977		T-1770
Dore Twp.	410/16SW	Granges Expl. AB	Base metals	Assessment	DD 1-175 ft.	1977		T-1791
Duff Twp.	42A/14SE	Geophysical Eng. Ltd.	Base metals	Assessment	DD 1-368 ft.	1977		T-1787
Ecclestone Twp.	42 G/7SW	International Minerals & Chemical Corp. (Canada) Ltd.	ap, verm.	Assessment	OVD 106-31, 320 ft. assays	1975,1976	2.6125	T-1731
Eldorado Twp.	42A/6SE	Utah Mines Ltd.	Base metals	Assessment	DD 2-949 ft.	1977		T-1785
Evelyn Twp.	42A/11NE	Newmont Expl. Co. of Can.Ltd.	Base metals	Assessment	Mag.	1976,1977	2.2139	T-1794
Fenton Twp.	42G/15W	Mattagami Lake Mines Ltd.	Base metals	Assessment	HEM, Mag, DD 2-729 ft.	1976	2.2314	T-1796
Foleyet Twp.	42 B/8SW	Bruneau, C.	Base metals	Assessment	rTr	1977		T-1800
Geary Twp.	42 A/13SE	Dalhousie Oil Co. Ltd.	Base metals	Assessment	Mag, VEM	1976, 1977	2.2254 2.2380	T-1782
Geary Twp.	42 A/13SE	Young Davidson Mines Ltd.	Base metals	Assessment	Mag, VEM, HEM	1976, 1977	2.2254 2.2386	T-1783
Genoa Twp.	410/16SE	Texasgulf Can. Ltd.	Base metals	Assessment	DD 5-2085 ft.	1977		T-1740
Godfrey Twp.	42 A/5NE	Geophysical Eng. Ltd.	Base metals	Assessment	DD 4-1610.5 ft.	1976		T-1752
Godfrey Twp.	42 A/5NE	Northim Mines Inc.	Base metals	Assessment	DD 1-350 ft.	1976		T-1750
Godfrey Twp.	42A/12SE	Texasgulf Can. Ltd.	Base metals	Assessment	DD 1-839 ft.	1975		T-1680
Gowan Twp.	42A/11NE	Allerston, R.	Base metals	Assessment	Mag.	1976,1977	2.2361	T-1619
Gowan Twp.	42A/11NE	Newmont Expl. of Can. Ltd.	Base metals	Assessment	Mag.	1976,1977	2.2339	T-1794
Greenlaw Twp.	410/10NW	Granges Expl.AB	Base metals	Assessment	DD 3-684 ft.	1977		T-1773
Greenlaw Twp.	410/10NW	Granges Expl.AB	Base metals	Assessment	DD 3-1062 ft.	1977		T-1774
Groves Twp.	41 P/12NE	Burns, I.	Base metals	Assessment	DD 1-123 ft.	1976		T-1753
Halcrow Twp.	410/15SW	Granges Expl.AB	Base metals	Assessment	DD 5-1046 ft.	1977		T-1759
Hanna Twp.	42 A/15NW	Geophysical Eng. Ltd.	Base metals	Assessment	DD 1-347 ft.	1977		T-1764
Hanna Twp.	42 A/14NE	Geophysical Eng. Ltd.	Base metals	Assessment	DD 1-350 ft.	1977		T-1799
Hanna Twp.	42 A/14NE	Western Mines Ltd.	Base metals	Assessment	DD 5-2132 ft. OVD 1-246 ft.	1977		T-1693
Heenan Twp.	410/16SW	Granges Expl.AB	Base Metals	Assessment	DD 1-206 ft.	1977		T-1792
Heenan Twp.	410/16SW	Granges Expl.AB	Base metals	Assessment	DD 1-258 ft.	1977		T-1795
Heenan Twp.	410/16SW	Gulf Minerals Can. Ltd.	Base metals	Assessment	DD 3-1483 ft.	1976,1977		T-1778

NORTHERN – TIMMINS

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work	Year	Toronto File No.	Local File No.
Heenan Twp.	410/16SW	Hollinger Mines Ltd.	Base metals	Assessment	DD 1-654 ft.	1976		T-1744
Heenan Twp.	410/16	Noranda Expl. Co. Ltd.	Base metals	Assessment	Mag., HEM	1977	2.2302	T-1803
Heenan Twp.	410/9, 410/16	W. G. Wahl Ltd.	Base metals	Assessment	VLF, GL, Mag., GL	1975	2.2085	T-2311
Hopper Lake Area	32 E/13	Amoco Can. Petroleum Co.Ltd.	Base metals,Au	Assessment	Mag.	1976	2.2139	T-1717
Hopper Lake Area	32 E/13	Noranda Expl. Co. Ltd.	Base metals	Assessment	VEM DD 3-1061.7 ft.	1975,1977	2.2137	T-1700
Jamieson Twp.	42A/11SW, 42A/12SE	Asarco Expl. Co. of Can. Ltd.	Base metals	Assessment	OVD 13-1122 ft. GC	1976	2.2103	T-1746
Keefer Twp.	42A/5SE	Galata, F.	Base metals	Assessment	sTr, rTr	1976		T-1556
Keefer Twp.	42A/5SW	Whitmarsh, B.	Base metals	Assessment	rTr	1977		T-1738
Keith Twp.	42B/1NW	Dome Expl.(Can.) Ltd.	Base metals	Assessment	DD 4-1383 ft.	1977		T-249
Kenogaming Twp.	42A/4NW	Can. Johns-Manville Co.Ltd.	usb.	Assessment	Mag., VEM	1977	2.2362	T-1813
Kidd Twp.	42A/11NW	Hollinger Mines Ltd.	Base metals	Assessment	Mag.	1977	2.2333	T-1790
Lamarche Twp.	42A/14NE	Geophysical Eng. Ltd.	Base metals	Assessment	DD 1-350 ft.	1977		T-1799
Langmuir Twp.	42A/6SE	Noranda Expl. Co. Ltd.	Base metals	Assessment	HEM	1977	2.2398	T-1811
Loveland Twp.	42A/12NE	Geophysical Eng. Ltd.	Base metals	Assessment	DD 3-884 ft.	1977		T-1757
Loveland Twp.	42A/12NE	Hollinger Mines Ltd.	Base metals	Assessment	DD 1-148 ft.	1975		T-1401
Lower Detour Lake Area	32 E/13, 22L	Amoco Can. Petroleum Co.Ltd.	Au, base metals	Assessment	DD 63-44,270.6 ft.	1975,1976		T-1692
Lower Detour Lake Area	32 E/4	Noranda Expl. Co. Ltd.	Base metals, Au	Assessment	DD 1-391.2 ft.	1977		T-1682
Lower Detour Lake Area	32 E/13	Noranda Expl. Co. Ltd.	Base metals, Au	Assessment	VEM	1975	2.2137	T-1700
Lower Detour Lake Area	32 E/13	Noranda Expl. Co. Ltd.	Base metals, Au	Assessment	Mag., VEM	1976	2.2259	T-1729
Lower Detour Lake Area	32 E/13	Noranda Expl. Co. Ltd.	Base metals, Au	Assessment	Mag., VEM	1976	2.2140	T-1747
Lower Detour Lake Area	32 E/13	Noranda Expl. Co. Ltd.	Base metals, Au	Assessment	Mag., VEM	1976	2.2157	T-1758
Lower Detour Lake Area	32 E/13	Noranda Expl. Co. Ltd.	Base metals, Au	Assessment	Mag., VEM	1976	2.2174	T-1761
Macdiarmid Twp.	42A/12NE	Can. Johns-Manville Co. Ltd.	usb.	Assessment	Mag., VEM	1977	2.2372	T-1539
Macdiarmid Twp.	42A/12NE	Geophysical Eng. Ltd.	Base metals	Assessment	DD 2-861 ft.	1977		T-1756
Mallard Twp.	410/9NW	Gulf Minerals Can. Ltd.	Base metals	Assessment	DD 2-995 ft.	1977		T-1781
Mallard Twp.	410/9NW	Noranda Expl. Co. Ltd.	Base metals	Assessment	Mag., HEM	1976	2.2303	T-1786
Mallard Twp.	410/9, 410/16	W. G. Wahl Ltd.	Base metals	Assessment	VLF, GL, Mag., GC, Assays DD 2-963 ft.	1975,1976	2.2085	T-2311
Mann Twp.	42A/14SE	Dome Expl.(Can.) Ltd.	Base metals	Assessment	Turam, Mag., HEM, DD 10-4514 ft.	1976,1977	2.2222	T-1766
Mann Twp.	42A/15SW	Hollinger Mines Ltd.	Base metals	Assessment	DD 1-404 ft.	1976		T-1656
Marion Twp.	410/9NE	Noranda Expl. Co. Ltd.	Base metals	Assessment	DD 1-432.5 ft.	1977		T-2299
Marion Twp.	410/16	Noranda Expl. Co. Ltd.	Base metals	Assessment	DD 1-321.7 ft.	1977		T-2307
Marion Twp.	410/9, 410/16	W. G. Wahl Ltd.	Base metals	Assessment	VLF, GL, Mag. GL DD 2 -963 ft.	1975,1976	2.2085	T-2311

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work	Year	Toronto File No.	Local File No.
Moberly Twp.	42A/12NW	Hollinger Mines Ltd.	Base metals	Assessment	DD 1-666 ft.	1977		T-1788
Montcalm Twp.	42B/9NE	Noranda Expl. Co. Ltd.	Base metals	Assessment	AMag.	1977	2.2492	T-1804
Noble Twp.	42P/13SE	Beach Gold Mines Ltd.	U	Assessment	ARA	1976	2.2131	T-1755
Osway Twp.	410/9NW	Noranda Expl. Co. Ltd.	Base metals	Assessment	Mag., HEM	1976	2.2303	T-1786
Poulett Twp.	42B/9NE	Noranda Expl. Co. Ltd.	Base metals	Assessment	AMag.	1977	2.2492	T-1804
Prosser Twp.	42A/14SE	Texasgulf Can. Ltd.	Base metals	Assessment	HEM	1976	2.2290	T-1741
Raney Twp.	410/15NW	J-Dex Expl. Ltd.	Base metals	Assessment	DD 9-983.5 ft.	1976,1977		T-2180
Reaume Twp.	42A/13NE	Geophysical Eng. Ltd.	Base metals	Assessment	DD 2-743 ft.	1977		T-1765
Reaume Twp.	42A/14NE	Geophysical Eng. Ltd.	Base metals	Assessment	DD 1-401.1 ft.	1977		T-1784
Reaume Twp.	42A/14NE	Noranda Expl. Co. Ltd.	Base metals	Assessment	Mag.	1976	2.2176	T-1760
Reaume Twp.	42A/14NE	Western Mines Ltd.	Base metals	Assessment	DD 5 -2132 ft. OVD 1-246 ft.	1977		T-1693
Reid Twp.	42A/14SW	Texasgulf Can. Ltd.	Base metals	Assessment	Mag., HEM	1975,1976	2.2190	T-1762
Sheraton Twp.	42A/7NE	Ont. Paper Co. Ltd.	Base metals	Assessment	IP, Mag., GL	1975	2.2048	T-1745
Slack Twp.	41G/1SW	Mattagami Lake Mines Ltd.	Base metals	Assessment	HEM, Mag., DD 2-729 ft.	1976	2.2314	T-1796
South Bluff Area E. of	Ck., 42 1/9	Conwest Expl. Co. Ltd.	Base metals	Assessment	DD 5 - 1049 ft.	1976		T-1711
Stetham Twp.	41P/13SE	Beach Gold Mines Ltd.	U	Assessment	ARA DD 5 -1973 ft.	1976,1977	2.2131	T-1755
Sunday Lake Area	32 L, 32 E/13	Amoco Can. Petroleum Co. Ltd.	Au, base metals	Assessment	DD 66-46,280.6 ft.	1974,1975, 1976		T-1692
Sunday Lake Area	32 L/4	Noranda Expl. Co. Ltd.	Base metals	Assessment	Mag., VEM	1976	2.2175	T-1695
Sunday Lake, Area West of	32 E/13, 22L	Amoco Can. Petroleum Co. Ltd.	Au, base metals	Assessment	DD 64-44,270.6 ft.	1974,1975, 1976		T-1692
Swanson Twp.	42G/1NW	Mattagami Lake Mines Ltd.	Base metals	Assessment	Mag., HEM DD 1-397 ft.	1976	2.2316	T-1798
Swayze Twp.	410/15SE	Granges Expl. AB	Base metals	Assessment	DD 1-208 ft.	1977		T-1768
Swayze Twp.	410/15SE	Granges Expl. AB	Base metals	Assessment	DD 2-325 ft.	1977		T-1769
Swayze Twp.	410/15SE	Gulf Minerals Can. Ltd.	Base metals	Assessment	DD 1-506 ft.	1977		T-1780
Thomas Twp.	42 A/7NW	Hill, L.E.	Base metals	Assessment	DD 1-203 ft.	1976		T-1557
Thomas Twp.	42 A/7NW	Noranda Expl. Co. Ltd.	Base metals	Assessment	Mag., HEM	1977	2.2393	T-1812
Timmins Twp.	42 A/7SE	Larouche, M. & Morin, R.	Base metals	Assessment	Mag., VEM, GL	1975	2.2115	T-1754
Tisdale Twp.	42A/11SW	Kavula, A.	Base metals, Au	Assessment	DD 1-320 ft.	1977		T-1642
Tisdale Twp.	42A/6 NW	Lepic, A.	Base metals, Au	Assessment	Manual work	1977		T-1581
Tooms Twp.	410/10NW	Granges Expl. AB	Base metals	Assessment	DD 4-754 ft.	1977		T-1771
Tooms Twp.	410/10NW	Granges Expl. AB	Base metals	Assessment	DD 7 -1749 ft.	1977		T-1772
Turnbull Twp.	42A/5NE	Conwest Expl. Co. Ltd.	Base metals	Assessment	DD 4-1230 ft.	1977		T-1658
Turnbull Twp.	42A/5NE	Northim Mines Inc.	Base metals	Assessment	DD 1-350 ft.	1976		T-1750
Turnbull Twp.	42 A/5	Texasgulf Can. Ltd.	Base metals	Assessment	Mag., HEM, VLF	1976	2.2329	T-1801
Whitesides Twp.	42 A/5NW	Can. Nickel Co. Ltd.	Base metals	Assessment	DD 1-125 ft.	1977		T-1810
Whitney Twp.	42 A/6NE	Allerston, R.	talc	Assessment	GL	1976	2.2257	T-1052

1977 Report of Kirkland Lake Resident Geologist

H.L. Lovell¹ and F.R. Ploeger²

CONTENTS

Introduction	66
Resident Geologist's Activities	66
Mining Activity	67
Cobalt Area	67
Agnico-Eagle Mines Ltd.	67
Coniagas-Tretheway Mine	67
Beaver-Temiskaming Mine	67
Teck Corp. Ltd.	67
Silverfields Mine	67
Canadaka Mines Ltd.	67
Bailey Mine	67
Canadian Smelting and Refining (1974) Ltd.	67
Matachewan Area	67
Extender Minerals of Canada Ltd.	67
United Asbestos Inc.	67
Midlothian Mine	67
Holtvre-Matheson Area	67
Pamour Porcupine Mines Ltd.	67
Ross Mine	67
Hedman Mines Ltd.	71
Kirkland Lake Area	71
Willroy Mines Ltd.	71
Macassa Division	71
Kerr Addison Mines Ltd.	71
The Adams Mine	71
Guides for Gold Exploration	71
Property Examinations	72
Mowat, A.	72
Laroma Midlothian Gold Occurrence	72
Hillcrest Gold Occurrence	72
Barker Syndicate Gold Occurrence	72
Sawka-Allard Gold Occurrence	73
Lowe, D.	73
Mitchell-Hearst Gold Occurrence	73
Swansea Gold Mines Inc.	73
Pamour Porcupine Mines Ltd.	73
Ross Mine	73
Geological Branch Activities	74
Research by Other Agencies	74
References and Publications	74

TABLES

1— Claims recorded and assessment work credit received	66
2— Maps and reports issued by the Geological Branch	75
3— Assessment work and other information received in 1977.	76

FIGURES

1,2—Kirkland Lake Resident Geologist's district	68,69, 70
---	--------------

INTRODUCTION

Exploration activity declined for base metals in 1977 and increased for precious metals. The following statistics were compiled for the Larder Lake Mining Division, which with the Cobalt area, forms the Kirkland Lake Resident Geologist's area. As shown by the figures, the overall trend of base and precious metals exploration combined is generally down.

TABLE 1 CLAIMS RECORDED AND ASSESSMENT WORK CREDIT RECEIVED, LARDER LAKE MINING DIVISION.

	Claims Recorded	Claims Cancelled	Claims Active	Diamond Drilling (Man Days)	Geophys. Surveys (Man Days)	Geological Surveys (Man Days)
1977	1,826	2,834	5,703	37,101	45,436	1,820
1976	2,350	2,979	6,712	47,723½	42,147	6,220
1975	2,916	5,010	7,341	45,880	38,047	6,738
1974	4,757	2,296	9,435	40,678	55,716	4,441
1973	3,260	3,214	6,974	34,113	35,811	8,150

RESIDENT GEOLOGIST'S ACTIVITIES

Staff consisted of a Resident Geologist, and a Resource Geologist.

Activities included: completion of the Lorrain Township preliminary map; compilation of data series maps for 14 townships; 40 mineral property examinations; mineral potential evaluation for the municipalities of

¹Resident Geologist, Ontario Ministry of Natural Resources, 4 Government Road East, Kirkland Lake, P2N 1A2, telephone (705) 567-5242.

²Resource Geologist.

Kirkland Lake, Larder Lake, Virginiatown and surrounding areas; lake development plans for eight lakes; examination and collection of representative samples of 1500 m of diamond drill core; guiding three Junior Ranger field camps on geological field trips; participation in field trips for the Geological Survey of Canada and the Geological Branch and guiding exploration industry field trips in the Kirkland Lake and Cobalt areas. Approximately 1,100 inquiries were handled.

MINING ACTIVITY

Eleven mining groups and one refinery operated during 1977, producing gold-silver bullion, copper concentrate, silver-cobalt concentrate, refined silver, iron ore pellets, asbestos fibre and barite. In addition a number of sand and gravel pits operated.

One mine closed during 1977, that of United Asbestos Incorporated 30 km west of Matachewan.

Cobalt Area

AGNICO-EAGLE MINES LIMITED

Coniagas-Tretheway Mine

In 1977 the emphasis switched from underground mining to open cut mining of silver ore employing front end loaders and trucks. The Penn mill operated during the warm months.

Beaver-Temiskaming Mine

Exploration continued throughout the year, primarily from the 1,600-foot level, and a small amount of silver ore was mined.

TECK CORPORATION LIMITED

Silverfields Mine

Mine operations continued; however, during the latter part of the year the tonnage of silver ore milled decreased from 290 to 250 tons per day. Two deep exploratory holes were drilled from the 6th level of the Silverfields mine into the underlying Early Precambrian metavolcanics. Underground exploration of the recently acquired Waldag claims is scheduled to commence early in 1978.

CANADAKA MINES LIMITED

Bailey Mine

Mining and development continued on the Bailey 4th and 5th levels, and some ore was mined from the Conisil (South Giroux) and Cleopatra mines.

In addition to the Bailey, Conisil and Cleopatra ore, the new mill, started up in 1976, processed silver-bearing material from tailings basins and mine dumps. Underground exploration was confined to the Bailey and Conisil workings.

CANADIAN SMELTING AND REFINING (1974) LIMITED

Refined silver bars continued to be produced; by-product arsenic and a form of copper are currently being stockpiled. Concentrates came from all the Cobalt mines, and from the properties of Echo Bay Mines Limited and Terra Mining and Exploration Limited near Great Bear Lake, Northwest Territories.

Matachewan Area

EXTENDER MINERALS OF CANADA LIMITED

Open cut mining of barite ore continued during the warm months; the mill operated year around. A decline ramp is scheduled to be driven underground in 1978.

UNITED ASBESTOS INCORPORATED

Midlothian Mine

Production was discontinued at the Midlothian mine on March 2, 1977. Feasibility studies by Kilborn Engineering for The Clarkson Company Limited were conducted throughout the latter part of the year, including 3308 m of diamond drilling.

Holtyre-Matheson Area

PAMOUR PORCUPINE MINES LIMITED



Ross Mine

This relatively low grade gold producer (with by-product silver and copper) continued production. By year end, a decision had been made by management to deepen the shaft to develop new levels in two stages; one

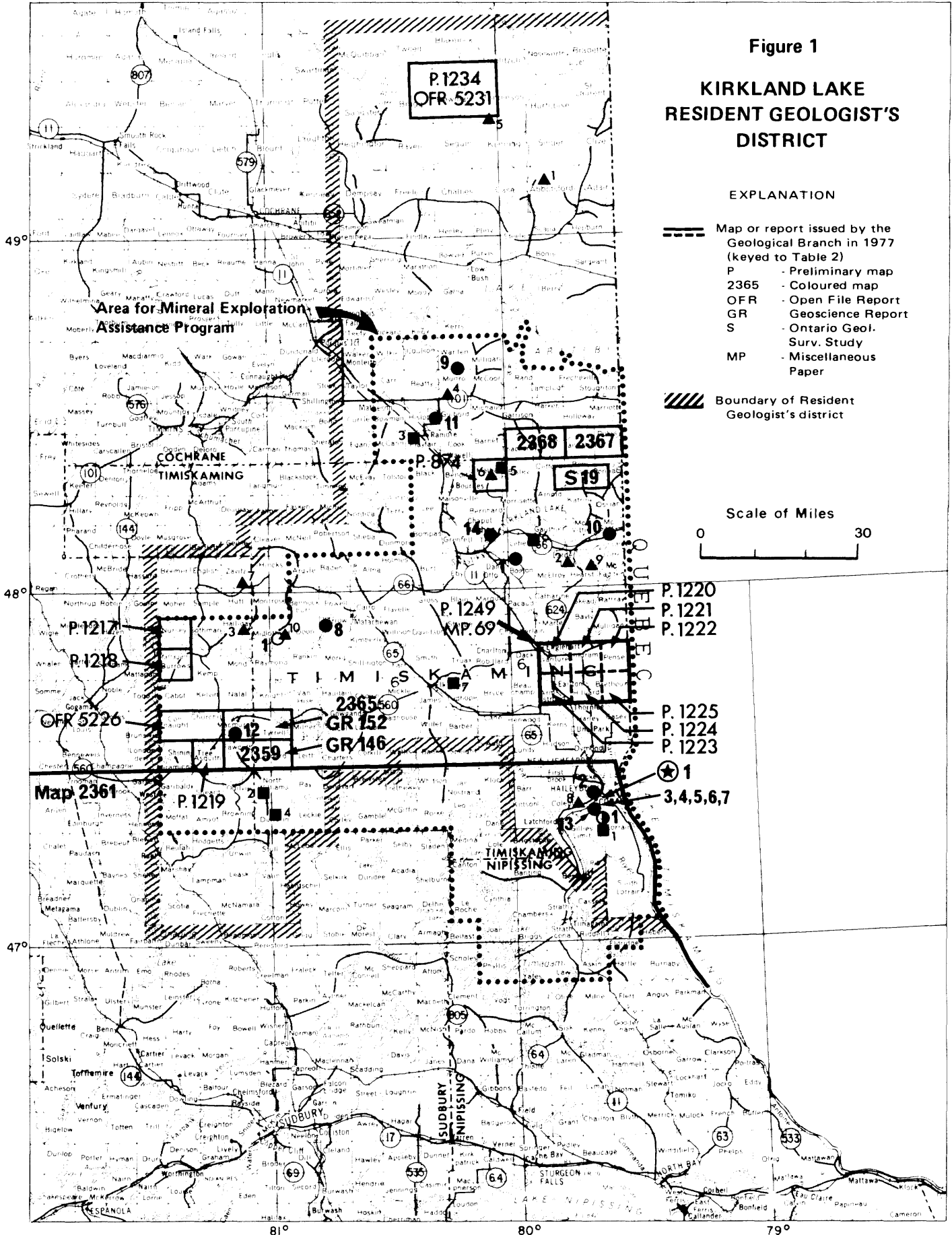
Figure 1

**KIRKLAND LAKE
RESIDENT GEOLOGIST'S
DISTRICT**

EXPLANATION

-  Map or report issued by the Geological Branch in 1977 (keyed to Table 2)
- P - Preliminary map
- 2365 - Coloured map
- OFR - Open File Report
- GR - Geoscience Report
- S - Ontario Geol. Surv. Study
- MP - Miscellaneous Paper
-  Boundary of Resident Geologist's district

Scale of Miles




EXPLANATION

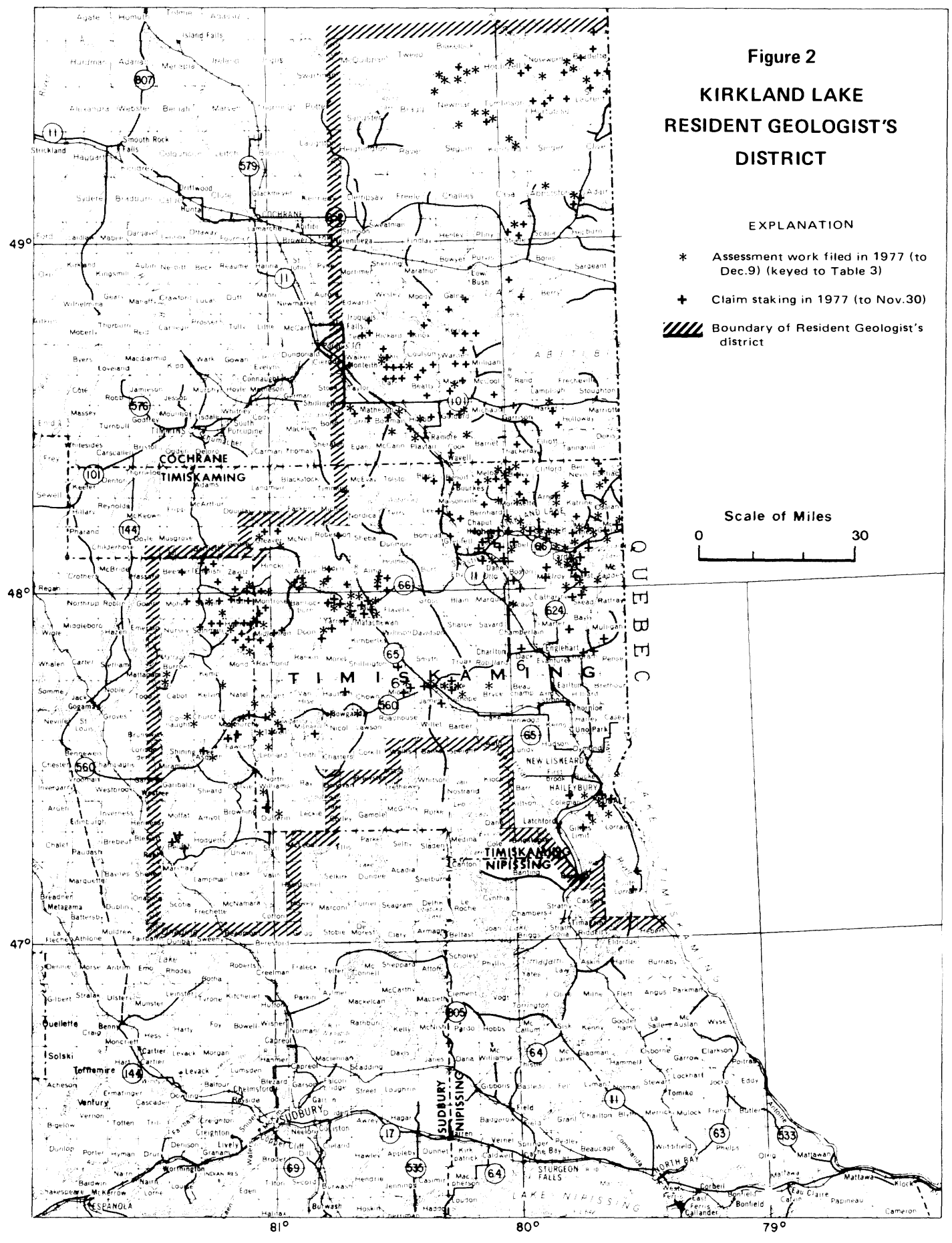
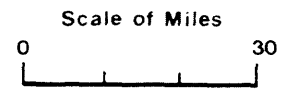
- Producing mines, 1977
 1. Adams Mine, The (Dominion Foundries and Steel Ltd.) Fe
 2. Agnico-Eagle Mines Ltd.-Coniagas-Tretheway mine Ag,Co
 - 3.-7. Canadaka Mines Ltd.
 3. Bailey mine Ag,Co,Ni
 4. Cleopatra mine Ag,Co
 5. Coniagas mine (tailings) Ag
 6. Conisil-South Giroux mine Ag,Co,Ni
 7. Kerr Lake mine (waste dump) Ag
 8. Extender Minerals of Canada Ltd. barite
 9. Hedman Mines Ltd. asbestos
 10. Kerr Addison Mines Ltd. Au,Ag
 11. Pamour Porcupine Mines Ltd.-Ross mine . . Au,Cu,Ag
 12. Sutherland, H.Jr.-Bennett vein (hand cobbing) . Au,Ag
 13. Teck Corp. Ltd.-Silverfields mine. Ag,Co
 14. Willroy Mines Ltd.-Macassa mine Au
- ① Mine under development
 1. Agnico-Eagle Mines Ltd.-Beaver-Timiskaming mine Ag,Co,Pb,Cu
- Mine closing in 1977
 1. United Asbestos, Inc.-Midlothian mine asbestos
- ★ Refinery
 1. Canadian Smelting and Refining (1974) Ltd. Ag
- ▲ Properties under evaluation or active exploration
 1. Dome Explor. (Canada) Ltd. Cu,Au
 2. Falconbridge Copper Ltd. (Hearst, McElroy Tps.) Zn Pb
 3. Falconbridge Copper Ltd. (Halliday Tp.) Zn Au
 4. Munro-Croesus gold mine Au
 5. Noranda Explor. Co. Ltd. Cu,Au
 6. Rio Tinto Canadian Explors. Ltd. (Melba Tp.) Cu,Zn
 7. Rio Tinto Canadian Explors. Ltd. (Zavitz Tp.) Cu,Zn
 8. St. Joseph Explors. Ltd. Ag,Zn,Cu
 9. Thunderwood Explors. Ltd.. Au
 10. United Asbestos Inc. asbestos
- MEAP projects (project no. in parentheses)
 1. Agnico-Eagle Mines Ltd. (Silver Div.) (CG-105). Ag
 2. Extender Minerals of Canada Ltd. (CG-116) . . barite
 3. Ferguson, J.D. & Kakish, J. (Fin Resources Inc) (KL-88) Au,Cu
 4. Fournier, A.L. (CG-112). Ag,Cu,Pb
 5. Here Fault Copper Ltd. (KL-85) Cu,Zn
 6. Inco Ltd. (KL-83) Au
 7. Northern Silver Fox Resources Inc. (CG-118) . Ag,Cu

Figure 2

KIRKLAND LAKE RESIDENT GEOLOGIST'S DISTRICT

EXPLANATION

- * Assessment work filed in 1977 (to Dec.9) (keyed to Table 3)
- + Claim staking in 1977 (to Nov.30)
-  Boundary of Resident Geologist's district



level immediately and one additional level if ore continuity were proven by further exploration.

HEDMAN MINES LIMITED

Open pit production, mainly of short fibre asbestos, continued in 1977. Most of the ore was broken during the warm months and trucked to the company mill at Matheson throughout the entire year.

Kirkland Lake Area

WILLROY MINES LIMITED

Macassa Division

In 1977, Willroy Mines Limited acquired ownership of the Tegren Goldfields Limited property adjoining Willroy's Macassa mine. The combined Macassa-Tegren mine increased the number of employees from 280 to about 320; near year end, daily production of gold ore was increased to about 300 tons.

KERR ADDISON MINES LIMITED

Production of gold ore, mainly from flow ore stopes, was phased down to about 1,000 tons per working day by the end of 1977; about 2 years of proven ore reserves remain. No major underground development was undertaken during the year.

THE ADAMS MINE (DOMINION FOUNDRIES AND STEEL LIMITED)

Operational management by Cliffs of Canada Limited continued at both The Adams Mine and the related Sherman Mine near Temagami. The annual production at The Adams Mine exceeded one million tons of iron pellets, which were shipped by rail to the company's steel plants in Hamilton.

GUIDES FOR GOLD EXPLORATION

In the Kirkland Lake district exploration for gold should be directed to areas that have produced large amounts of high grade ore by mining methods as cheap in upper levels as open pit mining. These areas contain known gold occurrences in geological environments, similar to those of the producers, which have not yet been explored by concepts and methods developed in the past year or two.

Rock strata, similar to the host rocks at the Kerr Addison gold mine are currently being systematically explored on part of Queenston Gold Mines Limited property by the Canadian Nickel Company Limited. More than a dozen large areas of similar geological environments in the Matachewan-Kirkland Lake-Larder Lake gold belt have undergone very little exploration since World War II. Historically, exploration has been concentrated on the carbonate rocks of the "Larder Lake-Cadillac Fault" partly because one type of this rock formation is found and recognized easily by its distinctive bright green chromic muscovite. Exploration has been primarily concentrated on the carbonate rocks because they are typically cut by numerous quartz veins in which native gold is readily recognized. However, the standard evaluating procedure of diamond drilling, core splitting and assaying has not proven adequate for evaluating the ore-making potential of carbonate rocks because the gold is distributed erratically in the quartz veins. A better method for evaluating gold-bearing carbonate rocks would be based on an estimation of the free silica content of the carbonate rock (C. Donig, Kerr Addison Mines Limited). Any carbonate rock containing 20 to 50 percent free silica should be bulk sampled and assayed. Much of the gold should be in second and third generations of quartz veins, which can be identified by recognizing the appearance of the veins exhibiting crosscutting features.

A more rewarding diamond drill target is the favourable horizon of intrastratal sulphide-bearing cherty tuff lenses. These are located stratigraphically below the carbonate rocks, rarely more than 30 m. Exploration has heretofore largely neglected this type of host rock in favour of the more readily recognized carbonate rocks with the typically profuse quartz veins. Gold is present particularly in the pyrite. An approximate estimate of gold content can often be made based on the percentage of pyrite in disseminated form, fracture fillings, and interbanded, indistinctly in many places, with the chert. Exceptions are thick massive lenses of almost pure sulphide mineralization which contain low concentrations of gold. These cherty lenses, occupying depressions on the surface of a stratum underlying the carbonate and adjacent altered ultramafic rocks (e.g., talc-chlorite schist) tend to contain rather uniform concentrations of gold, amenable to evaluation of representative tonnages and grades by drill indication. Electromagnetic surveys over sulphide-bearing intrastratal cherty tuff lenses can be useful for accurate drill targeting.

One other prolific host rock for gold ore is found in the Kirkland Lake mines. It consists of brecciated, graphitic cherty tuff. Gold is contained mainly in pyrite which occurs as disseminated grains and fracture-fillings. The ore lenses are found along one or more favourable contacts between syenitic and hematitic trachytic rocks that, in many places, controlled the location of faulting

NORTHERN – KIRKLAND LAKE

(e.g., the Kirkland Lake Main Break). These siliceous ore lenses are not the better-known fracture- and fissure-filling quartz veins with distinct walls (many with chloritic slips). They are more readily detected by geophysical methods because of the presence of graphite, disseminated sulphide minerals, and rock formation contacts. Some of the latter form favourable horizons between trachytic tuffs and flows. Assays of drill core represent fairly accurately the gold content. Exploration territory for this type of gold deposit extends from a few kilometres west of Matachewan to east of Larder Lake, for as much as 10 km north and south of Highway 66, as well as east of Shining Tree, and perhaps in the Matheson-Harker Township area accessible mainly from Highway 101.

PROPERTY EXAMINATIONS

A. Mowat

LAROMA MIDLOTHIAN GOLD OCCURRENCE

Stratigraphy comparable to the Kerr Addison Mines Limited property in the Larder Lake area is present in Midlothian Township, 110 km west of the Kerr Addison mine. This favourable horizon extends southeast along strike, to the vicinity of the north arm of Lloyd Lake. Rock types present are altered ultramafic rocks, carbonate rocks including those containing chromic muscovite, felsic metavolcanics, and "Timiskaming"-type metasediments. Previous work obtained assays to 0.07 ounces gold per ton from drill core and selected samples (Marshall 1947, p.18). A chip sample yielded an assay of 1.34 ounces gold per ton (Bright 1970, p.22).

Exploration here consisted mainly of stripping soil, some rock work (pitting and trenching), diamond drilling and assaying. The work in general, and most of the sampling, was confined to areas of quartz stockworks and veins in the carbonate rock. The work was concentrated around one pit in which blebs of visible gold, the largest 8 mm in diameter, were observed by the writer on a visit in 1964 when the property was undergoing exploration by Laroma Midlothian Mines Limited. The carbonate-chert-felsic tuff zone is about 60 m wide.

Polysuturing is widespread in large areas of the carbonate rock, indicating that some of the carbonate is altered ultramafic rock. However, interbedded within the central gold-rich part of the carbonate rock is conchoidally fracturing chromic muscovite-bearing chert, and felsic cherty tuff having white weathered surfaces. Quartz veins cutting the carbonate rocks, chert and felsic tuff contain sphalerite and pyrite as well as gold. Underlying the ultramafic rock is fine-grained banded tuff with disseminated pyrite, blocky white feldspar

phenocrysts in a chloritic matrix, and quartz veinlets.

HILLCREST GOLD OCCURRENCE

The Hillcrest occurrence is located 5 km northwest of Englehart. No diamond drilling has been recorded for this ground since 1945. The upward stratigraphic succession, i.e., outwards from the Round Lake batholith, as determined from outcrops is: contorted metamorphosed banded mafic tuff with red feldspathic patches, some containing chalcopyrite blebs; dark (amphibolitized) bedded mafic tuff with 15 percent pyrite in some beds or bands; quartz veined coarse, medium and fine grained basalt; green (chromic muscovite) and rusty carbonate rock about 15 m thick at a point near the 14 m deep cribbed shaft west of the north-south side-road; and overlying talc-chlorite schist interbedded with massive chloritic basalt. Narrow feldspar porphyry and lamprophyre dikes cut the strata. The lithology of this property appears to be similar to that of the Kerr Addison gold mine 40 km to the northeast. Better results may be obtained by diamond drill holes collared stratigraphically above the gold-bearing carbonate rock and directed down the section in an effort to intersect possible gold-bearing pyritic horizons about 30 m below the lower contact of the carbonate rock.

Barker Syndicate Gold Occurrence

The claims held by the Barker Syndicate in Yarrow Township include an inlier of Early Precambrian rocks that are obscured along strike east and west of Mistinikon Lake by a covering of Huronian sedimentary rocks. Early Precambrian rock types are dark, foliated chloritic basalt with lenses of a carbonate mineral underlying interbanded green carbonate rock and yellowish grey silicified sericite schist. These underlie interbanded pyrite, schist and chert. Quartz veins bearing pyrite and a little chalcopyrite cut particularly the carbonate rocks and silicified schist. The silicified schist contains 3 to 5 percent disseminated pyrite. Overlying the carbonate and silicified sericite schist is "Timiskaming"-type conglomeratic tuff containing broken fragments of white feldspar, and reddish fragments, including a trachytic porphyry fragment 0.6 m long. Trenching in the carbonate rocks and sericite schist encountered low to moderate gold content, and localized higher grade gold. Several holes were diamond drilled into the interbanded carbonate and sericite schists, which form a zone more than 60 m wide. Only one hole was drilled south i.e., down the stratigraphic section from the gold-bearing carbonate rock zone into the horizon that would be equivalent to the Kerr Addison "flow ore" rock type, if present on this property.

Sawka-Allard Gold Occurrence

The Sawka-Allard occurrence is located 30 km southwest of the Kerr Addison gold mine. Diamond drilling by W. Sawka and C. Allard in 1957 totalled 324 m in six holes. Beginning with the lower strata in contact with Round Lake batholith granitic rocks, the section here is as follows: mafic banded tuff, with disseminated pyrite in places; sulphide-bearing cherty "iron formation" lenses; carbonate rock (some with chromic muscovite) cut by quartz veins bearing chalcopyrite and gold and intercalated with talc-chlorite schist; massive basalt with a few grains of serpentine; contorted chloritic carbonate schist; and a flow or sill, of magnesian basalt composition, that is a hundred metres or more thick.

The drill holes were spotted to intersect the gold-bearing quartz veined carbonate stratum in a direction towards the overlying stratum. Any new program should diamond drill angle holes from the favourable carbonate stratum through the underlying lenses of sulphide-bearing cherty "iron formation" that may be comparable to the Kerr Addison mine "flow ore" i.e., intrastatal pyritic cherty tuff or "sulphide iron formation".

D. Lowe

MITCHELL-HEARST GOLD OCCURRENCE

This property is located 13 km from the Kerr Addison mine, south of Larder Lake village. The most recent exploration, other than the bulldozer stripping and rock trenching of the past two years, was the diamond drilling of seven holes (617 m) by Mitchell-Hearst Gold Mines Limited across the carbonate zone in 1944. The stratigraphic section discernible from outcrops is (from bottom to top): massive "greenstone", carbonatized chloritic rock, grey carbonate rock, green carbonate rock, thin bedded tuff, grey carbonate rock, greywacke, talc-chlorite schist (altered ultramafic flow with spinifex), felsic rock with pyrite (massive lower and schistose upper part), carbonaceous (graphitic) schist, green carbonate rock (altered ultramafic flow with polysuturing and spinifex), and green carbonate rock (altered ultramafic flow base). Present also is an intrusive porphyry with a grey matrix and white feldspar phenocrysts. Exploration to date has been directed mainly to the carbonate rocks and quartz carbonate veins which contain visible gold, pyrite and galena. Future diamond drilling should be directed to intersect possible sulphide-rich strata below the carbonate horizons.

Swansea Gold Mines Incorporated

Mining claims owned by Swansea Gold Mines Incorporated

are located 10 km west, approximately along strike, from the Kerr Addison mine. Six holes, totalling 779 m, were diamond drilled in 1976. Hole No.6, 153 m in length, encountered the following interbedded strata: mafic banded tuff, polysutured ultramafic rock, carbonatized and carbonate-veined ultramafic rock, green (fuchsite) carbonate rock, laminated greywacke, talc-chlorite schist, black graphitic nodular to massive colloform pyrite-bearing finely laminated mudstone, banded sericitic cherty tuff with fuchsite and 3 percent fine-grained disseminated pyrite. Ultramafic dikes are also present.

The banded sericitic cherty tuff containing fine-grained disseminated pyrite may be a favourable horizon for possible Kerr Addison-type "flow ore". Experience elsewhere in the Kirkland-Larder Lakes area shows that this favourable horizon can be repeated because of similar environments recurring in the stratigraphic section, or because of folding. Geophysical surveys that discriminate between disseminated sulphide mineralization in a series of strata-bound cherty tuff lenses and almost massive pyrite-bearing graphitic tuffaceous mudstone might point to worthwhile drill targets.

Pamour Porcupine Mines Limited

ROSS MINE

The Ross mine is located in the southeast corner of Hislop Township, in the north half of concession II, lot 1. Bedrock is poorly exposed throughout most of the township but the geology has been interpreted by V.K. Prest (1956). Underground mapping and diamond drill records show Prest's interpretation to be basically correct. The mine area is underlain by massive and pillowed intermediate to mafic flows, flow top breccia and tuff; intermediate to felsic porphyritic flows and crystal tuff; and volcanogenic bedded metasediments and conglomerates. These units are intruded by pale green to pink "lamprophyre" dikes ("Peter Price" dikes in mine terminology) and by black rhyolitic dikes. Age relationships are difficult to determine because of the lack of reliable top determinations and complex structure.

Extensive alteration and faulting inhibit the lateral tracing of units. The rocks have been variably carbonatized, anhydritized, syenitized, hematized, albitized and silicified. This degree of alteration results in selective or complete "bleaching" and textural overprinting, thus masking the original colour and texture.

Faults, slips, fractures and shear zones abound within the underground workings. Several north-trending faults are evident, especially in the upper levels of the mine; however, their relationships to ore control are unclear. Northwest-trending faults and shear zones parallel the

dominant trend of the stratigraphy and folding in the township.

The distribution of rock units within the workings indicates that the rocks have been isoclinally folded in the immediate mine area. These folds appear to open towards the surface, and become more compressed with depth. Mafic rocks, compressed by folding, fracture brittly in many directions resulting in "plymouth rock" texture; the more felsic rocks tend to shear.

At the Ross mine, folding appears to be the major control for many of the ore zones. These zones are pipe-like in form and in many cases follow the stratigraphy in the noses of folds. Mining is currently carried out in these continuous pipe-like bodies; in the past, massive carbonate-quartz veins have also been mined, mainly in the upper levels. Chalcopyrite, pyrite, sphalerite, bornite and tennantite are the dominant economic minerals in the pipe-like zones and pyrite, sphalerite, tennantite, proustite, pearceite, galena, native gold, and electrum constitute the major ore mineral assemblage for the carbonate zones. Milling is done at the Pamour Porcupine Mines Limited mill in Timmins where gold, copper and silver are recovered.

GEOLOGICAL BRANCH ACTIVITIES

Work by D.R. Pyke progressed on the regional stratigraphy and structure of the Timmins-Kirkland Lake area, and the Sinclair Lake area.

Synoptic mapping of the Kirkland Lake-Larder Lake areas by L.S. Jensen continued during 1977, with emphasis on field tour stops for the combined Geological Association of Canada—Mineralogical Association of Canada—Geological Society of America tour scheduled for the fall of 1978.

In connection with his work on iron deposits of Ontario, H.D. Meyn spent time examining the area of the Adams iron mine of Dominion Foundries and Steel Limited near Kirkland Lake.

Field work for a study of the Quaternary geology of the New Liskeard area was completed by J.D. Morton and R.F.C. King of Morton Dodds and Partners Limited.

The engineering evaluation of terrain in northern Ontario, covering the entire Kirkland Lake Resident Geologist's area and beyond, was begun by Lee Geo-Indicators Limited, Geo-Analysis Limited, and J.D. Mollard and Associates Limited.

RESEARCH BY OTHER AGENCIES

Laurentian University

D. Gamble: Trace elements in the quartz veins, and effects of wallrock alteration (major elements) in the Macassa gold-silver mine at Kirkland Lake.

McMaster University

R.S. Hyde: Timiskaming Group sedimentary rocks of the Kirkland Lake-Larder Lake area.

L. Tihor: Gold distribution in the Kirkland Lake-Larder Lake area, with emphasis on Kerr Addison-type ore deposits.

Queen's University

D. Wright: Ore-making faults and rolls in Macassa-Tegren gold-silver mine, Kirkland Lake.

University of Saskatchewan

L.S. Jensen: Archean rocks of the area from Lake Abitibi to Kirkland Lake.

University of Toronto

A. Hartlein: The Silverfields mine at Cobalt.

M. Jackson: Mafic volcanic rocks of Lava Flow Mountain, Ramore area.

I. Smith: The Kinojevis Group tholeiite-Blake River Group calc-alkaline contact near Ramore.

REFERENCES AND PUBLICATIONS

Akande, S.O.

1977: A Comparison and Genesis of Three Vein Systems of the Ross mine, Hislop Township, Ontario; Unpublished M.Sc. thesis, Univ. of Western Ontario, 183p.

Arndt, N.T.

1977: Thick Layered Peridotite-Gabbro Lava Flows in Munro Township, Ontario; Canadian J. Earth Sci., Vol.14, p.2620-2637.

Arndt, N.T., Naldrett, A.J. and Pyke, D.R.

1977: Komatiitic and Iron-Rich Tholeiitic Lavas of Munro Township, Northeast Ontario; J. Petrology, Vol.18, p.319-369.

Arth, J.G., Arndt, N.T. and Naldrett, A.J.

1977: Genesis of Archean Komatiites from Munro Township, Ontario: Trace Element Evidence; Geology, Vol.5, p.590-594.

Blackadar, R.G.

1977: Report of Activities; Geol. Surv. Canada, Paper 77-1A, 525p.

Bright, E.G.

1970: Geology of Halliday and Midlothian Townships; Ontario Dept. Mines, GR 79, 33p. Accompanied by Map 2187, scale 1 inch to ½ mile.

Gibb, R.A., and Thomas, M.D.

1976: Gravity Signature of Fossil Plate Boundaries in the Canadian Shield; Nature, Vol.262, p.199-200.

Hodgson, C. Jay and Lydon, J.W.

1977: Geological Setting of Volcanogenic Massive Sulphide Deposits and Active Hydrothermal Systems: Some Implications for Exploration; CIMM Bulletin, Oct. 1977, p.95-106.

Hyde, R.S., and Walker, R.G.

1977: Sedimentary Environments of the Archean Greenstone Belt in the Kirkland Lake Area; p.185-189 in Report of Activities, Geol. Surv. Canada, Paper 77-1A.

Irving, E., and Naldrett, A.J.
 1977: Paleomagnetism in Abitibi Greenstone Belt and Abitibi and Matachewan Diabase dikes: Evidence of the Archean Geomagnetic Field; *J. Geology*, Vol.85, p.157-176.

Large, R.R.
 1977: Chemical Evolution and Zonation of Massive Sulphide Deposits in Volcanic Terrains; *Economic Geology*, Vol.72, p.549-572.

Marshall, H.I.
 1947: Geology of Midlothian Township; Ontario Dept. Mines, Vol.56, pt.5, 24p. Accompanied by Map 1947-4, scale 1 inch to 1,000 feet.

Nagy, B. *et al.*
 1977: Indications of a Biological and Biochemical Evolutionary Trend during the Archean and Early Proterozoic; *Precambrian Research*, Vol.5, p.109-120.

Prest, V.K.
 1956: Geology of Hislop Township; Ontario Dept. Mines, Vol.65, part 5, 51p. (published 1957). Accompanied by Map 1955-5, scale 1 inch to 1,000 feet.

Rock, N.M.S.
 1976: The role of CO₂ in Alkali Rock Genesis; *Geological Magazine*, Vol.113, No.2, p.97-113.

Roy, J.L., and Lapointe, P.L.
 1976: The Paleomagnetism of Huronian Red Beds and Nipissing Diabase: Post-Huronian Igneous Events and Apparent Polar Path for the Interval -2300 to -1500 Ma for Laurentia; *Canadian J. Earth Sci.*, Vol.13, p.749-773.

Strong, D.F. (ed.)
 1977: Metallogeny and Plate Tectonics; *Geol. Assoc. Canada, Special Paper 14*, 660p.

Vuagnat, M.
 1977: Pillow Lava Flow: Isolated Sacks or Connected Lava Tubes?; *Bulletin Volcanologique*, p.581-589.

Webb, P.K., and Weaver, S.D.
 1977: Trachyte Shield Volcanoes: a New Volcanic Form from South Turkana, Kenya; *Bulletin Volcanologique*, Vol. 39, No.2, p.294-312.

ONTARIO GEOLOGICAL SURVEY STUDY
 Study 19

MISCELLANEOUS PAPERS

- MP 48
- MP 69
- MP 71
- MP 73
- MP 74
- MP 75

OPEN FILE REPORTS

- OFR 5226
- OFR 5230
- OFR 5231
- OFR 5232

MISCELLANEOUS PUBLICATION

Statistical Report on the Mineral Industry of Ontario

MINERAL POLICY BACKGROUND PAPER

MPBP 3

MINERAL DEPOSITS CIRCULAR

MDC 15

COLOURED MAPS

- 2205
- 2359
- 2361
- 2365
- 2367
- 2368

PRELIMINARY MAPS

- P. 874
- P. 1062 (1977 Rev.)
- P. 1217
- P. 1218
- P. 1219
- P. 1220-1225 (incl.)
- P. 1228
- P. 1234
- P. 1246
- P. 1249
- P. 1517

TABLE 2 | MAPS AND REPORTS PERTAINING TO THE KIRKLAND LAKE REGION, ISSUED BY THE GEOLOGICAL BRANCH OF THE ONTARIO MINISTRY OF NATURAL RESOURCES IN 1977. SEE "LIST OF PUBLICATIONS" (BACK POCKET) FOR DETAILS.

GEOSCIENCE REPORTS

- GR 146
- GR 152

GEOSCIENCE STUDY

GS 16

NORTHERN – KIRKLAND LAKE

TABLE 3 Assessment work and other information received in 1977.

Kirkland Lake Resident Geologist's District							
Abbreviations				Commodities			
A	- assay values	Mag (2)	- magnetometer (number of areas covered by survey)	Ag	- silver		
AEM	- airborne EM	MEAP	- Mineral Exploration Assistance Program	asb	- asbestos		
AM	- airborne Mag	OSC	- Ontario Securities Commission	Au	- gold		
ARa	- airborne radiometric	Ov DH	- overburden drill hole	Co	- cobalt		
Asses.	- assessment work	Pros.	- prospectus	Cu	- copper		
C	- correspondence	R	- resistivity	Mo	- molybdenum		
DDH (2)	- diamond drill hole (number of holes)	rTr	- rock trenching	Ni	- nickel		
DH (perc.)	- percussion drill holes	sTr	- soil trenching or stripping	Pb	- lead		
EM (2)	- electromagnetic (number of areas covered by survey)	u/g	- underground work	U	- uranium		
Gc	- geochemical	VEM	- vertical loop EM	Zn	- zinc		
GL	- geological	VLF-EM	- very low frequency EM				
HEM	- horizontal loop EM	XN	- section (drill hole)				
IP	- induced polarization						

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work	Year	Toronto File No.
Abbotsford, Case, Newman, Singer, Tomlinson	32-E-4	Dome Exploration (Canada) Ltd.		Asses	Mag (3), HEM (3), DDH (21)	1976-77	2.2101 2.2102
Abbotsford	32-E-4	Geophysical Engineering Ltd.		Asses.	DDH (1), VLF-EM	1977	
Adair	32-E-4	Geophysical Engineering Ltd.			see under Abbotsford Tp.		
Alma	42-A-2	Sheedy, Robert		Asses. MEAP CG115	rTr sTr, VHEM	1977 1977	
Argyle	42-A-2	Sunisloe, George		Asses.	sTr	1977	
Arnold	31-M-4	Gunsinger, M. and Mathias, I. (also see Van Dola, Harry)		Asses.	sTr	1976	
Arnold	32-D-4, 5	James, Allen B. & James, Donald		Asses.	rTr, sTr	1976 1977	
Arnold	32-D-4	Walsh, Michael H.		Asses	sTr	1977	
Asquith	41-P-11	Saville, Albert	Ag	Asses	sTr, rTr	1976 1977	
Asquith	41-P-11	Kayak Explorations Ltd.	Cu, Au	Asses.	DDH (10)	1976	
Asquith	41-P-11	McBride, William W.		Asses.	sTr	1977	
Baden	42-A-2	Hames, C. M.	Au, Cu	Asses.	DDH (1)	1976	
Bernhardt, Morrisette	42-A-8	Cooper, Wilfred		Asses.	sTr, rTr	1976, 1977	
Bernhardt, Morrisette	42-A-1	Geological Exploration Services Reg'd. (see also Cooper, W.)		Asses.	VLF-EM, A, GL	1976	2.2206
Bernhardt, Morrisette	42-A-1	Haas-Warner Mining Limited (see also Deloye, Ernest, C.; Kirana Kirkland Gold)		Asses.	rTr	1976, 1977	
Bisley	32-D-5	Rio Tinto Canadian Exploration Ltd.		Asses.	DDH (1)	1976	
Bisley	32-D-5	McVittie et al Syndicate Group "B"		Asses.	Mag, VLF-EM, CM	1976	
Bisley	32-D-5	Rio Tinto Canadian Exploration Ltd.		Asses.	DDH (4), A	1977	
Black	42-A-8	Boland, C. L.		Asses.	sTr	1977	
Blakelock	42-H-8	Geophysical Engineering Ltd.		Asses.	DDH (2), EM, VLF-EM (2)	1976	
Blakelock	42-H-8, 9	Noranda Exploration Co. Ltd.		Asses.	DDH, XN	1977	
Blakelock	42-H-9	Hudson Bay Exploration & Development Co. Ltd. "Group D"		Asses.	HEM	1977	2.2406

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work	Year	Toronto File No.
Blakelock	42-H-9	Hudson Bay Exploration & Development Co. Ltd. "Group E"		Asses.	HEM	1977	2.2406
Blakelock	42-H-9	Hudson Bay Exploration & Development Co. Ltd. "Group G"		Asses.	HEM	1977	2.2395
Blakelock, Tweed	42-H-8	Hudson Bay Exploration & Development Co. Ltd. "Group H"		Asses.	HEM	1977	2.2395
Bond	42-A-9,10	Ingamar Exploration Co. Ltd.			see under Currie Tp.		
Bowman	42-A-7, 8, 9, 10	Foster, Walter		Asses.	DDH (4)	1977	
Bowman	42-A-7,8, 9,10	Ingamar Exploration Co. Ltd.			see under Currie Tp.		
Bradette	32-E-5, 12	Noranda Exploration Co. Ltd.		Asses.	DDH (1), XN	1977	
Bradette, St. Laurent	32-E-5	Falconbridge Nickel Mines Ltd.		Asses.	HEM (2), Mag (2)	1977	2.2320
Bragg	42-H-8	Hudson Bay Exploration & Development Co. Ltd. "Group K"			HEM	1977	2.2394
Bryce	41-P-9	Nielsen, Julius	Au	Asses.	VLF-EM, rTr	1975, 1976	2.1964
Bucke	31-M-5	Saint Joseph Exploration Ltd. "Sas Lake group"			see under Coleman Tp		
Burrows	41-P-14	Hollinger Mines Ltd.	Cu, Au		DDH	1975	
Burrows	41-P-14	Hanna Mining Company, The (Shining Tree project)			see under Cabot Tp.		
Cabot	41-P-11, 14	Hanna Mining Company, The (Shining Tree project)	Cu, Ag	Asses.	DDH, GL (2), Mag (2), HEM (2)	1976	
Cairo	41-P-15	Texasgulf Canada Ltd.	Cu, Zn	Asses.	Mag, HEM, DDH (2)	1976	
Cairo	41-P-15	Welsh, George S.		Asses.	rTr, sTr	1976, 1977	
Cairo	41-P-15	Sheedy, Robert			rTr	1976	
Cairo	41-P-15	Majestic-Wiley Contractors Ltd.	Au, Cu, Mo	Asses.	GL	1976	2.2230
Case	32-E-4	Dome Exploration (Canada) Ltd.			see under Abbotsford Tp.		
Catharine, Skead, Hearst, McElroy, Rattray, McFadden	31-M-13 32-D-4	MacGregor, R. A. (Selco Mining Corp. Ltd. option; Rattray Group & Groups A1 - F1)		Asses.	Gc, AM, Mag (2), VLF-EM (2)	1976 1977	
Catharine	31-M-13	Armstrong, Roy		Asses.	sTr	1976	
Charters, Donovan, Leith	41-P-7, 10	Shartner, Gustave (Grouse Syndicate)		Asses.	sTr	1977	
Cleaver	42-A-2, 3	Rousseau, R.		Asses.	rTr	1976	
Cleaver	42-A-2, 3	Amex Exploration, Inc.		Asses.	Mag	1977	2.2343
Clifford	32-D-5	Noranda Exploration Co. Ltd.		Asses.	Mag (2)	1977	2.2385
Coleman	31-M-5	Consolidated Summit Mines Ltd. (see also Silver Summit Mines Ltd.; Savage; Ausic; Silverfields; Mensilvo)		O.S.C.	pros.	1976	
Coleman, Lorrain	31-M-5	Silmi Explorations Inc. (see also Silver Miller Mines Ltd.)		O.S.C.	pros.	1976	
Coleman	31-M-5	Agnico-Eagle Mines Ltd. (Silver Division)		MEAP CG105	UG DDH (81), A	1976	
Coleman	31-M-5	Burton, Douglas "Green Lake"	Cu, Ag, Pb, Zn	Asses.	DDH, XN	1976	
Coleman	31-M-5	Saint Joseph Explorations Ltd. "Sas Lake group"	Cu, Zn, Ag	Asses.	DDH (4), XN, Mag (2), HEM (5)	1976	2.2146
Coleman	31-M-5	The Ophir Mines Development Co. of Ontario, Ltd. (see also Mayfair; Adams, William M.; also McAllister, R. C.)	Ag, Co	Asses.	DDH, XN	1977	
Connaught	41-P-11	Texasgulf Canada Ltd.	Cu	Asses.	Mag(6), VLF-EM, HEM (4)	1976, 1977	2.2234, 2.2289, 2.2379
Cook	42-A-8	Mid-North Engineering Services Ltd.		Asses.	DDH (2), A	1977	
Coulson	42-A-9	Kennedy, William		Asses.	rTr	1976	
Currie, Bowman, Hislop, Sheraton, Bond	42-A-7, 8, 9, 10	Ingamar Exploration Co. Ltd.	U	Asses.	ARa	1977	2.2327

NORTHERN – KIRKLAND LAKE

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work	Year	Toronto File No.
Donovan	41-P-7	Shartner, Gustave (Grouse Syndicate)			see under Charters Tp.		
Dufferin	41-P-7	Fournier, A. L.	Ag, Cu, Pb, Co	MEAP CG112 MEAP CG116	sTr	1976 1977	
Edwards	42-A-15	Great Bear Silver Mines Ltd.		O.S.C.	Prosp.	1976	
	42-A-15	International Nickel Co. of Canada Ltd., The	Cu, Zn	donation	DDH (3)	1963	
English, Halliday, Mincks, Mutt, Montrose, Semple, Sothman, Zavitz	41-P-14	Granges Exploration Canada AB	Cu, Zn	Asses.	DDH (1), XN	1977	
Farr	41-P-16	Bell, Thomas			rTr	1977	
Gauthier	32-D-4	Mayfair Mines Ltd.	Au	Asses.	DDH (4), A, Mag, GL	1976	2.2166
Gauthier	32-D-4	Labine, Maurice			sTr	1976	
Gauthier	32-D-4	McCullough, Edward William	Au	Asses.	rTr, sTr	1976	
Gauthier	32-D-4	Sciminex Ltd. (see also Anatole Resources Ltd.)			see under Harker Tp.		
Gauthier	32-D-4	Rosen, A. E.	Au, Cu	donation	GL	1960	
Gauthier	32-D-4	Fraser, Donald R.		Asses.	rTr	1977	
Gauthier	32-D-4	Haas-Warner Mining Ltd.		Asses.	DDH (1)	1977	
Gauthier	32-D-4	Cassan Mining Limited (Roberts, G. L.)	Au	Asses.	Mag, VLF-EM	1977	2.2298
Gauthier	32-D-4	Queenston Gold Mines, Ltd. (see also International Nickel Co. of Canada Ltd., The)		donation	report	1977	
Gauthier, Lebel	32-D-4	International Nickel Company of Canada Ltd., The "Canico, Munro claims" (see also Queenston & Upper Canada Mines)	Au	Asses.	Rotary DH (69); Mag (15); IP; A; GL (14)	1976 1977	2.2309 2.2271
Gauthier, Hearst, McElroy	32-D-4	Friedrich, Karl U.		Asses.	sTr	1977	
Gillies Limit	31-M-5	Teck Corporation Ltd. "Silverfields Division"; "West Group "Scheak-Bradley opt"; "August Johnson opt" (Keevil Mining Group) "Montreal River claims"	Ag	Asses	Gc (7)	1976	2.2113
Gillies Limit	31-M-5	Zuzack, John	Cu		GL	1973	
Gillies Limit	31-M-5	Home, K. P.		Asses.	sTr	1977	
Guibord	42-A-9	Hollinger Mines Ltd. "Group #4"	Au	Asses.	GL, EM	1976	2.2138
Guibord, Munro	42-A-9	Blake, Fred		Asses.	Mag	1976	
Halliday	11-P-14	Granges Exploration Canada AB			see under English Tp.		
Halliday, Sothman	41-S-14	Allerston, Ralph E.	Cu, Zn	Asses.	DDH (4)		
Harker, Gauthier, Lebel, McGarry, Teck, McVittie	32-D-12	Sciminex Limited (see also Anatole Resources Ltd.)			GL	1973	
Harker, Lamplugh	32-D-12	Canadian Johns-Manville Co. Ltd. "Ghost Mountain"	Asb	Asses.	DDH (3), XN	1976	
Hearst	32-D-12	Chorzepa, Emil (see also Mitchell- Hearst Gold Mines Ltd.)		Asses.	Mag	1976	2.2167
Hearst	32-D-12	Lowe, D.	Cu, Ag	Asses.	sTr, rTr	1976	
Hearst, McFadden, McGarry, McVittie	32-D-4	Geophysical Engineering Ltd.			AM (2), AEM (2)	1976	
Hearst	32-D-4	MacGregor, R. A. (Selco Mining Corp., Ltd. option; Ratray Group & Groups A1 - F1)			see under Catharine Tp.		
Hearst	32-D-4	Falconbridge Copper Ltd.	Zn	Asses.	DDH (1); sTr	1977	
Hearst	32-D-4	Kozdas, Anton			sTr	1977	
Hearst	32-D-4	Friedrich, Karl U.			see under Gauthier Tp.		

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work	Year	Toronto File No.
Hincks, Hutt, Zavitz	41-P-14 42-A-3	Rio Tinto Canadian Exploration Ltd. (see also Pan-Ore Gold Mines Ltd.)	Cu, Zn	Asses.	DDH (8)	1976	
Hincks	42-A-3	Granges Exploration Canada AB			see under English Tp.		
Hincks	42-A-3	Sunisloe, George		Asses.	sTr	1977	
Hislop	42-A-8, 9	Dalhousie Oil Co. Ltd.		Asses.	CEM, Mag (2)	1976	2.2218
Hislop	42-A-8	Ingamar Exploration Co. Ltd.			see under Currie Tp.		
Hoblitzell	32-E-5	Geophysical Engineering Ltd.	Cu, Zn, Ag	Asses.	DDH, EM, VLF	1976	
Hutt	41-P-14	Rio Tinto Canadian Exploration Ltd. (see also Pan-Ore Gold Mines Ltd.)			see under Hincks Tp.		
Hutt	41-P-14	Granges Exploration Canada AB			see under English Tp.		
Hutt	41-P-14	International Nickel Co. of Canada Ltd., The			see under Montrose Tp.		
James	41-P-9	Fournier, A. L.		Asses.	sTr	1974 1975 1976	
James, Smyth, Truax, Tudhope	41-P-9 41-P-16	Corridor Mines Ltd. (NRG Resources Inc.) "King, H.; Welsh, G. S. claims"		Asses.	sTr	1976	
Katrine, Ossian	32-D-4	Walsh-Katrine Gold Mines Ltd. (Wadge Mines; Baghdad Gold Mines Ltd.; Mid-North Engineering Co.)	Au	donation	C, DDH, A, XN, misc. plans	1921-1934	
Kelvin	41-P-11, 14	Hudson Bay Oil & Gas Mining Co. (HBOG Mining Ltd.)		Asses.	DDH (5)	1975	
Kenning, Tomlinson	42-H-8	Noranda Exploration Co. Ltd.	Cu, Zn	Asses.	DDH (5), XN	1975 1977	
Kenning	32-E-5	Hudson Bay Exploration & Development Co. Ltd. "Group P"		Asses.	HEM	1977	2.2407
Kenning	32-E-5	Hudson Bay Exploration & Development Co. Ltd. "Group R"		Asses.	HEM	1977	2.2396
Knight	42-P-11	Getty Mines, Ltd. "Arthur Lake"			see under Natal Tp.		
Lamplugh	32-D-12	Canadian Johns-Manville Co. Ltd. "Ghost Mountain"			see under Harker Tp.		
Lawson	41-P-10	MacGregor, Robert A.	Co, Ag	Asses.	Gc, VLF-EM, Mag (4)		
Lebel	32-D-4	Sciminex Ltd. (see also Anatole Resources Ltd.)			see under Harker Tp.		
Lebel	32-D-4	Morgan, Charles R.		Asses.	sTr, rTr	1976	
Lebel	32-D-4	Labine, M. J.; Duranseau, Y. (see also Dane Copper Mines Ltd.; Nucleonic Mines Ltd.; Gray, J. J.)		Asses.	rTr, sTr	1975	
Lebel, Gauthier	32-D-4	International Nickel Co. of Canada Ltd., The (see also Queenston Gold Mines Ltd., & Upper Canada Resources Ltd.)	Au	MEAP KL83	OV DH (25), XN, A, G, Mag, IP	1976 1977	
Lebel, Morrisette	42-A-2	Chorzepa, Emil	Au	Asses.	DDH (5), rTr, A	1976 1977	
Lebel	32-D-4	Tamminen, Toivo J.		Asses.	rTr	1977	
Lebel	32-D-4	Haas-Warner Mining Ltd. (Mud Lake property)		Asses.	DDH (1)	1977	
Leith	41-P-10	Shartner, Gustave			see under Charters Tp.		
Leonard	41-P-10, 11	McGill, Kenneth E.		Asses.	sTr	1976	
Leonard	41-P-10, 11	Waddington, G. E.		Asses.	GL	1975	
Lorrain	31-M-5	Silmil Explorations Inc. (see also Silver Miller Mines Ltd.)			see under Coleman Tp.		
Lorrain	31-M-5	McCullough, Edward William & Brown, Ted	Ag	Asses.	sTr	1977	
Lorrain	31-M-5	McAllister, R. C.	Cu	Asses.	DDH (1); XN, sTr	1977	
McElroy	32-D-5	Croxall, James E.		Asses.	VLF-EM (2)	1976	
McElroy	32-D-5	MacGregor, R. A. (Selco Mining Corp. Ltd. option; Rattray Group & Groups A1 - F1)			see under Catharine Tp		

NORTHERN – KIRKLAND LAKE

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work	Year	Toronto File No.
McElroy	32-D-5	Yost, C. A. (see also Utah Larder Gold Mines Ltd.)		Asses.	rTr	1977	
McElroy	32-D-5	Friedrich, Karl U.			see under Gauthier Tp.		
McFadden	32-D-4	Geophysical Engineering Ltd.			see under Hearst Tp.		
McFadden	32-D-4	MacGregor, R. A. (Selco Mining Corp. Ltd. option; Rattray Group & Groups A1 - F1)			see Catharine Tp.		
Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work	Year	Toronto File No.
McGarry	32-D-4	Sciminex Ltd. (see also Anatole Resources Ltd.)			see under Harker Tp.		
McGarry	32-D-4	Geophysical Engineering Ltd.			see under Hearst Tp.		
McGarry	32-D-4	Kerr Addison Mines Ltd.	Au		GL	1977	
McGarry	32-D-4	Walker, James	Au	Asses.	DDH (1)	1977	
MacMurchy	41-P-11	Getty Mining Northeast Ltd. "Sulphide Creek Group"	Cu, Zn	Asses.	DDH (1)	1976	
MacMurchy	41-P-11	Decker, Albert		Asses.	sTr, rTr	1975	
MacMurchy	41-P-11	Brunet, C. W.		Asses.	rTr	1977	
McVittie	32-D-4	Sciminex Ltd. (see also Anatole Resources Ltd.)			see under Harker Tp.		
McVittie	32-D-4	Geophysical Engineering Ltd.			see under Hearst Tp.		
McVittie	32-D-4	Bustraen, Michel	Zn	Asses.	DDH (1), rTr	1976 1977	
McVittie	32-D-4	Clark, Alexander H.		Asses.	rTr	1976	
McVittie	32-D-4	Bustraen, Remi		Asses.	sTr	1977	
Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work	Year	Toronto File No.
Melba	42-A-8	Héré Fault Copper Ltd. "Sullivan, T.; Tamminen, T. V.; Tagliamonte, F. P.; Mathias, Alex"	Cu, Zn	MEAP KL85	DDH (4), XN, A, EM, Mag (3)	1977	
Melba	42-A-8	Melba Gold Mines Ltd. "Kittilson-Hurd claims" (Pitchvein Mines Ltd.)	Cu, Zn	Asses.	HEM (2); Mag	1977	2.2335
Mickle	41-P-9	Welsh Silver Mines Ltd. (see also Sheedy, Robert)		Asses.	sTr, rTr	1976	
Mickle	41-P-9	Sheedy, Robert (see Welsh Silver Mines)		Asses.	rTr, sTr	1976	
Midlothian	41-P-14	Granges Exploration Canada AB		Asses.	OV DDH (1)	1977	
Mond	41-P-14	Granges Exploration Canada AB		Asses.	DDH (1), XN	1977	
Montrose	41-P-14	Granges Exploration Canada AB			see under English Tp.		
Montrose, Hutt	41-P-14	International Nickel Co. of Canada Ltd., The		Asses.	DDH	1976	
Morrisette	32-D-4	Chorzepa, Emil			see under Lebel Tp.		
Morrisette	32-D-4	Tamminen, Toivo		Asses.	rTr	1976	
Morrisette	32-D-4	Geological Exploration Services Reg'd. (see also Cooper, W.)			see under Lebel Tp.		
Munro	42-A-9	Blake, Fred			see under Guibord Tp.		
Munro	42-A-9	Noranda Exploration Co. Ltd.		Asses.	Mag	1977	2.2384
Natal, Knight	41-P-11	Getty Mines, Ltd. "Arthur Lake Group"	Cu, Zn, Pb	Asses.	GL, DDH (1)	1976	
Newman	42-H-8	Dome Exploration (Canada) Ltd.			see under Abbotsford Tp.		
Newman	42-H-8	Noranda Exploration Co. Ltd. "Group 1-73, 2-73"		Asses.	DDH (1), XN	1977	
Newman	42-H-8	Hudson Bay Exploration & Development Co. Ltd. "Group K"			see under Bragg Tp.		
Nicol	41-P-10	Hammill, Patrick		Asses.	rTr, sTr	1976 1977	
North Williams	41-P-6	Extender Minerals of Canada Ltd.	Barite	MEAP CG116	DDH (6), A, sTr, rTr	1977	

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work	Year	Toronto File No.
Noseworthy	32-E-12	Geophysical Engineering Ltd.	Cu, Zn	Asses.	DDH (3), EM	1976	
Ossian	32-D-4	Walsh-Katrine Gold Mines Ltd. (Wadge Mines; Baghdad Gold Mines Ltd.; Mid-North Engineering Co.)			see under Katrine Tp.		
Ossian	32-D-4	Minedel Mines Ltd. (see also Ossian Gold Mines Ltd.)	Cu, Zn, Pb, Au	Asses.	HEM, Mag	1977	2.2326
Otto	42-A-1	Noranda Exploration Co. Ltd.		Asses.	Mag, VEM	1976	2.2189
Otto	42-A-1	Upper Kirkland Mines Ltd. (subsidiary of Upper Canada Mines Ltd.; see Kirkland Gateway Gold Mines Ltd.)			see under Teck Tp.		
Pacaud	31-M-13	Laskowski, Hans	Au	Asses.	DDH (2)	1977	
Playfair	42-A-8	Ferguson, John D. & Kakish, J. "K & F property" (FIN Resources Inc.)	Au, Cu	MEAP KL88	Mag	1977	
Pontiac	32-D-5	Noranda Exploration Co. Ltd.		Asses.	GL	1976	
Powell	41-P-15	Selco Mining Corporation Ltd. "Jones-Magiener property"		Asses.	Mag, EM	1976	2.2163
Powell	41-P-15	Thomas Skimming & Associates Ltd.			research reports (2)	1977	
Powell	41-P-15	Sheedy, Robert		Asses.	rTr	1976	
Powell	41-P-15	Welsh, George Stanley (Majestic Construction Ltd. option)		Asses.	rTr	1977	
Powell	41-P-15	Gemex Minerals Inc.		Asses.	Pros.	1976	
Powell	41-P-15	King, Henry		Asses.	DDH (5), A	1977	
Rattray	31-M-13	MacGregor, R. A. (Selco Mining Corp. Ltd. option; Rattray Group & Groups A1 - F1)			see under Catharine Tp.		
Semple	41-P-14	Noranda Exploration Co. Ltd. (Groups 2-75, 3-75, 4-75)		Asses.	Mag, EM	1976	2.2143
		Granges Exploration Canada AB			see under English Tp.		
Singer	32-E-4	Dome Exploration (Canada) Ltd.			see under Abbotsford Tp.		
Skead	31-M-13	MacGregor, R. A. (Selco Mining Corp. Ltd. option)			see under Catharine Tp.		
Skead	31-M-13	MacGregor, R. A. "Lincoln Nipissing Project"	Cu, Zn, Au	Asses.	Gc (12)	1977	
Smyth	41-P-16	Corridor Mines Ltd. (NRG Resources Inc.) "King, H.; Welsh, G. S. claims"			see under James Tp.		
Sothman	41-P-14	Granges Exploration Canada AB			see under English Tp.		
Sothman	41-P-14	Allerston, Ralph E.			see under Halliday Tp.		
Steele	32-E-4	Dex Ltd.		Asses.	rTr	1976	
St. Laurent, Bradette	32-E-5	Falconbridge Nickel Mines Ltd.			see under Bradette Tp.		
Taylor	42-A-10	Turney, Walter		Asses.	GR	1969	
Teck	42-A-1	Sciminex Ltd. (see also Anatole Resources Ltd.)			see under Marker Tp.		
Teck	42-A-1	Spark Gold Mines Ltd. "Welsh claims" (see also Casakirk Gold Mines, Ltd. & Barnette Legris claims)		Asses.	sTr, DDH (1)	1976 1977	
Teck	42-A-1	Labine, M., Duranseau, Y.		Asses.	sTr	1976	
Teck	42-A-1	Stewart, Arden K.		Asses.	sTr	1977	
Teck, Otto	42-A-1	Upper Kirkland Mines Ltd. (subsidiary of Upper Canada Mines; see Kirkland Gateway Gold Mines)	Au	donation	report	1977	
Tomlinson	42-H-8 32-E-5	Dome Exploration (Canada) Ltd.			see under Abbotsford Tp.		
Tomlinson	42-H-8 32-E-5	Geophysical Engineering Ltd.		Asses.	DDH	1975	
Tomlinson	42-H-8 32-E-5	Noranda Exploration Co. Ltd.			see under Kenning Tp.		
Truax	42-H-8 32-E-5	Corridor Mines Ltd. (NRG Resources Inc.) "King, H.; Welsh, G. S. claims"			see under James Tp.		

NORTHERN – KIRKLAND LAKE

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work	Year	Toronto File No.
Tudhope	41-P-9	Corridor Mines Ltd. (NRG Resources Inc.) "King, H.; Welsh, G. S. claims"			see under James Tp.		
Tudhope	41-P-9	Venne, Orien	Ag, Cu	Asses.	DDH (2)	1976	
Tudhope	41-P-9	Northern Silver Fox Resources Inc.	Ag, Co, Cu	MEAP CG118	DDH (10), A, VLF-EM (2), Mag, GL	1977	
Tweed	42-H-9	Hudson Bay Exploration & Development Co. Ltd. "Group H"			see under Blakelock Tp.		
Tweed	42-H-9	Hudson Bay Exploration & Development Co. Ltd. "Group K"			see under Bragg Tp.		
Tyrrell	41-P-10, 11	LaFrance Gold Mines Ltd. (see also LaFrance Explorations Ltd.)	Au	Asses.	GL, DDH (7)	1976	2.2168
Tyrrell	41-P-10, 11	Getty Mines, Ltd. "Cripple Lake Group"		Asses.	Mag	1976	2.2149
Wesley, Moody	42-A-15, 16	International Nickel Co. of Cda., Ltd., The	Cu, Zn	donation	DDH (2)	1964	
Wilkie	42-A-9	Hollinger Mines Ltd. "Group I"		Asses.	DDH (1)	1977	
Yarrow	41-P-15	Harvey, Leo Roger Joseph		Asses.	sTr, rTr	1976 1977	
Yarrow	41-P-15	Dubé, Norman		Asses.	rTr	1977	
Zavitz	42-A-3	Rio Tinto Canadian Exploration Ltd. (see also Pan-Ore Gold Mines Ltd.)			see under Hincks Tp.		
Zavitz	42-A-3	Granges Exploration Canada AB			see under English Tp.		
Zavitz	42-A-3	Rio Tinto Canadian Exploration Ltd. "R & R option"		Asses.	DDH (5)	1977	

1977 Report of Northeastern Regional Geologist and Sault Ste. Marie Resident Geologist

P.E. Giblin¹

CONTENTS

Introduction	83
Mining and Development Operations	83
Exploration Activity	85
Geological Branch Activities	85
Regional Geologist's Activities	85
Some General Remarks to Industry	87
Recent Publications and Theses	87

TABLES

1— Maps and Reports Issued by the Geological Branch . . .	88
2— Exploration Activity in 1977	89
3— Assessment Work and Other Information Received in 1977	89

FIGURE

1— Sault Ste. Marie Resident Geologist's District	84
---	----

INTRODUCTION

The general low level of exploration activity that has existed for the past several years continued in 1977, although there was a modest increase in the number of new claims recorded, the first time since 1973 that the declining trend in new recordings has been reversed. Reflecting general metal market conditions, most exploration centered on the search for uranium, principally in the Elliot Lake area, with only a minor amount of work being devoted to base-metals and gold.

In contrast with the exploration situation, mine production and mine development activities continued strongly, particularly in Elliot Lake where both Denison Mines Limited and Rio Algom Limited are engaged in major expansion programs. Ontario Hydro recently contracted with Denison Mines Limited and Preston Mines Limited (an affiliate of Rio Algom Limited) for the purchase of 198 million pounds of uranium oxide, to be delivered between 1980 and 2020. Total

value of the purchase is stated to be about \$6.5 billion, representing the world's largest uranium sales contract to date. Total milling capacity of the operating companies will be raised from the current level of 11,600 tons per day to 30,300 tons per day. Capital expenditures of approximately \$500 to \$550 million will be required for new and expanded mining and milling facilities, and total direct permanent employment in the Elliot Lake mining and milling operations will increase from the current level of 2,900 to about 6,500 by the year 1984. It has been estimated (The Northern Miner, Jan. 19, 1978) that the new jobs to be created will generate an annual wage and salary bill of from \$65 million to \$75 million.

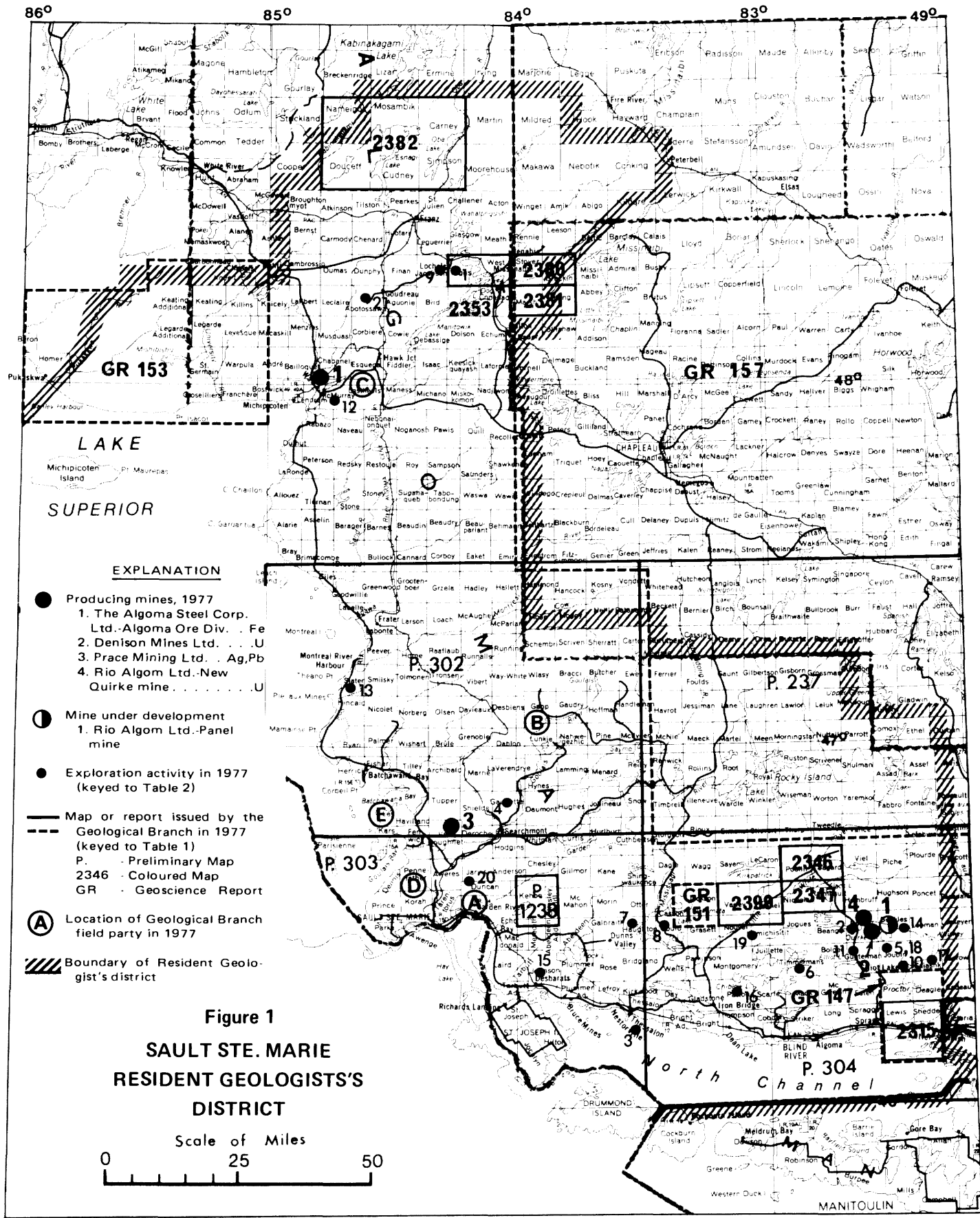
MINING AND DEVELOPMENT OPERATIONS

The Algoma Ore Division of The Algoma Steel Corporation Limited continued production of iron ore at Wawa, producing 1,745,000 gross tons of sinter during 1977.

Denison Mines Limited continued production of uranium oxide at Elliot Lake. Mill capacity is now 7,100 tons per day, and total production in 1977 amounted to 4.0 million pounds of uranium oxide. Output is expected to rise to 5 million pounds in 1978, and to more than 10 million pounds per year by the early 1980s. Late in 1977 a major sale agreement was announced. Ontario Hydro has contracted with Denison Mines Limited to purchase 126 million pounds of uranium oxide over the period 1980-2011. As a result, the capacity of Denison's existing mill will be raised to 12,000 tons per day; the Stanrock and Can-Met mines will be reopened, and the Stanrock mill will be rebuilt to process ore from both of these mines at the rate of 3,000 tons per day. By 1984 the company's total milling capacity will thus be 15,000 tons per day. The company's work force will increase from the current level of about 1,500 persons to between 3,200 and 3,400 persons by 1984.

Prace Mining Limited drove a decline on the company's silver-lead deposit located in VanKoughnet

¹Regional Geologist, Ontario Ministry of Natural Resources, 875 Queen Street East, Sault Ste. Marie, P6A 2B3.



Township, 30 km north of Sault Ste. Marie. Drifting was carried out and broken ore was stockpiled.

Rio Algom Limited continued production of uranium oxide at Elliot Lake. Ore is mined from the New Quirke Mine and processed in the Quirke mill. A major mill expansion program, designed to increase processing capacity from the current level of 4,500 tons per day to 7,000 tons per day, is nearing completion and is scheduled to be completed in 1978. The Panel mine and mill are being reopened, and production is scheduled to begin in 1980 at the rate of 3,300 tons per day. A total of about 750 new permanent jobs will be created with expansion of the Quirke mill, the New Quirke mine, and reopening of the Panel mine and mill.

Preston Mines Limited, an affiliate of Rio Algom Limited, recently announced an agreement with Ontario Hydro under which Ontario Hydro will purchase 72 million pounds of uranium oxide from Preston during the period of 1984-2020. The Stanleigh mine and mill will be reopened, and production is scheduled to begin in 1984 at a milling rate of 5,000 tons per day. Operations at Stanleigh will be carried out by Rio Algom Limited under a management contract with Preston Mines Limited. Approximately 1,000 new permanent jobs will result from reopening of the Stanleigh mine and mill.

The combined effect of expanding the Quirke mill, and re-opening of the Panel and Stanleigh mills will result in raising the total milling capacity of Rio Algom Limited to 15,300 tons per day by 1984.

EXPLORATION ACTIVITY

Exploration for uranium comprised the bulk of the work carried out during the year with much of the work taking place near Elliot Lake, where several companies undertook drilling programs. Canuc Mines Limited, Denison Mines Limited, and Rio Algom Limited drilled on their Elliot Lake area properties; Fort Norman Explorations Incorporated drilled in Timmermans Township; Long Lac Mineral Exploration Limited drilled the Silvermaque and Abeta properties located in Gunterman and Joubin Townships; North American Nuclear Limited drilled in Buckles and Gunterman Townships; while Rio Algom Limited also carried out drilling in Kamichisitit and Nouvel Townships on property optioned from Superior Northwest Incorporated.

In other uranium-related exploration programs conducted elsewhere in the district, Conwest Exploration Company Limited and partners drilled in the North Channel of Lake Huron south of Thessalon; D.S. Robertson and Associates carried out geological mapping and drilling in Jarvis and Duncan Townships, 15 km northeast of Sault Ste. Marie; Moncrieff Uranium Mines Limited conducted geophysical surveying and drilling

near Montreal River; and R. Paynter carried out trenching in Johnson Township near the village of Desbarats.

Exploration for base-metals was at a very low level, and was concentrated in the Wawa area. Several small groups of claims were staked in the Pukaskwa "greenstone" belt, about 65 km west of Wawa. In the Michipicoten "greenstone" belt, near Goudreau, United Canso Oil and Gas Limited carried out underground and surface exploration on a copper-gold deposit optioned from Ego Mines Limited. Also near Goudreau, Gulf Minerals Canada Limited drilled geophysical anomalies.

The exploration activities in the district are summarized in Table 2, and the locations are illustrated in Figure 1.

GEOLOGICAL BRANCH ACTIVITIES

G. Bennett mapped the Garden River Indian Reserve (Indian Reserve No. 14) and adjacent portions of Kehoe and Macdonald Townships. The area is centered about 20 km east of Sault Ste. Marie (A, in Figure 1). In addition, Bennett examined and sampled Huronian volcanic rocks in the Elliot Lake, Massey, Thessalon, and Sault Ste. Marie areas as part of a continuing study of the geochemistry and stratigraphy of these rocks.

E.C. Grunsky carried out mapping in the Cowie Lake area, located about 70 km northeast of Sault Ste. Marie (B, Figure 1).

R.P. Sage mapped the Firesand River carbonatite complex, located 7 km east of Wawa in McMurray and Lastheels Townships (C, Figure 1).

Areas covered by maps and reports published during 1977 by the Geological Branch are shown in Figure 1, and listed in Table 1.

REGIONAL GEOLOGIST'S ACTIVITIES

Staff in the Sault Ste. Marie office consists of G. Bennett (Geologist, Precambrian Geology Section), E.J. Leahy (Resource Geologist), G. Nivins (Secretary), and the writer. Bennett was engaged in field mapping projects which have been briefly described in the preceding section. Activities of the rest of the staff, beyond the routine operation of the office, are described in the following paragraphs.

Despite the generally low level of exploration activity, the number of visitors and inquiries to the office from industry, the general public, and municipal governments seeking information remained close to the levels of previous years. Although most inquiries still concern data of interest for minerals exploration, some new trends have been developing in the last few years.

An increasing number of inquiries have been received for information and advice on ground-water supplies and water-well drilling problems; for geological information relating to engineering and construction projects; and for information on aggregate sources.

Activities relating directly to mineral exploration involved revision of four geological compilation maps comprising the Rocky Island Lake-Biscotasing sheet, the Batchawana sheet, Sault Ste. Marie sheet, and Blind River-Elliot Lake sheet (Maps P.237, P.302, P.303 and P.304, respectively; see Figure 1); field mapping in Pennefather Township by E.J. Leahy (D, Figure 1); completion of field mapping of the Sandy Islands-Rudderhead Point sheet by P.E. Giblin (E, Figure 1); collection of drill core from several sources, including that from a hole drilled on the shore of Lake Superior near Montreal River which provides the only complete section available of the Mica Bay Formation; a study of government-operated core storage facilities; collection of numerous plans and sections of the Tribag Mine; plotting on maps at the scale of 1 inch to 1 mile of aggregate pits in the district; field examination of several prospects; and the provision of information and advice to numerous companies and individuals engaged in exploration.

In other activities less directly related to exploration, E.J. Leahy prepared notes on the geology of Killarney Provincial Park for a brochure which has been published by the Division of Parks; prepared further notes on this park's geological features for inclusion in the park master plan; and completed a report relating landforms and geology of the City of Sault Ste. Marie for publication by the Geological Branch. P.E. Giblin prepared a geological report for the Sault Ste. Marie Region Conservation Authority, interpreting for the general public the geological features of the Gros Cap Conservation Area.

E.J. Leahy and P.E. Giblin provided short reports covering geology, mineral deposits, mineral potential and recommendations respecting land-use to the Ministry of Natural Resources for 11 new lake development plans; and reviewed 18 draft lake development plans to ensure that the planned developments would not adversely affect exploration or use of mineral resources.

E.J. Leahy and P.E. Giblin spent considerable time dealing with a land disposition policy proposed for the Wawa administrative district, to ensure that the policy would not adversely affect exploration and the use of mineral resources.

In other land-use related matters, P.E. Giblin spent considerable time as a member of the Lake Wanapitei study committee, which was requested by the Minister of Natural Resources to recommend a strategy for the development and use of the lake, a matter precipitated by the planned drilling of a uranium prospect from the ice on the lake. The unusual interest in the lake arises from the fact that the lake is the water supply source

for Sudbury and some neighbouring municipalities.

Considerable time was also spent dealing with certain provisions of the proposed master plan for Lake Superior Provincial Park. In terms of its effect on the use of mineral resources, the point of most concern in the plan is a proposal to extend the northern boundary of the Park in Rabazo Township to the Michipicoten River, incorporating approximately 5,300 acres of the Michipicoten "greenstone" belt. This area includes four known gold occurrences, some of which carry associated silver, copper, and lead mineralization. The area does not appear to have been subjected to modern intensive prospecting.

P.E. Giblin provided information and advice respecting use of mineral resources to the Manitoulin Official Plan, the Blind River Official Plan, the Sault Ste. Marie North Official Plan, the Sault Ste. Marie and Area Planning Board, the Ministry of Natural Resources' Strategic Land-Use Plan for Northeastern Ontario, an inter-ministerial working group on radioactivity in housing at Elliot Lake, a proposed mine development in the Temagami administrative district, and the ministry's land-use plan for the McConnell Lakes area in North Bay district.

Project proposals of the Sault Ste. Marie Region Conservation Authority, the Nickel District Conservation Authority, and the North Bay-Mattawa Conservation Authority were reviewed to ensure they did not adversely affect exploration for, or utilization of, mineral resources.

In still other land-use related matters, the writer reviewed and responded to applications for reservations (i.e. withdrawals of land from staking), initiated by other divisions of the ministry, for lands for housing, parks, and a forest plantation reserve. A sub-division plan involving a potential geological hazard was reviewed and appropriate measures suggested. Inquiries from the Ministries of Housing and of the Environment concerning potential radiation and radon problems were answered. In collaboration with staff of the Ministry of the Environment, guidelines were developed for a drilling project in an environmentally sensitive area. Two hydro-electric generation proposals were reviewed for possible adverse effects on mineral resources of the proposed flooding associated with the projects. Minor land-use related items involved collaboration with ministry regional and district staff on problems of land tenure and land-use by mining and aggregate companies and individuals.

Minor activities involved provision of information and some support service to field parties of the Precambrian Geology Section, and as in the previous few years, pre-publication reviews of maps prepared by staff of the Mineral Deposits Section.

In addition to the above, the writer supervised administration of the Sudbury and Sault Ste. Marie offices

and was involved in several internal ministry projects.

SOME GENERAL REMARKS TO INDUSTRY

1. The Ministry of Natural Resources' land-use planning program in northeastern Ontario is moving forward from the rather generalized stage of policy statement and background information, embodied in the Strategic Land-Use Plan, towards a more detailed stage of planning by administrative districts, wherein zones and their uses will be defined. This second, more detailed stage of planning is due to begin this year.

It will be seen from the preceding account of activities that the Regional Geologist represents the Division of Mines in a great variety of land-use planning functions, advocating measures that will permit optimal use of mineral resources. To the extent that industry interests run parallel to those of the Division of Mines he can also serve as an advocate for both in the ministry land-use planning process. Effective advocacy, which will become even more important as we move into district-level planning and as official plan areas spread in northern Ontario, requires a comprehensive data base to help support mineral resource-related views when conflicts arise.

Although some exploration data is submitted for assessment work credit, and some is collected by ministry geologists, a large part (if not the largest part) does not normally come into possession of the ministry. Some of this latter class of information is reasonably proprietary, but a considerable portion, particularly that on dormant or abandoned projects, could be given to the ministry without harm. It is in the best interests of the industry to consider donations of exploration data to the Ministry of Natural Resources, and to cooperate when asked for information by ministry geologists, in order that planning may be carried out with the fullest possible knowledge of mineral resources and mineral potential.

2. Recent experience with proposed drilling programs in potentially sensitive areas such as lakes used for municipal water reservoirs, has shown that serious obstacles to drilling may arise. Companies or individuals planning to drill in such areas would be well advised to consult the Resident or Regional Geologist and Ministry of the Environment staff in the area concerned for advice on proceeding, before making contractual commitments dependent on performance or results of such drilling.

RECENT PUBLICATIONS AND THESES

Fryer, B.J.
1977: Geochemistry of Early Proterozoic Paleosols North of Lake Huron, Ontario; p.18 *in* Abstracts and Proceedings, Twenty-Third Annual Meeting, Institute on Lake

Superior Geology.

Jackson, M.R.
1977: Geochemical study of the Mamainse Point rhyolites, Algoma District, Ontario; Unpub. B.A. thesis, McMaster University, 59p.

Kemp, A.L.W., Thomas, R.L., Wong, H.K.T., and Johnston, L.M.
1977: Nitrogen and C/N Ratios in the Sediments of Lakes Superior, Huron, St. Clair, Erie, and Ontario; Canadian J. Earth Sci., Vol.14, p.2402-2413.

Long, D.G.F.
1977: Resedimented Conglomerates of Huronian (Lower Aphebian) Age from the North Shore of Lake Huron, Ontario, Canada; Canadian J. Earth Sci., Vol.14, p.2495-2509.

McLennan, S.M., Fryer, B.J., and Young, G.M.
1977: An Estimate of the Rare Earth Element Distribution in Post-Kenoran Upper Crust North of Lake Huron; p.29 *in* Abstracts and Proceedings, Twenty-Third Annual Meeting, Institute on Lake Superior Geology.

Morris, W.A.
1977: Paleomagnetism of the Gowganda and Chibougamau Formations: Evidence for 2,200-m.y.-old Folding and Remagnetization Event of the Southern Province; Geology, Vol.5, p.137-140.

Mothersill, J.S.
1977: Post-Glacial Sediment Distribution in the Canadian Portion of Lake Superior; p.36 *in* Abstracts and Proceedings, Twenty-Third Annual Meeting, Institute on Lake Superior Geology.

Norman, D.I.
1977: Geology and Geochemistry of the Tribag Mine, Batchawana Bay, Ontario; Unpub. Ph.D. thesis, University of Minnesota, 257p.

Robinson, D.J.
1977: The Prace Pb-Zn-Ag Deposit; Unpub. Senior thesis, University of Western Ontario, Senior Thesis 490, 54p.

Ruzicka, V.
1977: Assessment of Selected Uranium Occurrences and Areas Favourable for Uranium Mineralization in Canada; p.27-29 *in* Report of Activities, Part A, Geol. Surv. Canada Paper 77-1A.

Theis, N.J.
1976: Uranium-Bearing and Associated Minerals in their Geochemical and Sedimentological Context, Elliot Lake, Ontario; Unpub. Ph.D. thesis, Queen's University, 157p.

Young, G.M., Long, D.G.F., and McLennan, S.M.
1977: Deltaic Deposits in the Upper Pectors, Espanola, and Gowganda Formations (Huronian); p.46 *in* Abstracts and Proceedings, Twenty-Third Annual Meeting, Institute on Lake Superior Geology.

NORTHEASTERN – SAULT STE. MARIE

TABLE 1 | MAPS AND REPORTS PERTAINING TO THE SAULT STE. MARIE MINING DIVISION, ISSUED BY THE GEOLOGICAL BRANCH OF THE ONTARIO MINISTRY OF NATURAL RESOURCES IN 1977. SEE "LIST OF PUBLICATIONS" (BACK POCKET) FOR DETAILS.

GEOSCIENCE REPORTS

GR 147
GR 151
GR 153
GR 157

MISCELLANEOUS PAPERS

MP 70
MP 71
MP 75

COLOURED MAPS

Map 2315
Map 2346
Map 2347
Map 2353
Map 2380
Map 2381
Map 2382
Map 2399

PRELIMINARY MAPS

P. 237 (1977 Revision)
P. 302 (1977 Revision)
P. 303 (1977 Revision)
P. 304 (1977 Revision)
P. 1062 (1977 Revision)
P. 1227
P. 1228
P. 1238
P. 1246
P. 1513
P. 1515
P. 1516
P. 1518
P. 1519

TABLE 2 Exploration activity in 1977.

The following is a list of individuals and companies known to be engaged in exploration within the Sault Ste. Marie Mining Division in 1977, and the type of work undertaken in each case.

Number on Figure 1	Individual or Company	Activity
1	Burt, D. F.	Drilling, gold prospect, Riggs and Jacobson Townships.
2	Canuc Mines Ltd.	Drilling, uranium prospect, Bouck Township.
3	Conwest Exploration Co. Ltd.	Drilling, uranium prospect, North Channel, Lake Huron.
4	Dengas Explorations & Holdings Ltd.	Drilling, Gaudette Township.
5	Denison Mines Ltd.	Drilling, uranium prospect, Joubin Township.
6	Fort Norman Explorations Inc.	Drilling, uranium prospect, Timmermans Township.
7	Ghering, E.	Trenching, Houghton Township.
8	Gould Coppermine Ltd.	Drilling, copper prospect, Gould Township.
9	Gulf Minerals Canada Ltd.	Drilling, base-metals prospect, Jacobson Township.
10	Kelley, S. K.	Trenching, Joubin Township.
11	Long Lac Mineral Exploration Ltd.	Drilling, uranium prospects, Gunterman and Joubin Townships.
12	McLean, P.J.	Trenching, McMurray Township.
13	Moncrieff Uranium Mines Ltd.	Geophysical surveying and drilling, uranium prospect, Slater Township.
14	North American Nuclear Ltd.	Drilling, uranium prospects, Buckles and Gunterman Townships.
15	Paynter, R.	Trenching, uranium prospect, Johnson Township.
16	Pellerin, U.	Trenching, Patton Township.
17	Questmont Mines Ltd.	Trenching, uranium prospect, Gaiashk Township.
18	Rio Algom Limited	Drilling, uranium prospects, Elliot Lake area.
19	Rio Algom Limited	Drilling, uranium prospect, Kamichisitit and Nouvel Townships.
20	Robertson, D. S., and Associates	Geological surveying and drilling, uranium prospect, Jarvis and Duncan Townships.
21	United Canso Oil & Gas Ltd.	Underground exploration, surface geophysical surveying and drilling, copper-gold prospect (Ego Mines Ltd. property), Abotossaway Township.

TABLE 3 Assessment work and other information received in 1977.

Sault Ste. Marie Mining Division

Abbreviations

A	- Airborne	IP	- Induced Polarization
CS	- Core Samples	Mag	- Magnetometer
D	- Donated by Company or Individual	Pros	- Prospectus
DDH	- Diamond Drill Hole	RA	- Radioactive, Radiometric
DN	- Dip Needle Survey	SA	- Assaying
EM	- Electromagnetic	Tr	- Trenching
G	- Ground	U	- Underground Development
GL	- Geological	VLF	- Very Low Frequency

Township or Claim Map Area	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File No.	Local File No.
Albanel	US-CA-MEX Explorations Ltd.		OSC	Pros.	1977		SSM-1545A
Beange	New Force Crag Mines Ltd.		OSC	Pros.	1976		SSM-1861
Buckles	North American Nuclear Ltd.		Assess.	6 DDH (981.3') CS, 4 DDH (921')	1977		SSM-1858
Dagle	Barcis, A.	Cu	D	Geochem. Surv.	1975		SSM-1131
Deroche	Feldstein, H.E.		D	GEM	1970		SSM-1881
	Saint Antonio Mining & Expl'n. Co.		D	Loc. Plan	1920-24		SSM-1888
Desbiens	HBOG Mining Ltd.		D	3 DDH (465')	1976		SSM-1889
Esquega	Lakemount Mines Ltd.	Cu, Ni	D	GL, EM	1952, 1954, 1957, 58		SSM-1896
Gaiashk	Kelley, S.K.		Assess.	Tr	1976		SSM-1898
	Questmont Mines Ltd.	U	Assess.	Tr	1977		SSM-1886

NORTHEASTERN – SAULT STE. MARIE

Township or Claim Map Area	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File No.	Local File No.
Gapp	HBOG Mining Ltd.		D	3 DDH (744.5')	1976		SSM-1889
Gaudette	Dengas Explorations & Holdings Ltd.		Assess.	2 DDH (361.8')	1977		SSM-1657
Grasett	Rio Tinto Canadian Exploration Ltd.		Assess.	GL & Scint.	1976	2.2269	SSM-1897
Gunterman	MacGregor, R.A.		Assess.	Geochem., GMag & VLFEM	1976	2.2288	SSM-1859
	North American Nuclear Ltd.		Assess.	2 DDH (2714')	1977		SSM-1879
Haughton	Chering, E.		Assess.	Tr	1977		SSM-1794
Jacobson	Burt, D.F.	Au	Assess.	2 DDH (225.3')	1977		SSM-1880
	Gulf Minerals Canada Ltd.		Assess.	3 DDH (1081')	1977		SSM-1892
Jogues	Raylloyd Mines & Explorations Ltd.	U	Assess.	1 DDH (206') 1 DDH (3939')	1974 1975		SSM-1767
Joubin	Denison Mines Ltd.		Assess.	1 DDH (280')	1977		SSM-1678
	Kelley, S.K.		Assess.	Tr	1977		SSM-1898
Kamichisitit	Rio Tinto Canadian Exploration Ltd.		Assess.	GL & Scint.	1976	2.2269	SSM-1897
	Shell Canada Ltd.		Assess.	GL & GRA	1976	2.2182	SSM-1860
	Superior Northwest Inc.	U	Assess.	2 DDH (7352.6')	1976-77		SSM-1757
Kincaid	Danaray Uranium Mines Ltd.	U	Assess.	4 DDH (161.4')	1951		SSM-290
	Doughty, W.		D	GL	1962		SSM-1890
	Haugeneder, J.		D	GL, Geochem., Radem EM & Mag	1971-72		SSM-1895
Kirkwood	Paynter, R.		Assess.	2 DDH (374')	1976		SSM-1826
Leeson	Coniagas Mines Ltd., The		Assess.	GL, SA	1973	2.2029	SSM-1726
Lunkie	HBOG Mining Ltd.		D	7 DDH (884')	1976		SSM-1889
McMurray	Hillside Mines Ltd.	Au	D	GL	1955		SSM-1691
	McLean, P.J.		Assess.	Tr	1977		SSM-1893
Meath	Dome Exploration (Canada) Ltd.		Assess.	1 DDH (302') SA	1975		SSM-1853
Montgomery	Rio Tinto Canadian Exploration Ltd.		Assess.	GL & Scint.	1976	2.2269	SSM-1897
Nouvel	Rio Tinto Canadian Exploration Ltd.		Assess.	GL & Scint.	1976	2.2269	SSM-1897
	Superior Northwest Inc.	U	Assess.	1 DDH (5580')	1977		SSM-1757
Patton	Pellerin, U.		Assess. Assess.	Tr Tr	1976 1977		SSM-1695
Rennie	Dome Exploration (Canada) Ltd.		Assess.	1 DDH (526'), SA	1975		SSM-1853
Riggs	Burt, D.F.	Au	Assess.	1 DDH (115')	1977		SSM-1880
Running	Asarco Exploration Co. of Canada Ltd.		D	AEM & Mag GEM & Mag, GL	1974 1974		SSM-1755
Schembri	Asarco Exploration Co. of Canada Ltd.		D	1 DDH (248.9')	1974		SSM-1755
Stover	Dome Exploration (Canada) Ltd.		D	10 DDH (7078'), SA	1975-76		SSM-1770
Timmermans	Fort Norman Explorations Inc.	U,Th	Assess. Assess. Assess.	2 DDH (3005') 1 DDH (1369') CS 3 DDH (4374')	1976-77 1977 1977		SSM-1820
Varley	Rio Tinto Canadian Exploration Ltd.		Assess.	GL & Scint.	1976	2.2269	SSM-1897
Way-White	HBOG Mining Ltd.		D	2 DDH (266')	1976		SSM-1889

1977 Report of Sudbury Resident Geologist

W.O. Karvinen¹ and L. Cooper²

CONTENTS

Introduction	91
Resident Geologist's Activities	91
Operating Mines and Mills	91
Copper-Nickel	91
Iron	95
Uranium	95
Industrial Minerals	95
Exploration Activity	96
Geological Branch Activity	96

TABLES

1— Maps and reports issued by the Geological Branch . . .	96
2— Exploration activity in 1977.	97
3— Assessment work and other information received in 1977.	98

FIGURES

1,2—Sudbury Resident Geologist's district.	92,93
3—Sudbury Nickel Irruption area.	94

INTRODUCTION

The decline in exploration experienced in recent years continued during 1977. As a result no new discoveries were made. Claim staking was down more than 50 percent, from 1,771 claims in 1976 to 760 in 1977 (Sudbury Mining Recorder, personal communication).

Depressed metal prices and the build-up of vast nickel inventories forced the two major mine operators in the area to announce severe cutbacks in production resulting in the loss of about 4,000 jobs. The only uranium mine in the district, Agnew Lake, commenced production of uranium oxide by heap leaching on surface and underground. One new stone quarry, Dana Black Granite Limited, commenced operations in July.

¹Resident Geologist, Ontario Ministry of Natural Resources, 1112 The Kingsway, Sudbury, P3B 2E5.

²Resource Geologist.

³Statistics from Resident Geologist's files, Ontario Ministry of Natural Resources, Sudbury.

RESIDENT GEOLOGIST'S ACTIVITIES

W.O. Karvinen assumed responsibilities as Resident Geologist in Sudbury on April 1, 1977. The Resource Geologist's position was filled by L. Cooper in June. Y.M. Paquette is Secretary.

OPERATING MINES AND MILLS³

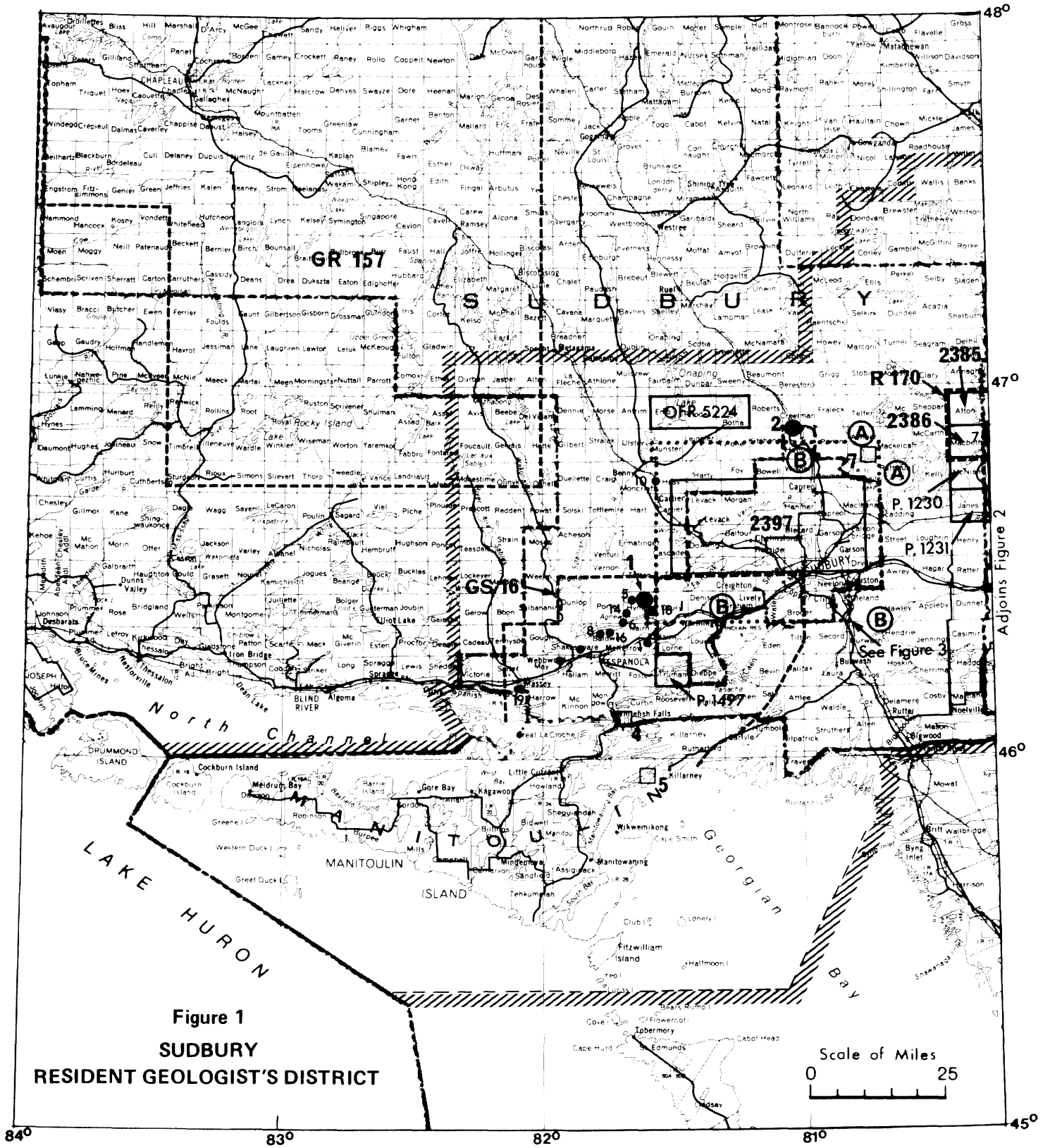
Because of the vast build-up of copper-nickel inventories, the two major producers in the area were forced to announce drastic cutbacks in production commencing in the New Year. Early in 1977, Falconbridge Nickel Mines Limited announced a one-month shut-down of its operations followed by an announcement in August to reduce the workforce by 434 and the closure of the North Mine. In October, Inco Limited followed with the announcement that a total of 3200 jobs at its Sudbury operations would be eliminated and four mines, the Victoria, Creighton No.3, Copper Cliff North, and Crean Hill, would cease operations. In addition, a reduction in production at Stobie Mine is scheduled to commence early in the New Year. Inco also plans a one-month shut-down in July of 1978. In early December, Falconbridge announced a further reduction of its work force by an additional 750 people and the suspension of operations at its Lockerby Mine. The company also plans a complete shut-down of operations for seven weeks next summer.

Slumping world economies were also responsible for a production slowdown at the Moose Mountain iron mine near Capreol where the operator, National Steel Corporation of Canada Limited ceased operations for two weeks during the summer of 1977.

Copper-Nickel

During the year, production of nickel, copper, iron, platinum group metals, gold, silver, cobalt, selenium and tellurium was continuous from 17 mines located on the north and south rims of the Sudbury Basin (Figure 3).

NORTHEASTERN – SUDBURY



Adjoins Figure 2

Figure 1
SUDBURY
RESIDENT GEOLOGIST'S DISTRICT

Scale of Miles
0 25

EXPLANATION

- Exploration activity in 1977 (keyed to Table 2)
- Ⓐ Location of Geological Branch field party in 1977
- ▨ Boundary of Resident Geologist's district
- ▬▬▬ Map or report issued by the Geological Branch in 1977 (keyed to Table 1)
- P - Preliminary Map
- 2385 - Coloured Map
- GS - Geoscience Study
- OFR - Open File Report
- R - Ontario Geological Survey Report
- GR - Geoscience Report

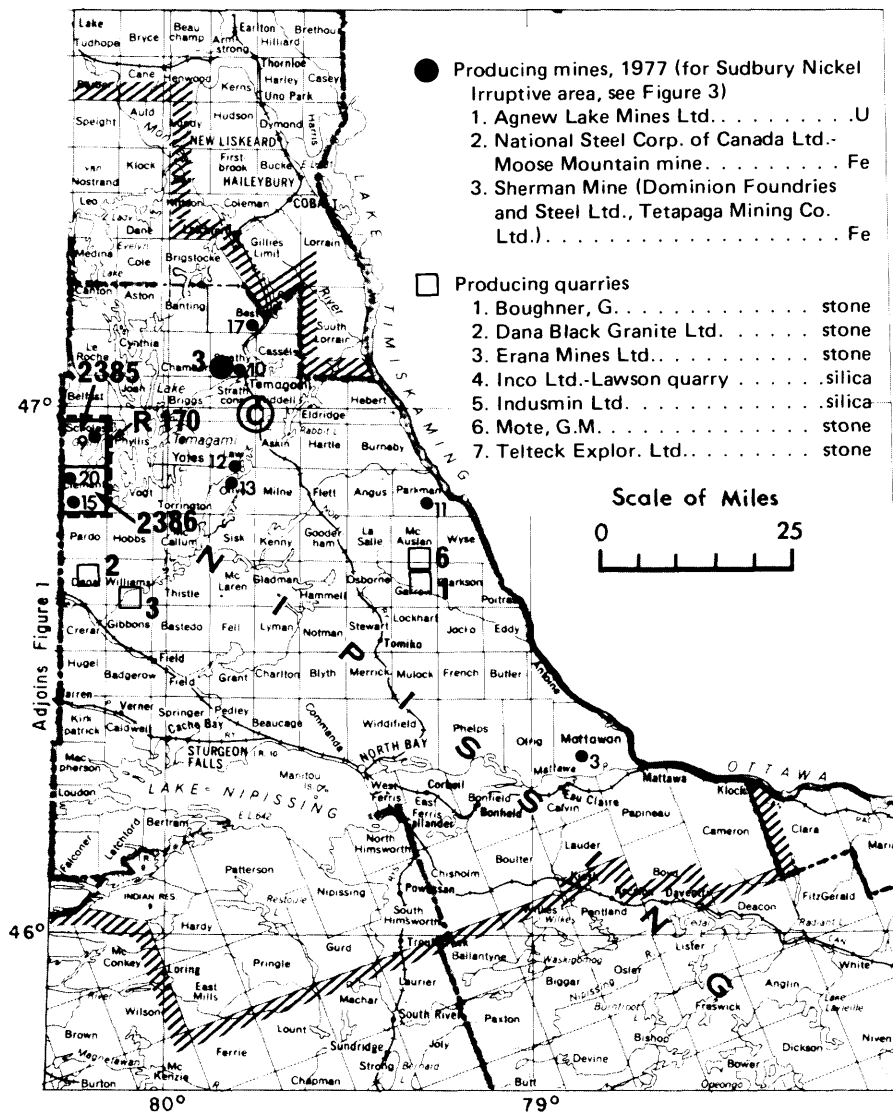


Figure 2
SUDBURY RESIDENT GEOLOGIST'S DISTRICT

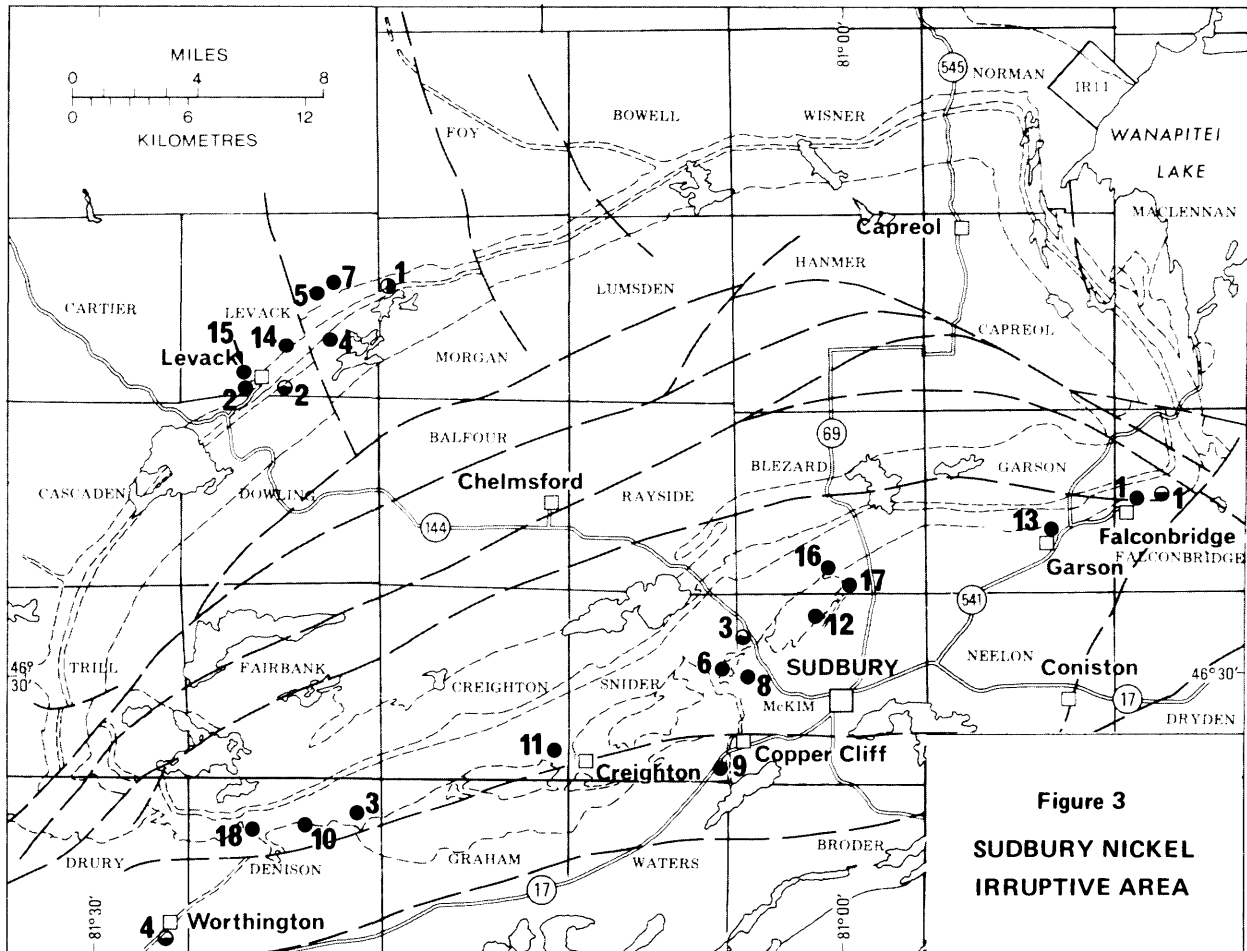


Figure 3
SUDBURY NICKEL
IRRUPITIVE AREA

EXPLANATION

- Producing mines
 - 1.-5. Falconbridge Nickel Mines Ltd. Ni, Cu, Pt, Co, Au, Ag
 - 1. Falconbridge mine
 - 2. Hardy open pit
 - 3. Lockerby mine
 - 4. North mine
 - 5. Strathcona mine
 - 6.-18. Inco Ltd. . Ni, Cu, Pt, Se, Te, Co, Au, Ag, Fe
 - 6. Clarabelle No.2 open pit
 - 7. Coleman mine
 - 8. Copper Cliff North mine
 - 9. Copper Cliff South mine
 - 10. Crean Hill mine
 - 11. Creighton mine
 - 12. Froid mine
 - 13. Garson mine
 - 14. Levack mine
 - 15. Levack West mine
 - 16. Little Stobie mine
 - 17. Stobie mine
 - 18. Victoria mine
- ⊙ Mine under development
 - 1. Falconbridge Nickel Mines Ltd.-Fraser mine
- ◡ Mine on care and maintenance basis
 - 1.-2. Falconbridge Nickel Mines Ltd.
 - 1. Falconbridge East mine
 - 2. Onaping mine
 - 3.-4. Inco Ltd.
 - 3. Murray mine
 - 4. Totten mine

The major producer, Inco Metals Company, operated 12 of the mines; the remaining five were operated by Falconbridge Nickel Mines Limited.

The Inco operations are grouped into four major complexes. The Creighton complex includes the Creighton No.3 (4,000 tons per day¹) and No.9 (8,000 t.p.d.), Crean Hill (4,000 t.p.d.) and Victoria mines (700 t.p.d.). Crushed ore from these mines is shipped to the Clarabelle Mill near Copper Cliff. The Copper Cliff complex is made up of the South mine (3,500 t.p.d.), the North mine (7,000 t.p.d.) and the Clarabelle No.2 open pit, in addition to the Clarabelle mill (30,000 t.p.d.). The Frood-Stobie Complex consists of the Frood (8,000 t.p.d.), Stobie (14,000 t.p.d.) and Little Stobie (3,000 t.p.d.) mines which feed the Frood-Stobie mill (20,000 t.p.d.). The ore from the Garson mine (4,500 t.p.d.) to the east is also concentrated at the Frood-Stobie mill. The Levack Complex includes the Levack West (3,800 t.p.d.), Levack (5,000 t.p.d.) and Coleman (3,300 t.p.d.) mines. Much of the ore from these mines is concentrated at the Levack mill (6,000 t.p.d.) and the overflow is shipped by rail to the Clarabelle Mill.

Bulk concentrate from the Frood Stobie and Clarabelle mills as well as pyrrhotite concentrate from the latter are further processed at the Copper Cliff mill (14,000 t.p.d.). Copper and nickel concentrates produced at the Copper Cliff and the Levack mills are then shipped to the smelter at Copper Cliff where blister copper, Bessemer matte (containing nickel and precious metals) and liquid sulphur dioxide is produced. The nickel-bearing matte is further processed, partly at the nearby nickel refinery where nickel pellets, nickel powder and ferro-nickel powder are produced. The remainder is processed into electrolytic nickel, S rounds and Incomag at the Port Colborne nickel refinery. The blister copper is fed to the copper refinery at Copper Cliff where cast copper and cathodes are produced. Gold, silver, selenium and tellurium are also recovered from platinum metal concentrates at the copper refinery. All platinum group metals are refined in Acton, England.

Iron concentrate from the Copper Cliff mill is processed at the iron ore recovery plant in Copper Cliff where both nickel oxide and iron ore pellets are produced. By-product sulphur dioxide from this plant is used to make sulphuric acid at a nearby plant operated by Canadian Industries Limited.

Construction of a new rolling mill at Copper Cliff began in March 1976 and is scheduled to commence operations in early 1978. The mill will produce nickel and cupro-nickel alloy strip, primarily for coinage.

Five copper-nickel mines, owned and operated by Falconbridge Nickel Mines Limited were in production during the year. These were the Strathcona, North, and Hardy Open Pit mines on the north rim near Levack and the Lockerby and Falconbridge mines on the south rim. Ore was processed at the Falconbridge, Fecunis and Strathcona mills. All concentrates were further refined at the smelter at Falconbridge.

The company plans to suspend production at the North and Lockerby mines and the Hardy open pit early in the new year in addition to a slow-down in production from the older mines.

The modified nickel-iron refinery which was built by Falconbridge Nickel Mines Limited in 1968-1970 at Falconbridge and later leased in 1975 to Sudbury Metals Company was not in production in 1977. The plant was designed to produce metallized iron pellets at a rate of 260,000 tons per year.

Iron

Two iron mines were in production in the district during 1977. The National Steel Corporation of Canada Limited operated the Moose Mountain mine (capacity: 3,900 t.p.d.) located about 25 km north of Sudbury. At Temagami, the Sherman Mine, which is owned 90 percent by Dominion Foundries and Steel Limited (Dofasco), was in continuous operation producing an average of about 3,300 tons of iron ore pellets per day.

Uranium

Production of "yellow cake" (uranium oxide) by a bacterial leaching method commenced in mid-1977 at the Agnew Lake uranium mine, located about 50 km west of Sudbury. The mine is owned by Kerr Addison Mines Limited and operated by its subsidiary, Agnew Lake Mines Limited. Heap leaching on surface of about 600,000 tons of ore and protore was initiated in June. In October, leaching of about 100,000 tons in an underground stope was started. Total production of U₃O₈ concentrates as of September 31, 1977 was 31,000 pounds (The Northern Miner, Nov. 10, 1977).

Ore reserves at the mine are estimated to be in excess of 6.6 million tons grading 1.1 pounds U₃O₈ per ton (The Northern Miner, July 21, 1977).

Industrial Minerals

Silica, from high quality quartzite of the Lorrain Formation, was quarried by Inco Metals Company at its Lawson Quarry, about 65 km southwest of Sudbury and by Indusmin Limited on Badgeley Island in Georgian

¹potential capacity. Does not imply average tonnage actually mined or milled in 1977.

Bay. Indusmin also plans to commence quarrying of silica from a pegmatite dike on the west shore of Nepe-wassi Lake in Hawley Township, about 32 km east of Sudbury (Sudbury Mining Recorder's files).

Decorative stone was quarried intermittently in five localities in the area during the year. "Black granite" for facings and tombstones was produced by Dana Black Granite Limited and Erana Mines Limited near River Valley, located about 65 km east of Sudbury. The former company commenced production in June; the latter company has produced intermittently for several years. Although known by its pseudonym as "Black Granite", the rock produced at these quarries is high quality, massive, coarse-grained, black anorthosite. The main markets are in the United States.

Colourful, muscovite quartz feldspar schist is quarried by two separate operators, G. Mote and G. Boughner in McAuslan Township, about 40 km north of North Bay. The rock is broken into various sizes and shipped by rail to markets mainly in the eastern United States. Both quarries operate during the summer months (G. Boughner, personal communication).

Telteck Explorations Limited produced about 10 tons per day of decorative building stone from a quarry in Aylmer Township, about 40 km northeast of Sudbury. The rock consists of a coarse dolomitic breccia containing vugs of quartz, which occurs in a circular pipe-like structure cutting sills and argillites of the Gowganda Formation. Some parts of the orange-to buff-coloured breccia contain spectacular splashes of bornite and chalcopyrite. Production is limited to the summer months. The broken rock is trucked to markets in Southern Ontario (E. Taillefer, Telteck Explorations Limited, personal communication).

EXPLORATION ACTIVITY

Outside of the Nickel Irruptive, where Inco Limited and Falconbridge Nickel Mines Limited carried out surface exploration of potential copper-nickel prospects, exploration in the area was concentrated mainly on uranium. The area receiving most attention is the belt of lower Huronian (Matinenda Formation) rocks extending from Agnew Lake in Hyman Township, west through Webbwood and Massey to Spanish. Geological mapping, radiometric surveys and drilling were carried out in the belt by Kerr Addison Mines Limited, David S. Robertson and Associates Limited, Consolidated Morrison Explorations Limited and Norcen Energy Resources Limited. Late in the fall, Glencair Mining Company Limited initiated a drilling program on a uranium prospect held by C. Springer in Baldwin Township. Nine holes totalling over 700 m were completed. In holes 1 and 2, 21.7 m of 0.533 pounds U₃O₈ per ton and 26.7 m of 0.7 pounds U₃O₈ per ton respectively

were encountered (The Northern Miner, Oct. 6, 1977). The company plans to drill an additional five holes in 1978.

Limited uranium exploration was carried out in the Cartier-Benny area, Hutton and Parkin Townships, and the Turner Township area. In the Cartier-Benny area, Hollinger Mines Limited drilled three holes totalling 243 m in Hess and Moncrieff Townships. No significant results were obtained (Resident Geologist's files, Ontario Ministry of Natural Resources, Sudbury). Some drilling and radiometric surveys were conducted in Hutton, Parkin and Roberts Townships by a few companies. In Turner Township, most of the uranium prospects are covered by claims owned by Aggressive Mining Limited who carried out radon and magnetometer surveys.

Base metal exploration was limited almost totally to the Temagami area, where one major company, Hollinger Mines Limited, conducted some geophysical surveys.

A summary of exploration activity in the district is provided in Table 2.

GEOLOGICAL BRANCH ACTIVITY

Three geological field programs were conducted in the district by Geological Branch staff. B. Dressler carried out detail bedrock mapping in Aylmer and Rathbun Townships near Lake Wanapitei (A in Figure 1). E. Sado mapped and assessed aggregate deposits in a large portion of the Regional Municipality of Sudbury (B in Figure 1). Regional gravity and magnetic susceptibility surveys in an area extending from North Bay to Englehart were conducted by V.K. Gupta and D.R. Wadge (C in Figure 1).

TABLE 1 MAPS AND REPORTS PERTAINING TO THE SUDBURY MINING DIVISION, ISSUED BY THE GEOLOGICAL BRANCH OF THE ONTARIO MINISTRY OF NATURAL RESOURCES IN 1977. SEE "LIST OF PUBLICATIONS" (BACK POCKET) FOR DETAILS.

GEOSCIENCE REPORTS	COLOURED MAPS	
GR 157	2361	
	2385	
ONTARIO GEOLOGICAL SURVEY REPORT	2386	
Report 170	2397	
	PRELIMINARY MAPS	
GEOSCIENCE STUDY	P. 1062	P. 1247
GS 16	P. 1228	P. 1497
	P. 1229	P. 1512
MISCELLANEOUS PAPERS	P. 1230	P. 1513
MP 71	P. 1231	P. 1514
MP 75	P. 1246	
OPEN FILE REPORTS		
OFR 5224	OFR 5229	OFR 5232

TABLE 2 Exploration activity in 1977.

The following is a list of companies and individuals known to have conducted exploration within the Sudbury Resident Geologist's district in 1977, exclusive of exploration work on the Sudbury Nickel Irregularity. The numbers correspond to the numbered areas on Figures 1 and 2.

Number on Figure	Individual or Company	Activity
1.	Alanen, Wm.	Diamond drilling, copper-nickel prospect, Nairn Township
2.	Alexander, A.	Trenching, stripping, blasting, May Township
3.	Bischoff, C. T.	Prospecting, Mattawan Township
4.	Blue, P. C.	Drilling, blasting, trenching, gold prospect, Shakespeare Township
5.	Continental Diamond Drilling Co. Ltd.	Trenching, diamond drilling, uranium prospect, Hyman Township
6.	D. S. Robertson & Associates Ltd.	Geological mapping, line-cutting, uranium prospect, Porter, Baldwin, Hyman, Nairn townships
7.	Foubert, A.	Trenching, iron prospect, Clement Township
8.	Glencair Mining Co. Ltd.	Surveying, diamond drilling, trenching, uranium prospect, Baldwin Township
9.	Gull Lake Iron Mines Ltd.	Diamond drilling, iron prospect, Scholes Township
10.	Hollinger Mines Ltd.	Line-cutting, geophysical surveys, copper-gold prospect, Cassels and Strathy townships; diamond drilling, uranium prospect, Hess-Moncrieff townships
11.	Iron City Mines Ltd.	Trenching, diamond drilling, nickel-iron prospect, Parkman Township
12.	Keith, H.	Trenching, blasting, copper-nickel prospect, Law Township
13.	Keith, J. F.	Surveying, trenching, copper prospect, Olive Township
14.	Kerr Addison Mines Ltd.	Geophysical survey, diamond drilling, uranium prospect, Hyman Township
15.	Laferriere, E.	Line-cutting, gold-iron-copper prospect, Clement Township
16.	Maki, O. T.	Geophysical Survey, diamond drilling, uranium prospect, Baldwin Township
17.	Morin, R.	Trenching, copper-nickel prospect, Best Township
18.	Pitts Engineering Ltd.	Trenching, Hyman Township
19.	Tenant, G.	Diamond drilling, trenching, nickel-copper prospect, Salter Township
20.	Vaillancourt, R. A.	Prospecting, gold-iron-copper, prospect, Clement Township

NORTHEASTERN — SUDBURY

TABLE 3 Assessment work and other information received in 1977.

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work	Year	Toronto File No.	Local File No.
Baldwin	41 I/5	Consolidated Morrison Explorations Limited	U	Assess.	Tr, GL, DD 7-736'	1977		
Baldwin	41 I/5	Glencair Mining Company Limited	U	Assess.	GP, RA, Mag, GL	1976, 1977	2.2275	2.2377
Baldwin	41 I/5	Glencair Mining Company Limited	U	Prospectus		1977		
Baldwin	41 I/5	Weirmeir, Archie		Assess.	GP, RA	1977		
Baldwin & Porter	41 I/5	Consolidated Morrison Explorations Limited	U ₃ O ₈	Assess.	DD 7-664'	1976		
Baldwin, Hyman & Porter	41 I/5	Consolidated Morrison Explorations Limited	U ₃ O ₈	Assess.	DD 4-488'	1976		
Baldwin, Porter, Hyman & Nairn	41 I/5	Consolidated Morrison Explorations Limited	U ₃ O ₈	Assess.	DD 15-5,899'	1976		
Briggs	31 M/4	Aladdin Minerals Limited	Cu, Au	Assess.	DD 2-501'	1976		
Carlyle	41 I/3	Moody, Joseph Palmer	stone	Assess.	Tr, DD 4-120'	1977		
Cassels	31 M/4	Silver Leader Mines Limited		Prospectus		1977		
Clement	41 I/16	Laferriere, Edouard	base metals		DD 1-125'	1977		
Clement	41 I/16	Vaillancourt, R. A.	Cu	Assess.	DD 1-209'	1977		
Creelman & Roberts	41 I/14	Burns, Isaac	U	Assess.	GP, RA	1976		
Creighton & Fairbank	41 I/11	Sudbury Midzone Mines Limited			DD, GL	1952		
Curtin	41 I/4	White, Stanley J.	Cu, Ni	Assess.	Tr	1977		
Dieppe	41 I/3	Mattagami Lake Mines Limited	Cu, Ni, Au	Assess.	DD 5-2087', GP, Mag, RA	1976	2.1908	
Drury	41 I/6	Alanen, William	Cu, Ni	Assess.	DD 8-2,099, GL	1976		
Drury	41 I/6	Kerr Addison Mines Limited	U	Assess.	GL, GP, RA	1976	2.2229	
Drury	41 I/6	Kerr Addison Mines Limited	U	Assess.	DD 8-6568.6'	1977		
Ellis	41 P/7	Demonsky Jr., Peter James		Tr		1977		
Hart	41 I/12	Chauvin, Claude R.		Assess.	Tr	1977		
Hawley	41 I/7	Indusmin Limited	silica	Assess.	Tr, DD 3-248'	1977		
Henry	41 I/9	Denomme, Fernand	stone?	Assess.	Tr	1977		
Hess	41 I/12	Bardswich, L. J.	Fe, Cu	Assess.	Tr	1977		
Hess	41 I/12	Hollinger Mines Limited	U	Assess.	DD 4-816'	1977		
Hutton	41 I/14	Amax Potash Limited		Assess.	GP, Mag, RA, GL	1976	2.2181	
Hutton	41 I/14	Amax Potash Limited		Assess.	DD 3-1050', GL, Tr	1977		
Hutton	41 I/14	Hanna Mining Company, The	U	Assess.	GP, RA, GL	1976	2.2252	
Hyman	41 I/5	Amax Exploration Inc.	U	Assess.	GP, RA, GL	1977	2.2318	
Hyman	41 I/5	Consolidated Morrison Explorations Limited	U ₃ O ₈	Assess.	DD 2-1919'	1977		
Hyman	41 I/5	Rose, Ed	U	Assess.	GP, RA	1976	2.1996	
Hyman	41 I/5	Rose, Ed		Assess.	GL	1977	2.1800	
Kelly	41 I/15	Duncan K. Derry Limited		Assess.	GL	1977		
LaSalle	31 L/14	Mote, G. M.		Assess.	Tr	1977		
Law	31 L/13	Keith, Herbert A.		Assess.	Tr	1977		
Loughrin	41 I/10	Plexman, E. J.		Assess.	GP, RA, Tr	1976		
Lumsden	41 I/11	Sudbury Northrim Exploration Company Ltd.			GL	1952		
Moncrieff	41 I/13	Hollinger Mines Limited	U	Assess.	GL	1976	2.2272	

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work	Year	Toronto File No.	Local File No.
Moncrieff	41 I/13	Hollinger Mines Limited	U	Assess.	GL,DD 3-796', GP,EM	1977		
Mongowin	41 I/4	Allard, J. L.	Cu,Ni	Assess.	DD 3-608'	1977		
Mongowin	41 I/4	Burns Exploration, Ike	U	Assess.	GP	1977		
Mongowin, McKinnon & Merritt	41 I/4	Mongowin-Sudbury Explorations Limited	Cu,Ni	Assess.	DD 1-339', GP	1976		
McCarthy, Eden & Hart	41 I/15	Eden-Hart Claims	Ni		GL	1972		
Nairn	41 I/5	Alanen, Wm.	Cu,Ni	Assess.	DD 1-104'	1977		
Nipissing, Lake	31 L/5	Nova Beaucage Mines Limited	Nb,U		GP,Mag,GL,DD	1952-1971		
Papineau	31 L/2	Clark, Alex H. Jr.	V, Ti,Fe	Assess.	GL	1975	2.1945	
Pardo & McNish	41 I/16	Hollinger Mines Limited		Assess.	DD 1-12.5'	1977		
Parkin	41 I/15	Barry, Harold V.	U ₃ O ₈	Assess.	Tr	1977		
Parkman	31 L/14	Hopkins, Albert		Assess.	Tr	1977		
Parkman	31 L/14	Iron City Mines Limited		Assess.	Tr	1977		
Phyllis & Scholes	41 I/16	Cull Lake Iron Mines Limited	Fe	Prospectus		1976		
Porter	41 I/5	Consolidated Morrison Explorations Limited	U	Assess.	Tr,DD 5-513'	1977		
Porter	41 I/5	Kerr Addison Mines Limited	U ₃ O ₈	Assess.	DD 1-1530'	1977		
Porter & Hyman	41 I/5	Kerr Addison Mines Limited	U	Assess.	DD 4-6451.1'	1977		
Roberts & Creelman	41 I/14	Burns, Isaac	U	Assess.	GP,RA	1976		
Roberts & Creelman	41 I/14	Burns, Isaac & Sicard, Ernest	U	Assess.	GP,RA	1976		
Roberts, Creelman & Fraleck	41 I/14	Ingamar Exploration Limited	U	Assess.	GP,RA	1977	2.2307	
Robinson	41 G/15	Union Carbide Canada Ltd.			GL	1970		
Salter	41 J/1	Massey Mine	Cu		GL	1965		
Salter & May	41 J/1	Shunck, Raymond	U	Assess.	GP,RA	1977		
Shakespeare	41 I/5	Blue, Peter G.	Au	Assess.	Tr	1977	2.2313	
Shakespeare	41 I/5	Kerr Addison Mines Limited		Assess.	GP,RA	1976	2.2293	
Shakespeare	41 I/5	Kerr Addison Mines Limited		Assess.	GP,RA,Mag	1977		
Shakespeare, Gough Salter & Victoria	41 I/5	Kerr Addison Mines Limited	U ₃ O ₈	Assess.	GL,GP,RA	1976		
Stobie	41 P/2	Pollock, John A.	U ₃ O ₈	Assess.	DD 2-628'	1976		
Stobie	41 P/2	Pollock, John A.	U ₃ O ₈	Assess.	Tr	1977		
Strathcona	31 M/4	Halonon, John E.	base metals	Assess.	DD 2-201.0'	1977		
Strathcona	31 M/4	New Force Crag Mines Limited		Prospectus		1976		
Strathcona	31 M/4	St. Joseph Explorations Limited	base metals	Assess.	GL,GP,EM	1977		
Strathy	31 M/4	Hollinger Mines Limited		Assess.	GL	1977		
Tofflemire & Venturi	41 I/12	Burns, Isaac		Assess.	Tr	1977		
Truman	41 I/4	Fielding, C.	quartz		GL	1972		
Turner & Seagram	41 P/2	Aggressive Mining Limited		Assess.	DD 3-2311'	1977		
Turner	41 P/2	Aggressive Mining Limited	U	Assess.	GL,GP,RA	1976	2.2242	
Turner	41 P/2	Rivers, Ernest J.	U	Assess.	Tr	1977		
Victoria	41 J/1	Kerr Addison Mines Limited	U	Assess.	GP,Mag	1977		
Whitson	41 P/8	Argentium Silver Mines Limited		Assess.	Tr	1976		

1977 Report of Algonquin Regional Geologist

J.R. Trusler¹ and D.J. Villard²

CONTENTS

Introduction	100
Regional Geologist's Activities	100
Mining Activity	102
Exploration Activity	102
Recommendations for Exploration	102
Geological Branch Activities	103
Ministry of Natural Resources and Other Activities	103
Recent Publications and References	103

TABLES

1— Maps and reports issued by the Geological Branch . . .	104
2— Exploration activity in 1977.	104
3— Assessment work and other information received in 1977.	105
4— Known operating quarries in the Algonquin Region, 1977	108

FIGURE

1— Algonquin Region.	101
------------------------------	-----

INTRODUCTION

A continued favourable market for uranium and the moderate interest in industrial minerals maintained the exploration level in the Algonquin Region in 1977.

Government geoscience efforts added substantially to the geological information base in the region in this past year.

REGIONAL GEOLOGIST'S ACTIVITIES

Approximately 60 to 70 percent of the Regional Geologist's time was spent in administration, supervision of staff, meetings, mineral resource assessments in parks, proposed parks, and park reserves and mineral resource input to land use planning. The remainder of

his time was spent evaluating mining operations and identifying related operating problems, and advising on field projects.

The study of marine clays in Renfrew County continued with the identification of the extent of the Leda clays, and all landslide occurrences. Selected areas were evaluated in the field and some slopes, which may fail under certain conditions causing loss in property value or personal injury are being pointed out to the involved municipal governments.

A compilation and inventory of pits and quarries in the Algonquin Region initiated in 1976 was completed in early 1977. Approximately 3,100 pits exist in the Algonquin Region of which about half are expected to be active. The estimated annual production of aggregate was 8,000,000 tons. A field inventory was subsequently started in the summer of 1977. A total of 1,200 pits were examined; material quality, areal extent, and total quantity removed were recorded. This program will be continued in the succeeding summer with the aim of eventually identifying those pits strategic to the continuous supply of reasonably priced aggregate. Due to the lack of mineral input in municipal and Ministry district land use planning, the Regional Geologist commenced a program to rectify this situation. A formal contact has been established with the District Lands Supervisors, and a program established to train these personnel in the recognition of mineral and earth resource related problems. It is expected this approach will enable these people to input into land use planning in minor matters and bring major problems to the Regional Geologist's attention.

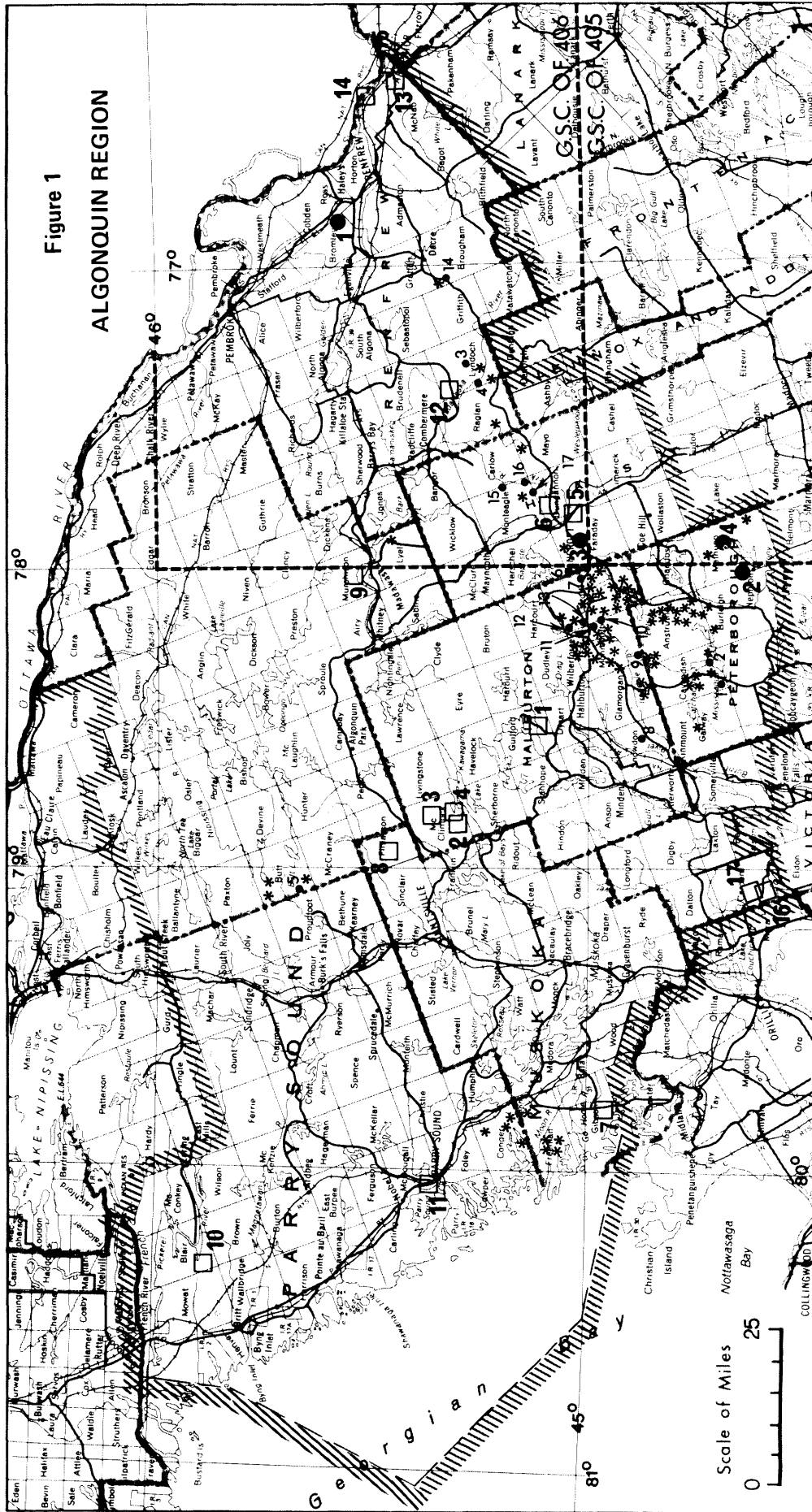
The Regional Geologist visited all operating quarries in the region this year. These are shown on Figure 1 and are listed in Table 4.

An aggregate inventory was conducted under the supervision of the Regional Geologist by R. Blair and funded by the Ministry of Treasury, Economics and Intergovernmental Affairs. The area studied is encompassed by the Pembroke, Round Lake, Golden Lake, Barry's Bay and Brudenell map-sheets of the National Topographic Series. On each map all natural aggregate-

¹Regional Geologist, Ontario Ministry of Natural Resources, Huntsville, Ontario, P0A 1K0.

²Resource Geologist.

Figure 1
ALGONQUIN REGION



EXPLANATION

- Producing mines, 1977
 - 1. Chromasco Ltd. Mg, Ca, Ti, Sr, Ba, Zr
 - 2. Indusmin Ltd. neph. syenite
 - 3. Madawaska Mines Ltd. U
 - 4. Sobin Chemicals (Canada) Ltd. neph. syenite
- Quarries known to be active in 1977 (keyed to Table 4)
- Exploration activity (keyed to Table 2)
- * Assessment work filed in 1977
- Open File Report issued by Geological Survey of Canada
- ▨ Boundary of Algonquin Region

ALGONQUIN

bearing units were outlined, quality of aggregate identified, and estimates of available quantities made. Estimates were also made of total removals to date from existing pits, and those materials which remain in reserve proximal to the pits. Quantities of natural aggregate frozen through cultural development and existing legislation were also estimated.

A cross inventory of the Regional Geologist's assessment files and the Toronto Assessment Files Research Office was conducted during the summer of 1977. A list of files available in Algonquin Region but not in the Toronto Assessment Files Research Office has been made available to the Toronto facility.

Geological mapping of the Leslie M. Frost Natural Resources Centre continued this summer under the supervision of the Regional Geologist. R. Keevil conducted the mapping and the results may be viewed at the Leslie M. Frost Natural Resources Centre.

The Regional Geologist conducted an intensive engineering evaluation at the Chromasco Limited magnesium fabrication facility near Haley Station. This and similar studies will enable the identification and prediction of the effects of market conditions and governmental policy on individual mining operations. Successful problem identification will contribute to a coordinated mineral policy, and better understanding of the effects of imposed changes on individual mining operations.

The Regional Geologist was capably assisted in January by K.E. Wallace, from February to September by D. Shaver, and in December by D.J. Villard.

MINING ACTIVITY

The Madawaska mine which was reopened in August, 1976, to produce uranium is now approaching its rated production capacity of 1,500 tons per day.

Nepheline syenite is produced from Nephton in Methuen Township by Indusmin Limited and from Blue Mountain in Methuen Township by Sobin Chemicals (Canada) Limited. Magnesium is produced from high purity dolomitic marble deposits near Haley Station in Ross Township by Chromasco Limited. Calcium and strontium are produced by the same company from purchased oxides. Chromasco Limited is currently studying the feasibility of expanding its domestic magnesium fabrication facilities employing the Magnetherm process. A two phase strategy is envisaged. Firstly, in the near term the production capacity of the existing plant would be raised and secondly, an entirely new plant of 24,000 tons annual production capacity would be constructed.

A clay deposit near Arnprior is being mined by Dochart Brick and Tile Company Limited for production of tile.

Bolenders Limited at Eagle Lake in Guilford Township operates on a year-round basis with nine employees. Dolomitic marble aggregate is produced largely for stucco dash and precast concrete veneer. A mixture of quartz and marble from one quarry provides 3500 tons of poultry grit annually for the southern Ontario market.

The Mill Lake quarry near Parry Sound produces flooring, veneer and dimension stone from an attractive, lined monzonite gneiss. The owner is currently studying the viability of marketing a ½-inch veneer stone to be applied as facing on gypsum wallboard and other panelling using a resinous adhesive.

Sodalite from the Princess quarry and rose quartz and beryl from Quadville were produced for mineral collectors again this year. Five mineral shops, in addition to these, operate year-round in the Bancroft area and many other retail stores market minerals throughout the Region. Quartz for decorative stone was produced by R. Kinsman in McClintock Township and by Comet Quartz in Murchison Township in 1977.

Canada Cement Lafarge Limited produced cut marble from Dungannon Township.

Of the remaining quarries, three are active on demand producing flagstone, chiefly from meta-arkose, two are active on demand producing aggregate from Precambrian intrusive rocks, and two are active on demand and two are operating on a continuous basis producing aggregate from Paleozoic limestone and dolostone.

EXPLORATION ACTIVITY

Staking activity declined from 1,425 claims in 1975 and 786 claims in 1976, to 647 claims in 1977. Exploration for uranium continued at a steady rate in the region. The townships immediately west of Bancroft, Butt Township, Conger and Freeman Townships, and the southern half of Renfrew County, received most attention. Some modest but promising exploration for zinc and high grade calcium carbonate was carried out in Peterborough and Hastings Counties. Pilot tests were made on a vermiculite deposit in Cavendish Township. A bulk sample of magnetite was removed from the Childs Rankin deposit in Mayo Township for the purpose of establishing the viability of a special products operation.

RECOMMENDATIONS FOR EXPLORATION

E.G. Bright (1977) further outlined the formations most likely to host uranium deposits in the Bancroft area. He also suggested that several deposits previously thought to be of vein or pegmatite origin are indeed original or reworked strata-bound deposits. Many of these appear to be spatially related to a rock previously

identified as syenite gneiss which Bright has reinterpreted as possible metavolcanic tuff.

During several visits to the Madawaska mine in 1977 the Regional Geologist was able to observe that the host rock for uranium does not conform to the so-called alaskite association. The host rock is a red feldspathic medium-to coarse-grained subsilicic rock conformable, with and intercalated with the surrounding gneiss and amphibolite. It has been suggested to the Regional Geologist that there is a similarity between the Madawaska mine and the Rossing deposit in South Africa (the World's largest uranium producer).

A better definition of genetic guides to exploration could only be revealed with comprehensive examination of the geology at the Madawaska mine. However, if the suggested similarity of Madawaska to Rossing is realistic, substantial potential exists for both essentially large conformable low grade uranium deposits and local high grade pre-metamorphic supergene deposits in the Bancroft area. Re-examination of small pegmatite associated deposits for continuity of uranium mineralization in the enclosing or intersected rocks may prove worthwhile.

Opportunities still exist to take advantage of growing industrial mineral markets which are now supplied by imports. Provided deposits of suitable quantity and quality can be found, several industrial minerals can compete with imports in Canadian industrial markets. These materials include: vermiculite, calcium carbonate, peat, silica, magnetite for speciality products, quartz, and dolomitic marble. Materials which may also be feasible to produce in southern Ontario include: various sources of rockwool insulation, fluorspar, graphite, tremolite, and feldspar.

GEOLOGICAL BRANCH ACTIVITIES

S.B. Lumbers continued reconnaissance mapping of the Pembroke area and E.G. Bright carried out field investigations to complete the Eels Lake compilation sheet. S. Themistocleous carried out a detailed mapping program in the Sebastopol Township area. Mineral deposit studies were carried out in Renfrew County under the supervision of B. Gordon, and P. Barnett initiated a program of mapping the surficial geology in Renfrew County.

R. Ross instructed at three Junior Ranger camps in the Algonquin Region. R. Keevil instructed at one Junior Ranger camp and R. Blair instructed at two Junior Ranger camps.

MINISTRY OF NATURAL RESOURCES AND OTHER ACTIVITIES

C. Spek and G. Cordiner conducted rapid earth science inventories for the Division of Parks in twenty small parks and park reserves within the Algonquin Region. Technical guidance and editorial reviews were rendered by the Regional Geologist.

W. Snider, of the Ministry of Environment, collected samples of rain water from various stations between Sudbury and Ottawa as well as samples of water from various streams and lakes. Levels of acidity and nutrients are being monitored in the rain water and in the lake and river systems. Since buffering capacities of the natural water bodies correlate very well with surficial and bedrock geology, he is also analyzing the morphology of the surficial deposits and the depths of leached and unleached materials.

J.M. McGinn, Director, Lands Administration Branch, Ministry of Natural Resources, chaired two public forums in the Region in 1977. Both meetings addressed conflicts between mining and cottaging interests. The lack of understanding of, and complete opposition to, the mining industry by the public in these two meetings was well demonstrated. Along with the present problems of exploration and mining on patented lands and in park and park reserves, this opposition could represent a serious threat to the future of mineral exploration and mining in the region. To offset this threat a serious public relations effort is needed not only to increase the public awareness of the need for minerals, the manner in which successful mineral exploration must be carried out, and the benefits of mineral production, but also to convince the public that mineral exploration can be carried out in a manner which will not have an unduly negative impact on their environment.

RECENT PUBLICATIONS AND REFERENCES

Bright, E.G.

1977: Regional Structure and Stratigraphy of the Eels Lake Area; p.110-117 *in* Summary of Field Work, 1977 by the Geological Branch, edited by V.G. Milne, O.L. White, R.B. Barlow, and J.A. Robertson, Ontario Geol. Survey Misc. Paper 75, 208p.

Cameron, B. and Mangion, S.

1977: Depositional Environments and Revised Stratigraphy Along the Black River-Trenton Boundary in New York and Ontario; *American J. Sci.*, Vol.277, p.486-502.

Coker, W.B. and Jonasson, I.R.

1977: Mineral Exploration Techniques, Geochemical Exploration for Uranium in the Grenville Province of Ontario; *CIM Bulletin*, (May), p.67-75.

ALGONQUIN

Derry, D.R.
1977: New Types of Deposits Will Provide Future Supplies of Uranium; Canadian Mining Journal (Mar.) p.56-60.

Duke, N.A. and Edgar, A.D.
1977: Petrology of the Blue Mountain and Bigwood Felsic Alkaline Complexes of the Grenville Province of Ontario; Canadian J. Earth Sci., Vol.14, No.4, p.515-538.

Fransham, P.B., and Gadd, N.R.
1977: Geological and Geomorphological Controls of Landslides in Ottawa Valley, Ontario; Canadian Geotechnical Journal, Vol.14, No.4, p.531-539.

GSC
1977: Report of Activities, Part B; Geol. Surv. Canada, Paper 76-1B, 350p.
1977: Report of Activities, Part A; Geol. Surv. Canada, Paper 77-1A, 527p.

Mitchell, S.L. and Appleyard, E.C.
1977: Miaskitic Coronites from the Bentley-Siddon Lakes Area, near Bancroft, Ontario; Canadian Mineral., Vol. 13, p.310-311.

Morris, W.A. and Roy, J.L.
1977: Discovery of the Hadrynian Polar Track and Further Study of the Grenville Problem; Nature Vol.266, p. 689-691.

Schwab, D.J. and Rao, D.B.
1977: Gravitational Oscillations of Lake Huron, Saginaw Bay, Georgian Bay, and the North Channel; J. Geophys. Res., Vol.82, No.15, p.2105-2116.

TABLE 1 | MAPS AND REPORTS PERTAINING TO THE ALGONQUIN REGION, ISSUED BY THE GEOLOGICAL BRANCH OF THE ONTARIO MINISTRY OF NATURAL RESOURCES IN 1977. SEE "LIST OF PUBLICATIONS" (BACK POCKET) FOR DETAILS.

MISCELLANEOUS PAPERS
MP 71
MP 75

PRELIMINARY MAPS
P. 1062 (1977 Revision)
P. 1228
P. 1229
P. 1246
P. 1247

OPEN FILE REPORTS
5227 (also issued by Geol. Surv. Canada as OF 405)
5228 (also issued by Geol. Surv. Canada as OF 406)
5229
5230

TABLE 2 Exploration activity in 1977.

Number on Figure	Individual or Company	Activity
1	Raycon Resources	Drilling
2	Goshawk Mines Ltd.	Geol. Mapping, Geochem., Drilling, Str., Tr.
3	Jim Bryan	Tr.
4	Russel J. Crawford	Tr.
5	Jim Lupo	Tr.
6	Western Mines	Drilling
7	Carday Uranium Mines Ltd.	Drilling
8	A. Hopkins	Drilling, Str., Rad.
9	Copper Lake Explorations Ltd.	Geol. Mapping, Drilling, Mag., EM, Str., Tr.
10	Powerex Resources Ltd.	Drilling, Str.
11	Landair Explorations Ltd.	EM, Str.
12	Carbrew Explorations Ltd.	Drilling, Rad., EM
13	Enertex Developments Inc.	Rad.
14	Imperial Oil Ltd.	Drilling
15	T.E. Barton	Drilling, Geol. Mapping, Geochem., Mag., Str.
16	Forefront Consolidated Explorations Ltd.	Drilling, Geophys.
17	New Kelora Mines Ltd.	Mag., Rad.

TABLE 3 Assessment work and other information received in 1977.

		Abbreviations							
D.D. (2-715')	- Diamond drilling, 2 holes, 715 feet total	Geol.	- Geological survey	Rad.	- Radiometric survey				
EM.	- Electromagnetic survey	Geophys.	- Geophysical survey	Str.	- Stripping				
Geochem.	- Geochemical survey	Mag.	- Magnetic survey	Tr.	- Trenching				
		MEAP	- Mineral Exploration Assistance Program Report						
Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work	Year	Toronto File No.	Local File No.	
HALIBURTON CO. CARDIFF TWP.	31 E/1	Enertex Developments Inc.	Uranium & Fluorite	Geol., Geophys.	Geol., EM., Rad.	1977	2.2402	Cardiff 165	
	31 D/16	Kerr Addison Mines Ltd.	Uranium	Geochem.	Radon in soil	1976	2.2160	Cardiff 166	
	31 D/16	Kerr Addison Mines Ltd.	Uranium	Geochem.	Radon in lake sediment	1976	2.2161	Cardiff 167	
	31 D/16	Kerr Addison Mines Ltd.	Uranium	Geophys.	Rad.	1976	2.2278	Cardiff 168	
	31 D/16	Ridgemar Explorations & Development Co. Ltd.	Uranium	Drill logs, Geophys. (MEAP)	D.D. (10-1462.5')	1976	MEAP E.O. 14	Cardiff 169	
	31 D/16	Kerr Addison Mines Ltd.	Uranium	Geochem., Geophys.	Radon in soil, Rad.	1976	2.2216	Cardiff 170	
	31 D/16	Kerr Addison Mines Ltd.	Uranium	Geophys.	Rad.	1976	2.2233	Cardiff 171	
HALIBURTON CO. CARDIFF TWP.	31 D/16	Kerr Addison Mines Ltd.	Uranium	Geochem.	Radon in soil	1976	2.2287	Cardiff 173	
	31 D/16	Kerr Addison Mines Ltd.	Uranium	Drill logs	D.D. (1-350')	1977		Cardiff 174	
	31 D/16	Ridgemar Explorations & Development Co. Ltd.	Uranium	Drill logs	D.D. (2-607')	1977		Cardiff 175	
	31 D/16	Kerr Addison Mines Ltd.	Uranium	Drill logs	D.D. (1-260.3')	1977		Cardiff 176	
	31 E/1	Kerr Addison Mines Ltd.	Uranium	Geochem.	Radon in soil	1975	2.2160	Cardiff 177	
	31 D/16	Kerr Addison Mines Ltd.	Uranium	Geochem.	Radon in soil	1975	2.2027	Cardiff 178	
	31 D/16	Kerr Addison Mines Ltd.	Uranium	Geochem.	Radon in soil	1975	2.2027	Cardiff 179	
	31 D/16	Kerr Addison Mines Ltd.	Uranium	Drill logs	D.D. (1-347.4')	1976		Cardiff 180	
	31 D/16	Kerr Addison Mines Ltd.	Uranium	Drill logs	D.D. (1-348.6')	1976		Cardiff 181	
	31 D/16	Kerr Addison Mines Ltd.	Uranium	Geophys.	Rad.	1976	2.2286	Cardiff 182	
	31 D/16	Kerr Addison Mines Ltd.	Uranium	Geol.	Geol.	1976	2.2286	Cardiff 183	
	31 E/1	Carbrew Explorations Ltd.	Uranium Molybdenite	Prospectus		1977	63.3477	Cardiff 184	
	HALIBURTON CO. GLAMORGAN TWP.	31 D/16	Crystal Comstock Mines Ltd.	Uranium	Geol. (Prospectus)	Geol.	1977		Glamorgan 13
31 D/16		Edgewood Explorations Ltd.	Uranium	Drill logs	D.D. (3-792.5')	1977		Glamorgan 14	
31 D/16		Edgewood Explorations Ltd.	Uranium	Geol., Geophys., Drill logs	Geol., Rad., D.D. (10-3220.9')	1977		Glamorgan 15	
HALIBURTON CO. LUTTERWORTH TWP.	31 D/15	St. Joseph Explorations Ltd.		Geophys.	Mag., EM.	1976	2.2330	Lutterworth 13	
HALIBURTON CO. MONMOUTH TWP.	31 E/1	New InSCO Mines Ltd.	Uranium	Geol., Geophys.	Geol., Rad.	1976		Monmouth 89	
	31 D/16	Powerex Resources Ltd.	Uranium	Geol., Geophys., Drill logs (MEAP)	Geol., Rad., EM. D.D. (3-1981')	1976	MEAP EO-9	Monmouth 90	
	31 D/16	Imperial Oil Ltd.	Uranium	Geol., Geophys.	Geol., Rad.	1976		Monmouth 91	

ALGONQUIN

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work	Year	Toronto File No.	Local File No.
	31 D/16	Imperial Oil Ltd.	Uranium	Geol., Geophys.	Geol., Rad.	1976	2.2191	Monmouth 92
	31 D/16	Lacana Mining Corp.	Uranium	Geol., Geophys., Geochem.	Tr., Str., Geol., Mag., Radon in soil	1976	2.2147	Monmouth 93
	31 D/16	St. Joseph Explorations Ltd.		Geol.	Geol.	1976	2.2299	Monmouth 94
HALIBURTON CO. MONMOUTH TWP.	31 D/16	Imperial Oil Ltd.	Uranium	Geol., Geophys.	Geol., Rad.	1976	2.2322	Monmouth 95
	31 E/1	Highland Mercury Mines Ltd.	Uranium	Assays		1977		Monmouth 96
	31 E/1	Highland Mercury Mines Ltd.	Uranium	Sketch	Tr.	1977		Monmouth 97
	31 E/1	Highland Mercury Mines Ltd.	Uranium	Geol., Geophys.	Geol., Mag.	1976		Monmouth 98
	31 D/16	Thomas J. Czuppon		Sketch	Tr.	1977		Monmouth 99
HASTINGS CO. DUNGANNON TWP.	31 F/4	Steetley Industries Ltd.	Marble	Geol.	Geol.	1976	2.2249	Dungannon 21
HASTINGS CO. FARADAY TWP.	31 F/4	Robert L.V. Ekstrom	Uranium	Geophys.	Mag.	1977	2.2344	Faraday 56
	31 E/1	Western Mines Ltd.	Uranium	Sketch	Tr.	1977		Faraday 57
HASTINGS CO. MAYO TWP.	31 F/4	A.H. Clark		Sketch	Tr.	1977		Mayo 7
HASTINGS CO. MONTEAGLE TWP.	31 F/4	Forefront Uranium Mines Ltd.	Uranium	Geochem. (MEAP)	Radon in soil	1976	MEAP (EO-21)	Monteagle 13
DIST. OF MUSKOKA FREEMAN TWP.	31 E/4	M. M. Phillips	Uranium	Sketch	Tr.	1976		Freeman 8
	31 E/4	L. A. Landrigan	Uranium	Sketch	Str.	1976		Freeman 9
	31 E/4	M. M. Phillips	Uranium	Sketch	Str.	1977		Freeman 10
DIST. OF MUSKOKA FREEMAN TWP.	31 E/4	M. M. Phillips	Uranium	Sketch	Tr.	1977		Freeman 11
DIST. OF NIPISSING BUTT TWP.	31 E/11	C. D. Gris	Uranium	Geol.	Geol.	1976	2.2195	Butt 10
	31 E/11	E. J. Rivers	Uranium	Sketch	Tr., Str.	1977		Butt 11
	31 E/11	C. D. Gris	Uranium	Sketch	Str.	1977		Butt 12
DIST. OF NIPISSING LYELL TWP.	31 F/15	C. S. Culbert		Sketch	Str.	1977		Lyell 2
DIST. OF PARRY SOUND CONGER TWP.	31 E/4	Mid-North Engineering Services Ltd.	Uranium	Geol., Geophys.	Geol., Mag., Rad.	1976	2.2279	Conger 6
	31 E/4	Mid-North Engineering Services Ltd.	Uranium & Copper	Drill logs	D.D. (6-1585')	1977		Conger 7
DIST. OF PARRY SOUND FERRIE TWP.	31 E/2	Everett Jones	Copper	Sketch	Tr.	1976		Ferrie 7
PETERBOROUGH CO. ANSTRUTHER TWP.	31 D/16	Imperial Oil Ltd.	Uranium	Geol.	Geol.	1976	2.2172	Anstruther 49
	31 D/16	Fin Resources Inc.	Uranium	Geol., Geophys., (MEAP)	Geol., Rad., Mag.	1976	MEAP EO-22	Anstruther 50
	31 D/16	Imperial Oil Ltd.	Uranium	Geol.	Geol.	1976	2.2203	Anstruther 51
	31 D/16	Imperial Oil Ltd.	Uranium	Geol., Geophys.	Geol., Rad.	1976	2.2211	Anstruther 52

Location	NTS	File Name	Commodity Sought	Type of Report	Time of Work	Year	Toronto File No.	Local File No.
PETERBOROUGH CO. ANSTRUTHER TWP.	31 D/16	Kerr Addison Mines Ltd.	Uranium	Geochem., Geophys., (MEAP)	Radon in soil, Rad.	1976	MEAP EO-11	Anstruther 53
	31 D/16	Kerr Addison Mines Ltd.	Uranium	Geochem., Geophys.	Radon in soil, Rad.	1976	2.2231	Anstruther 54
	31 D/16	Kerr Addison Mines Ltd.	Uranium	Geophys.	Rad.	1976	2.2217	Anstruther 55
	31 D/16	Kerr Addison Mines Ltd.	Uranium	Geophys., Geochem.	Rad., Radon in soil	1976	2.2232	Anstruther 56
	31 D/16	Imperial Oil Ltd.	Uranium	Geol.	Geol., Tr.	1977		Anstruther 57
	31 D/16	Kerr Addison Mines Ltd.	Uranium	Drill logs	D.D. (1-396.5')	1977		Anstruther 58
	31 D/16	Fin Resources Inc.	Uranium	Geol., Geophys.	Geol., Rad., Mag.	1976	2.2267	Anstruther 59
	31 D/16	Kerr Addison Mines Ltd.	Uranium	Drill logs	Assays, D.D. (1-349.5')	1977		Anstruther 60
	31 D/16	Imperial Oil Ltd.	Uranium	Drill logs	D.D. (3-181')	1977		Anstruther 61
	31 D/16	Fin Resources Inc.	Uranium	Drill logs	D.D. (2-1287') Geol. plan	1977		Anstruther 62
	31 D/9 & 16	Anstruther & Burleigh Twp. Properties	Uranium	Property summation	Geol., Rad. D.D.	1959		Anstruther 63
	31 D/9 & 16	Newkirk Mining Corp. Ltd.	Uranium	Geol.	Geol.	1954		Anstruther
PETERBOROUGH CO. BURLEIGH TWP.	31 D/9	Pole Star Mines Ltd.	Uranium	Geol., Geophys.	Geol., Rad.	1954		Burleigh 16
	31 D/9	Bibis Yukon Mines Ltd.	Uranium	Drill sections	D.D. (6-2405')	1954 (?)		Burleigh 17
PETERBOROUGH CO. CAVENDISH TWP.	31 D/16	R. W. Drude	Uranium	Assessment	Assays			Cavendish 63
	31 D/9	Goshawk Mines Ltd.	Vermiculite	Progress (MEAP)	Tonnage calculations Tr., D.D. (63-3,881')	1976	MEAP EO-23	Cavendish 64
	31 D/9	Goshawk Mines Ltd.	Vermiculite	Drill logs (MEAP)	D.D. (6-818')	1976	MEAP EO-23	Cavendish 65
	31 D/16	R. W. Drude	Uranium	Geophys.	Rad., Mag.	1976	2.2258	Cavendish 66
	31 D/16	R. W. Drude	Uranium	Sketch	Tr.	1977		Cavendish 67
	31 D/16	R. W. Drude	Uranium	Sketch	Tr., Assays	1977	2.2354	Cavendish 68
PETERBOROUGH CO. GALWAY TWP.	31 D/10	Andrew J. Troop	Uranium	Geol., Geophys.	Tr., Geol., Rad.	1976		Galway 24
PETERBOROUGH CO. METHUEN TWP.	31 C/12	Can. White Pigments Corp.	Marble	Drill logs	D.D. (14-4,027')	1976		Methuen 24
	31 C/12	V. Reynolds		Drill logs	D.D. (2-194')	1977		Methuen 25
RENFREW CO. BLITHFIELD TWP.	31 F/2	Nicholas Axiotis	Uranium	Geophys.	Rad.	1976	2.2265	Blithfield 10
RENFREW CO. BROUGHAM TWP.	31 F/6	Imperial Oil Ltd.	Uranium	Geol., Geophys.	Geol., Rad.	1976	2.2177	Brougham 9
RENFREW CO. LYNDOCH TWP.	31 F/3	St. Joseph Explorations Ltd.	Zn	Geol.	Geol.	1976	2.2239	Lyndoch 10
	31 F/3	R. J. Crawford		Sketch	Tr., Str.	1977		Lyndoch 11.
RENFREW CO. RAGLAN TWP.	31 F/4	James A. Bryan		Drill log	D.D. (1-150.8')	1976		Raglan 15

TABLE 4 Known operating quarries in the Algonquin Region, 1977.

OPERATOR	MATERIAL	QUARRY LOCATION
<u>HALIBURTON COUNTY:</u>		
1. Bolenders Ltd. Eagle Lake	Marble Stucco dash Precast concrete veneer Quartzite Poultry grit.	Conc. IV, Lot 24-25, Guilford Twp.
2. Wayne Borer R.R. #2, Norval	Tonalite & Meta-arkose Flagstone	Conc. II, Lot 16-17 McClintock Twp.
3. Richard Kinsman R.R. #2, Minden	Quartz	Conc. VI-VII, Lot 23-24, McClintock Twp.
4. Leonard Lock, Box 69, Dorset	Meta-Arkose Flagstone	Conc. II, Lot 20, McClintock Twp.
<u>MASTINGS COUNTY:</u>		
5. Canada Cement Lafarge Ltd.	Marble	Conc. X, Lot 29-30, Dungannon Twp.
6. Princess Sodalite Mine Bancroft	Sodalite	Conc. XIV, Lot 25, Dungannon Twp.
<u>DISTRICT OF MUSKOKA:</u>		
7. "Gibson River Quarry" Brennan Paving Co., 400 Gage Avenue N., Hamilton. - also M.T.C.	Monzonite & Tonalite Aggregate	Conc. III-IV, Lot 22-23, Gibson Ward, Township of Georgian Bay.
<u>DISTRICT OF NIPISSING:</u>		
8. Joseph Cotterchio, R.R. #2, Huntsville	Meta-Arkose Flagstone	Conc. IX, Lot 15, Finlayson Twp.
9. Comet Quartz Ltd. Box 267, Free Press Bldg. Whitney	Quartz	Conc. IV, Lot 14-15, Murchison Twp.
<u>DISTRICT OF PARRY SOUND:</u>		
10. Law Construction Box 9, Campbellville	Tonalite gneiss aggregate	Conc. VI, Lot 31, Blair Twp.
11. Mill Lake Stone Quarry Box 1174, Parry Sound	Flooring, veneer, dimension stone	Conc. III, Lot 24-25, McDougall Twp.
<u>RENFREW COUNTY:</u>		
12. Wal-Gem Mines and Minerals Quadeville	Beryl and Rose Quartz	Conc. XV, Lot 30 Lyndoch Twp.
13. Hoffman Concrete Products Ltd., R.R. #6, Pembroke	Dolostone Aggregate	Conc. IX, Lot 1, McNab Twp.
14. Smith Construction	Dolostone Aggregate	Conc. A, Lot 16, McNab Twp.
15. Dochart Brick and Tile Co. Ltd., Arnprior	Tile	Conc. XIII, Lot 7,8 McNab Twp.
<u>VICTORIA COUNTY:</u>		
16. Gormley Sand and Gravel Bethesda Side Road Bethesda, Toronto	Limestone Aggregate	Conc. I, Lot 1-4, Carden Twp.
17. Repac Construction Box 177, West Hill	Limestone Aggregate	Conc. II, Lot 4, Carden Twp.

1977 Report of Eastern Regional Geologist

A.E. Thurston¹

CONTENTS

Introduction	109
Economic Development	109
Geological Mapping and Mineral Assessment	111
Sensitive Clays.	111
Public Awareness Programs	112
Geological Branch Activities.	112
Geological Survey of Canada Activities.	112

TABLES

1— Maps and reports issued by the Geological Branch . . .	112
2— Exploration activity in 1977.	113
3— Assessment work and other information received in 1977.	113

FIGURE

1— Eastern Region	110
-----------------------------	-----

INTRODUCTION

In the Eastern Region, the duties of Regional Geologist are one of several functions of the Regional Mines Co-ordinator. Activities in the Eastern Region again centred on sensitive clay studies, aggregate resources, and exploration activities with particular emphasis on industrial minerals. Additional projects included public awareness and interpretive programs, geological mapping, aggregate and slope stability studies, and resource planning.

The staff of the Eastern Regional office provided geological and geotechnical consultation to several government agencies which included the Ministries of Environment; Transportation and Communications; Treasury, Economics and Intergovernmental Affairs; Housing; Industry and Tourism; the St. Lawrence Parks Commission; Ontario Hydro; Energy, Mines and Resource's Canada; and Parks Canada. The office staff also worked in close co-operation with companies, consultants, and individuals as well as providing geologi-

cal, engineering, and mining economic data. Besides giving talks at several technical meetings and seminars, information was also provided to members of the public, prospectors, and exploration companies. A number of sites under investigation for development were visited by the Regional Mines Co-ordinator.

Contrary to the almost Province-wide trend, exploration activity has increased in this region. The number of claims staked rose from 384 in 1976 to 539, a 40 per cent increase.

The position of Mineral Resources Manager was added to the region to supervise aggregate management. The enforcement and compilation of electrical and mechanical facilities in all pits and quarries in the region that was initiated in 1976, was completed this year. The mines engineering function of the Division of Mines was transferred to the Ministry of Labour in April.

A blasting course to familiarize ministry personnel with explosives was organized by the Regional Mines Co-ordinator. The two-day course, held in Tweed District, had 30 participants.

ECONOMIC DEVELOPMENT

Increasing interest has been shown by private industry in exploring for industrial minerals in eastern Ontario. This renewed interest is compatible with the industrial mineral assessment and feasibility studies that have been undertaken over the past three years by the region.

T.E.I.G.A. The Economic Development Branch of the Ministry of Treasury, Economics, and Intergovernmental Affairs is studying the mineral resources of eastern Ontario to identify potentially viable operations in the region. This study has coincided well with the ongoing industrial mineral studies in this region and the Algonquin Region.

Industrial Mineral Development. In eastern Ontario, a number of mineral resources could be profitably exploited to boost the economy. Mines staff in the Algonquin and Eastern Regions reviewed in detail with the Economic Development Branch of the Ministry of Treasury, Economics and Intergovernmental Affairs,

¹ Resource Geologist for M.A. Klugman, Regional Mines Co-ordinator Eastern Region, Concession Road, Kemptville, Ontario, K0G 1J0.

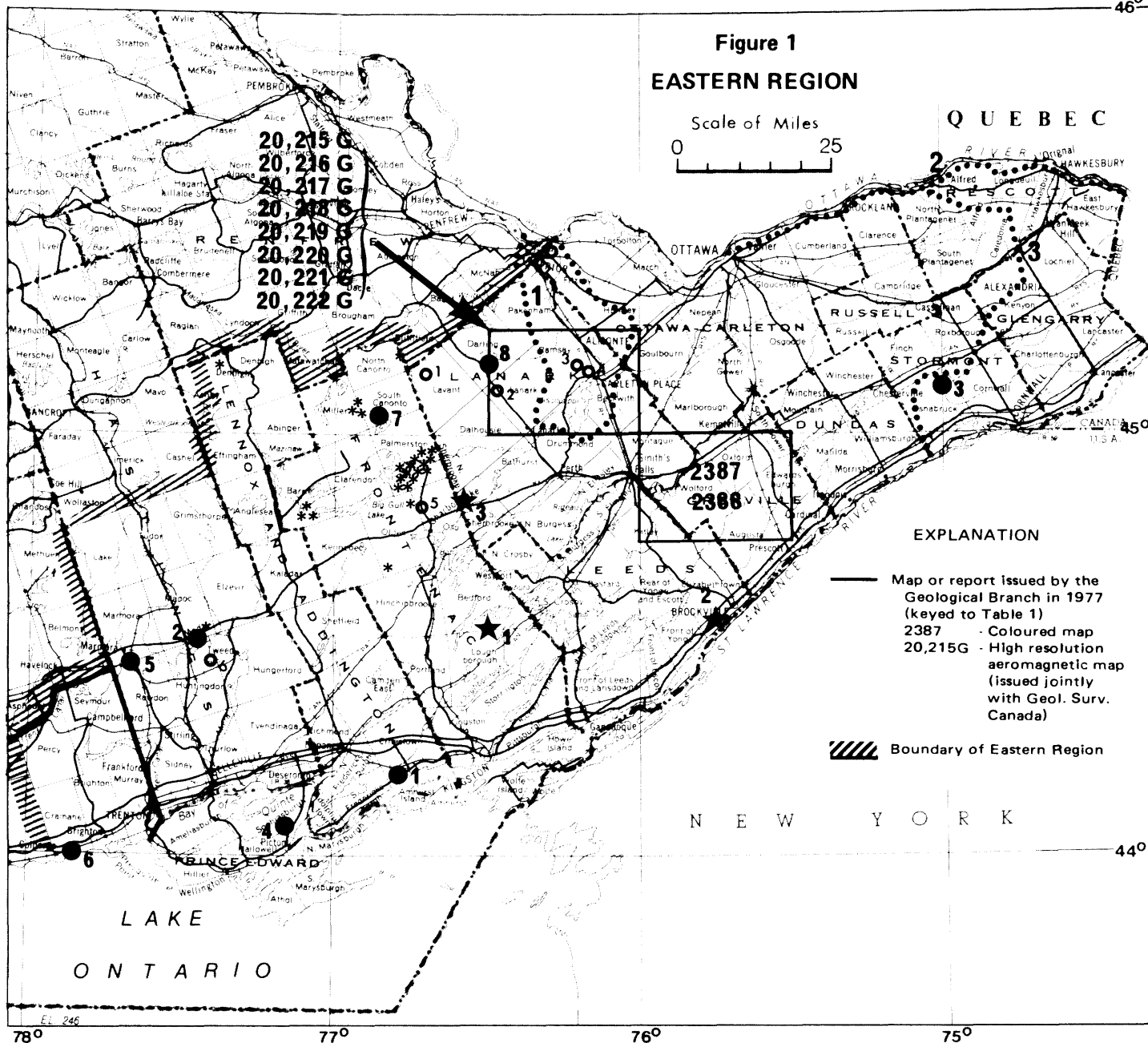


Figure 1
EASTERN REGION

Scale of Miles
0 25

EXPLANATION

- Map or report issued by the Geological Branch in 1977 (keyed to Table 1)
- 2387 - Coloured map
- 20,215 G - High resolution aeromagnetic map (issued jointly with Geol. Surv. Canada)
- ▨ Boundary of Eastern Region

EXPLANATION

- | | |
|---|--|
| <ul style="list-style-type: none"> ● Producing mines (excepting stone quarries, clay, sand, gravel, and silica extractive operations) <ul style="list-style-type: none"> 1. Canada Cement Lafarge Ltd. limestone (cement) 2. Canada Talc Industries Ltd. talc 3. Diamond Peat Moss peat 4. Lake Ontario Cement Co. Ltd. limestone (cement) 5. Marmoraton Mining Co. iron 6. St. Lawrence Cement Co. Ltd.,
Ogden Point Quarry limestone (cement) 7. TMF Mineral Resources Ltd. magnetite 8. William R. Barnes Co. Ltd. calcium carbonate ○ Exploration activity (undocumented) (keyed to Table 2) | <ul style="list-style-type: none"> * Assessment work filed in 1977 (keyed to Table 3) ★ Geological mapping of Provincial Parks <ul style="list-style-type: none"> 1. Frontenac Provincial Park 2. St. Lawrence Parkway 3. Silver Lake Provincial Park — Northumberland aggregate study ●●●● Slope stability studies <ul style="list-style-type: none"> 1. Mississippi River Valley 2. Ottawa River 3. Raisin Rigaud River Basins |
|---|--|

possible mineral resources which could promote regional development given the right incentives. Iron, silica, peat, crystalline limestone, and vermiculite are seen as some of these potential resources.

This study of industrial mineral potential has been an on going program in the region over the past three years. In identifying and studying the feasibility of the individual commodities, all aspects of development are considered including the geology, mining methods, beneficiation, market, economics and infrastructure. In studying the individual commodities, the staff of the region have cooperated closely with companies and individuals in an attempt to encourage the private sector in assessing and exploiting these commodities.

Canadian Council on Rural Development. A workshop sponsored by the Canadian Council on Rural Development was held in October in Perth. The future development of eastern Ontario, and how various approaches could affect it, was discussed. Several regional ministry personnel gave presentations; M.A. Klugman emphasized the need for exploitation of industrial minerals and for sequential land use.

Resource Planning for Eastern Ontario. The Ontario Ministry of Housing and the United Counties of Stormont, Dundas and Glengarry held a conference in Cornwall in October to discuss and review resource planning in eastern Ontario. The Regional Mines Co-ordinator assisted at the workshop dealing with aggregate resources.

Recommendations for Exploration. Besides the industrial mineral programs, an increasing amount of base metal exploration is taking place in the Grenville Province in this region. Mineralization and logistics of the area are favourable and require incentive for economic development.

Exploration for uranium is increasing in Hastings and Frontenac Counties. Some interest has been expressed in uranium showings in March Township in the Regional Municipality of Ottawa-Carleton.

GEOLOGICAL MAPPING AND MINERAL ASSESSMENT

A number of mapping projects were begun this year or continued from last year.

Parks Mapping. The second half of the map-area along the St. Lawrence River, between Brockville and Gananoque, was mapped, completing the mapping of the bedrock geology. Mapping was carried out in conjunction with the regional and district staff of the Division of Fish and Wildlife, who undertook a life science survey. This program is part of a co-operative project to map geological and biological features in detail along the St. Lawrence River valley from the Quebec border to Prince Edward County.

Mapping of the bedrock geology of Silver Lake Provincial Park was completed this summer. A report and map will be available to the park for their interpretive

program next year.

A co-operative program with the Division of Parks in the region involving check mapping of the bedrock geology in several Provincial parks is underway. A geologist hired by Regional Parks Branch under the technical guidance of the Regional Mines Co-ordinator mapped Frontenac Provincial Park in detail. This mapping will provide background information that will later be used for interpretive programs.

Aggregate. Aggregate is in short supply in parts of the Tweed District. A field study was undertaken in May to locate aggregate deposits in Grimsthorpe Township which could be exploited for use in the construction of forest access roads in the area.

Funded by the Ministry of Treasury, Economics, and Intergovernmental Affairs through the Northumberland Task Force, a technical assessment of aggregate reserves in Northumberland County was initiated, scheduled for completion in May 1978. This is the second assessment study; the first was carried out in 1976 in co-operation with the Regional Municipality of Ottawa-Carleton. These programs classify the aggregate both quantitatively and qualitatively and are designed for use by land-use planners.

An inventory of all pits and quarries in the region was started in 1977. In addition to the location of the pits and quarries, a preliminary estimate of the reserves, quantity removed, state of activity and rehabilitation are recorded.

Compilation of Regional Geology. Compilation of the regional bedrock geology at a scale of 1:250,000 continued.

District Land-Use Plans. Each district is preparing a land-use plan based on background information reports. Input by the Division of Mines has been provided for Lanark and Tweed Districts, and is planned for Cornwall District in the near future.

SENSITIVE CLAYS

Sensitive marine clays of eastern Ontario are still a prime concern especially in the realm of construction. Several regional government agencies review proposals for severances, subdivisions, dams, bridges, and other construction. Consultation on the stability of slopes and on the soil conditions is provided by the Regional Mines Co-ordinator who may recommend that developers retain a geotechnical engineer in problem areas. Field inspections were done on many of the sites to provide specific information on the stability of slopes and soils, and to provide suggestions for protective or remedial work.

Slope Stability Study of the South Nation River Basin. Final field checking was completed in the South Nation Watershed. The bulk of the field work and report preparation was done in 1976. The manuscript and maps

EASTERN

are in final form.

Slope Stability Study of the Mississippi River Watershed. A field study was completed this summer on the tributaries of the Mississippi River where it flows through sensitive marine clay. The map and report are at the drafting stage.

Slope Stability Study of the Raisin River and Rigaud River Watershed. A slope stability study was carried out on the eastern portion of the Region. Slopes along the St. Lawrence River in this area were also checked for stability.

PUBLIC AWARENESS PROGRAMS

Geology projects aimed at the public have been well received; there is an increasing demand for these informative and educational programs.

Four scale-models were constructed to illustrate that with sequential use, a pit or quarry can be rehabilitated to accommodate any number of developments including a residential area, a school, and an industrial park. These models have been displayed at exhibitions and conferences in the Eastern Region.

Junior Ranger Camps were visited again this summer to present geology talks and to give the Junior Rangers an insight into the Division of Mines' activities within the Ministry framework. On one occasion the talk was given in conjunction with a presentation by the Women's Affirmative Action Committee.

Geological information for park interpretive programs was provided for Charleston Lake and Silver Lake Provincial Parks. A display on small-scale mining in the Silver Lake area was completed for that park.

Further planning on the design of a working model of an Eastern Ontario gold mine was provided. When completed, the mini-mine will be used in Provincial parks in the area to increase public awareness about past and possible future mining in southern Ontario.

A number of requests were received for talks on a range of geological topics; lectures were given at Carleton University and several high schools.

A memorial in Marmora was dedicated to the late H.C. Rickaby, Deputy Minister of Mines from 1938 to 1960.

GEOLOGICAL BRANCH ACTIVITIES

J.M. Wolff of the Precambrian Geology Section completed detailed mapping of the Kaladar area. This portion of the Grenville structural province is adjacent to and south of the Clarendon Lake Area mapped by J.M. Moore in 1976.

Mapping by S.B. Lumbers was done in the Renfrew area in parts of Renfrew, Frontenac, Lanark, and

Lennox and Addington Counties.

Mapping by P.J. Barnett of the Quaternary geology of the Renfrew, Cobden, and Fort Coulonge areas of Renfrew and Lanark Counties included a small portion of the Eastern Region.

M.A. Vos and C.C. Storey examined deposits of marble, pegmatite, nepheline, graphite, garnet, sillimanite, zircon, and strontium. This project is part of a study requested by the Ministry of Treasury, Economics and Intergovernmental Affairs to encourage exploration and development as well as to aid governmental planning and policy guidance.

E.B. Freeman of the Geoscience Information Office conducted a four-day practical field work course at Madoc.

GEOLOGICAL SURVEY OF CANADA ACTIVITIES

J.E. Harrison carried out geomorphological studies in the Ottawa area with the hypothesis that many of the geomorphic features of the area were formed by coastal processes rather than by glacial or fluvial processes.

N.R. Gadd reported on an off-lap sedimentary sequence in sediments of the Champlain Sea in the Ottawa Valley.

I.R. Jonasson, B.W. Charbonneau, and K.L. Ford studied the nature and formation of radioactive hydrocarbons from Ordovician dolomitic sandstone in the Ottawa area.

Pore pressure measurements in sensitive clay slopes were taken by P. Fransham and D. Battrum. Data obtained will be used to help determine slope stability.

TABLE 1 | MAPS AND REPORTS PERTAINING TO THE EASTERN REGION, ISSUED BY THE GEOLOGICAL BRANCH OF THE ONTARIO MINISTRY OF NATURAL RESOURCES IN 1977. SEE "LIST OF PUBLICATIONS" (BACK POCKET) FOR DETAILS.

MINERAL DEPOSIT CIRCULAR MDC 15	COLOURED MAPS 2387 2388
MISCELLANEOUS PAPERS MP 70 MP 71 MP 73 MP 74 MP 75	PRELIMINARY MAPS P. 1229 P. 1247
OPEN FILE REPORTS OFR 5229 OFR 5230	
HIGH-RESOLUTION AEROMAGNETIC MAPS 20,215G-20,222G incl. (also issued by Geol. Surv. Canada) 40,001G-40,008G incl. (also issued by Geol. Surv. Canada)	

TABLE 2 Exploration activity in 1977.

NUMBER ON FIGURE	INDIVIDUAL OR COMPANY	TYPE OF WORK
1	not documented	Trenching and diamond drilling for base metals
2	not documented	Trenching and diamond drilling for base metals
3	not documented	Base metal exploration
4	not documented	Base metal exploration
5	not documented	Uranium exploration
6	not documented	Industrial mineral exploration

TABLE 3 Assessment work and other information received in 1977.

			Abbreviations					
Ag	- silver	EM	- Electromagnetic Survey	Pb	- lead			
Air	- Airborne Survey	Fe	- iron	RA	- Sampling, Assaying			
Assess	- Assessment Work	GL	- Geological Survey	Spec	- Spectrometer Survey			
Au	- gold	GP	- Geophysical Survey	TR	- Trenching			
Cu	- copper	Mag	- Magnetometer Survey	U	- uranium			
DDH 4-230	- 4 diamond drill holes totalling 230 feet	MEAP	- Mineral Exploration Assistance Program	Zn	- zinc			
Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work	Year	Toronto File No.	Local File No.
Ashby	31F/3	C.C. Allen	garnet	Assess	GL	1976	2.2277	Ashby 2
Barrie	31C/14	Henry F. Cook	Ag, Cu, Pb, Zn	Assess	GL	1976	2.2255	Barrie 31
Barrie	31C/14	Henry F. Cook	Ag, Cu, Pb, Zn	Assess, MEAP	DDH 4-230, TR	1976	63.3443	Barrie 33
Barrie	31C/14	Henry F. Cook	Ag, Cu, Pb, Zn	Assess, MEAP	DDH 1-112, TR, SA	1977		Barrie 34
Marmora	31C/5 & 12	J.R. Harrington	Au	Assess	EM	1976	2.2158	Marmora 9
Miller	31F/2	Thomas Skimming & Associates Limited	U	MEAP	GL, GP	1977		Miller 2
Miller & South Canonto	31F/2	Beach Gold Mines Limited	U	Assess	Air Spec	1976	2.2274	South Canonto 8
Miller & South Canonto	31F/2	J.P. Honsberger	U	Assess	DDH 5-1500	1976 1977		South Canonto 9
North Canonto & Blithefield	31F/2	N. Axiotis	U	Assess	RA	1977	2.2265	North Canonto 1
Olden	31C/10	Lynx-Canada Explorations Ltd.	sulphides	Assess	EM, Mag	1976	2.2171	Olden 31
Olden-Oso	31C/15	Mid-East Developments Ltd.	U	Assess, MEAP	DDH 16-3867, GL RA, SA, TR	1976 1977		Olden 34
Palmerston	31C/15	Lou Golant	U	Assess	SA	1976	2.2184	Palmerston 18
Palmerston	31C/15	Grange Mining Corporation Ltd.	U	Assess	Air Mag, Air RA	1976	2.2169	Palmerston 19
Palmerston	31C/15	D.W. Riddell	Fe, U	Assess	Air Mag, Air Spec	1976	2.2240	Palmerston 21
Palmerston	31C/15	Canorex Developments Limited	U	MEAP	DDH 5-452, GL, RA	1977		Palmerston 22
Palmerston	31C/15	D.W. Riddell	Fe, U	Assess	Air Mag, Air RA	1976	2.2284	Palmerston 23
Palmerston	31C/15	R.J. Wright	Fe, U	Assess	Air Mag, Air RA	1976	2.2253	Palmerston 25
Palmerston	31C/15	Noranda Exploration Co. Ltd.	U	Assess, MEAP	DDH 5-2158, GL, RA	1977	2.2490	Palmerston 27
Palmerston	31C/15	Westwind Mines Limited	U	MEAP	DDH 8-1853, RA	1977		Palmerston 28
Palmerston	31C/15	Bijou Mines Limited	U	Assess	DDH 1-243	1977	2.2502	Palmerston 29
Palmerston	31C/15	Ram Petroleum Limited	U	Assess	RA, TR	1976 1977	2.2469	Palmerston 30
Palmerston	31C/15	Elwood L. Reid	U	Assess	Air Mag, Air RA	1977	2.2363	Palmerston 31
Palmerston	31C/15	D.W. Riddell	U	Assess	RA	1977		Palmerston 32
Palmerston	31C/15	D.W. Riddell	U	Assess	DDH 1-384	1977		Palmerston 33
Palmerston	31C/15	D.W. Riddell	U	Assess	DDH 2-376	1977		Palmerston 34

1977 Report of Central Regional Geologist

Mahendra Narain¹ and Murthy Ghandikota²

CONTENTS

Introduction	114
Regional Geologist's Activities	114
Resource and Land-Use Planning	114
Geological Consultation	114
Pits and Quarries	116
Staking and Exploration Activity	116
Mining Activity	116
Geological Branch Activities	116
Recent Publications and References	117

TABLES

1— Mineral production during 1975	116
2— Maps and reports issued by the Geological Branch	117

FIGURE

1— Central Region	115
-----------------------------	-----

INTRODUCTION

The Regional Geologist administered the geological programs which provided geoscience information for mineral resource management in the region. Consulting services in matters related to geology and mineral resource management were also provided to various government agencies, private consulting firms and the public.

Staff members included Murthy Ghandikota, Resource Geologist and Anne-Marie Szebedinszky, Secretary.

REGIONAL GEOLOGIST'S ACTIVITIES

Resource and Land-Use Planning

A large part of the Regional Geologist's time was spent in planning and administration of the project

"Mapping of Land-Based Interests" for the Central and Southwestern regions of the ministry. The initial mapping was completed in October, 1977, and the information is available at the regional offices. Continued input was made to the Niagara Escarpment Commission towards preparation of their master plan report. An inventory of mineral resources in licenced pits and quarries was initiated. This inventory was completed in December, 1977 to provide an estimate of reserves, production and quality of aggregates. A preliminary list of geologically sensitive areas was prepared on a regional basis in an attempt to preserve these sites for educational and scientific studies.

Some of the projects and programs for which geological review and input were provided at the district and the regional level included: Kawartha Lakes Development Strategy Committee; Lake Simcoe-Couchiching Report Committee; Puslinch Crown Resource Management Area; Simcoe-Georgian Bay Area Task Force Development Strategy Committee; Preservation of Oriskany Sandstone; Official Plans for West Lincoln, Dunnville, South Cayuga, Port Colborne, Brantford, Brant County, South Dumfries, Hamilton-Wentworth Region, Halton Region, Wellington County, City of Mississauga, Town of Caledon; Scugog Island Provincial Park Master Plan; and Bronte Creek Provincial Park.

The Regional Geologist attended the Environmental Assessment Board hearings on Maple sanitary landfill sites.

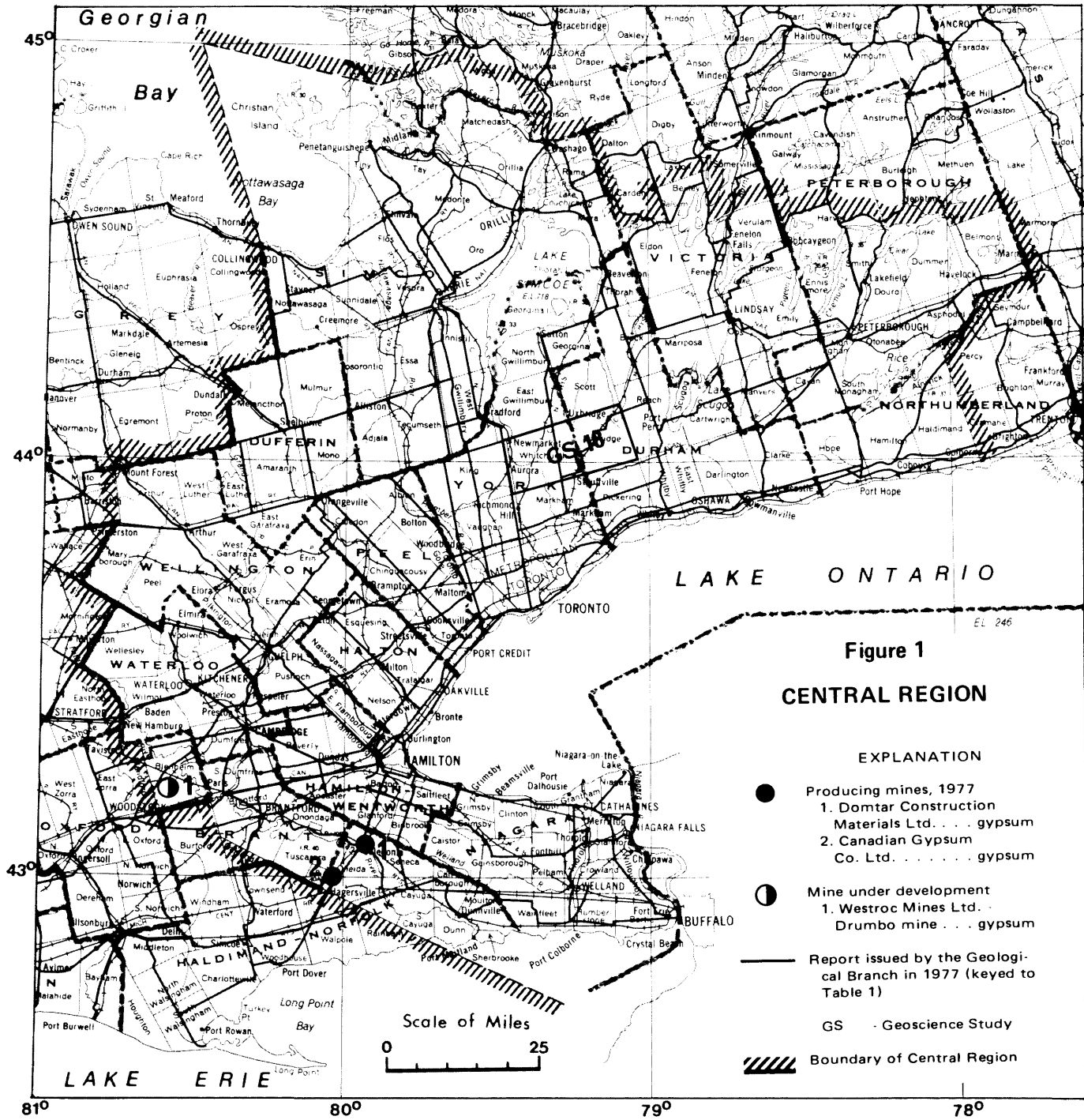
Geological Consultation

Geological consultation in Central Region is now provided both at the regional office in Richmond Hill and the district offices at Fonthill, Maple, Cambridge, Lindsay and Midhurst. Public and all other user groups are encouraged to use the facilities at these offices of the ministry.

Geological consultation was provided to municipal planning boards on matters relating to zoning by-laws, official plans and amendments, to the Ministry of Housing on proposed sanitary landfill sites in inactive

¹Regional Geologist, Ontario Ministry of Natural Resources, 10670 Yonge Street, Richmond Hill, L4C 3C9.

²Resource Geologist.



CENTRAL

pits, to the Ministry of Labour on health and safety problems. Geological information provided to public and consulting firms consisted of aggregate potential of individual land sites, water table problems, metallic and other industrial mineral potential, as well as rock and mineral identifications. Inquiries from students training in geological disciplines were also answered. The region and districts are planning programs to create public awareness and understanding of various mineral resource management programs. Two Junior Rangers programs for Maple and Huronia were performed by the Mineral Resource Geologist at Maple.

Pits and Quarries

The Regional Geologist attended an Ontario Municipal Board Hearing on the King Paving and Materials Limited application for a quarry licence. The quarry site includes the outcrops of an important geological formation of Oriskany Sandstone. Consultation on problems related to the enforcement of *The Pits and Quarries Control Act, 1971* were provided by the Regional Geologist as necessary.

STAKING AND EXPLORATION ACTIVITY

During 1977, one claim was staked in the Belmont Township, out of a total of 1,189 for the Eastern Ontario Mining Division. Assessment work has been done on four claims in the Belmont Township and these claims are held in good standing.

MINING ACTIVITY

Mining activity in Central Region consists mainly of the extraction of industrial minerals such as gypsum, sand and gravel, clay, dolostone, limestone, sandstone and shale.

There are two operating underground gypsum mines located at Hagersville and at Caledonia. A new gypsum mine, which will be the third producing mine in Ontario, is under development at a site on the north side of Highway 401 near Drumbo, 27 km west of Cambridge in Blenheim Township. Proven reserves of gypsum at this site are in the neighbourhood of 11 million tons which are in a deposit averaging 1.7 m in thickness, at a depth of about 117 m. The deposit is expected to provide a supply of gypsum that will last for 30 years when produced at the planned rate of 1,000 tons per day. The Drumbo mine is on property leased by Westroc Industries Ltd. of Mississauga. The gypsum material will be used for the manufacture of wall board and joint cements. The company has sunk an access shaft

3.8 m in diameter and 139 m in depth. Present development includes construction of shaft station, crusher station, loading pocket, crusher-storage bins, and conveyor systems. Preliminary drift work is in progress. It is expected that the mine will go into production by mid-1978 (*The Northern Miner*, September 29, 1977).

There are about 830 licenced pit and quarry operations in the region and about 40 applications are pending. Total aggregate production for the Central Region was 67,064,217 tons in 1976 (source: district offices of Central Region).

Table 1 gives the dollar value of materials produced in the Central Region during the year 1975.

TABLE 1 | MINERAL PRODUCTION IN THE CENTRAL REGION DURING 1975.

	Volume (tons)	Value (\$)
Stone	20,264,829	43,179,319
Sand and Gravel	37,646,770	50,942,636
Clay Products	—	37,976,066
Cement	1,743,831	47,149,609
Gypsum and Peat	—	3,571,357
Lime	99,396	3,555,191
Nepheline Syenite	516,352	8,869,497
Petroleum and Natural Gas	—	366,330
GRAND TOTAL		195,610,005

Source: Mineral Resources Branch, Ontario Ministry of Natural Resources.

GEOLOGICAL BRANCH ACTIVITIES

During the summer, J.C. Roegiers and J.C. Thompson undertook a study of stress relief and rock movement associated with the construction of the Hamilton Mountain Trunk Sewer. The purpose of this study was to monitor the program to determine (1) the detailed geology of the area, (2) the insitu stress conditions, (3) the strata movement.

Under the Township Aggregate Inventory program, several reports are being prepared by the Geological Branch and the regional staff. The Eastern Region is completing an assessment study of the Northumberland County which will cover four townships in the Central Region. The Maple District of the Central Region is preparing reports on five townships in the Region of York. The list of townships for which the reports are expected to be available by mid-1978 is as follows:

Regional Municipality of Niagara - Pelham
Brant County - South Dumfries
- Brantford
Waterloo County - Wilmot
- North Dumfries
- Waterloo (Town of)

Regional Municipality of Halton - Town of Halton Hills

- Town of Milton
- City of Burlington
- Town of Oakville

Wellington County - Puslinch

- Guelph
- Guelph City
- Erin
- Eramosa
- Pilkington

Regional Municipality of Peel - Town of Caledon
(including Albion)

Regional Municipality of York - Whitchurch

Regional Municipality of Durham - Uxbridge (including
Scott)

- Brock (including Reach)

Dufferin County - Adjala

- Mono
- Mulmur

Victoria County - Manvers

RECENT PUBLICATIONS AND REFERENCES

Northern Miner

1977: Westroc Develops New Ontario Gypsum Mine; (article)
The Northern Miner, September 29, 1977; p.12, 13.

Oussoren, H.C.

1977: Underground Mining of the Niagara Escarpment; Unpub.
B.A. Sc., Thesis, University of Toronto, Toronto, Ontario.

Pit and Quarry

1977: Ontario Producer Paces Way in Operations, Rehabilitation; (article) Pit and Quarry, September, 1977.

TABLE 2

MAPS AND REPORTS PERTAINING TO THE
CENTRAL REGION ISSUED BY THE ON-
TARIO GEOLOGICAL SURVEY OF THE
ONTARIO MINISTRY OF NATURAL RE-
SOURCE IN 1977. SEE "LIST OF PUBLI-
CATIONS" (BACK POCKET) FOR DETAILS.

GEOSCIENCE REPORT

GS 18

MISCELLANEOUS PAPERS

MP 48

MP 70

MP 71

MP 73

MP 74

MP 75

MINERAL DEPOSIT CIRCULAR

MDC 15

MISCELLANEOUS PUBLICATIONS

Statistical Report on the Mineral Industry of Ontario,
1971-1973.

Rocks and Minerals Information 1977

MPBP 3

A Policy for Mineral Aggregate Resource Management
(Report of the Ontario Mineral Aggregate Working
Party)

PRELIMINARY MAP

P. 1229

P. 1235

P. 1247

1977 Report of Southwestern Regional Geologist

R.G. Bryant¹

CONTENTS

Introduction	118
Oil and Natural Gas	118
Mining Activity	120
Pits and Quarries	120
Geological Branch Activities	121

TABLES

1— Oil and gas statistics: well completion report	121
2— Oil and gas statistics: success ratios	121
3— Maps and reports issued by the Geological Branch	121

FIGURE

1— Southwestern Region	119
----------------------------------	-----

INTRODUCTION

The position of Regional Geologist for the Southwestern Region is combined with the duties of Regional Geological Engineer and includes the role of Chief Inspector of Petroleum Resources, responsible for all drilling and production of oil and gas in the Province.

The main functions of this dual role are liaison with the oil and gas industry, enforcement of the Petroleum Resources Act and the Mining Act with respect to drilling and production of oil and gas (both on land and offshore) in Ontario, and co-ordination and overview of the resource programs with staff at the Petroleum Resources Laboratory situated in London.

This program assists the ministry to develop methods to ensure the proper conservation of oil and gas reserves and to maximize production efficiency by assisting in research programs related to the study of oil and gas reserves, geological interpretation and evaluation of producing and prospective oil and gas fields in Ontario, leading to eventual publication of geological and engineering reports and maps.

¹Regional Geologist, Ontario Ministry of Natural Resources, 1106 Dearnish Drive, London, N6E 1N9.

Participation in mineral resources management and strategic land-use planning ensures that the optimum utilization and development of mineral resources are considered.

Technical assistance is provided to the Ontario Energy Board in respect to public hearings by examining all geological, geophysical and engineering documents in support of applications for designation of boundaries for new gas storage pools and authorization to inject gas into depleted gas reefs.

Liaison with the Ministry of the Environment is maintained in regard to feasibility studies involving subsurface disposal of liquid waste effluents and produced brine.

All applications for municipal subdivisions in oil and gas producing areas, as forwarded by the Ministry of Housing are reviewed. This ensures that previously drilled and unplugged wells that could cause serious pollution problems or are a source of concern to property and life are properly located, plugged and abandoned, on a priority basis.

OIL AND NATURAL GAS

All of the petroleum and natural gas exploration and development in southern Ontario occurs in the Southwestern Region with the exception of a minor portion in the extreme west end of the Central Region. The following is a resume of last year's activities in Ontario.

Oil production for 1977 amounted to approximately 616,000 barrels, down 1 percent from the previous year. Oil production had been declining steadily each year at a rate of approximately 10 percent.

Gas production in 1977 increased in the order of 56 percent over 1976. Most of the increase is attributed to an escalation in production from Lake Erie.

Anschutz Canada Limited commenced production operations from their offshore wells in September of 1977, some four years after they first acquired acreage in Lake Erie.

A total of 187 wells were drilled during 1977 for a total footage of 95953.0 m compared to 159 wells for

EXPLANATION

- Salt mines
 1. Canadian Rock Salt Co. Ltd.
 2. Domtar Chemicals Ltd.
- ⊕ Salt brine wells
 1. Allied Chemicals Canada Ltd.
 2. Canadian Rock Salt Co. Ltd.
 3. Domtar Chemicals Ltd.
 4. Dow Chemicals of Canada Ltd.
- ☀ Successful gas discoveries in 1977
 1. Ram 50 Dawn 2-32-XIII (Exploratory)
 - Ram 51 Dawn 4-33-IX (Exploratory)
 2. Forbes 1 Dawn 4-24-IV
 3. McClure-Union Dawn 1 27-VI
 4. Heritage Dawn 1 26-II
 5. Dow Moore 3 21-XII
 6. Dow Moore 1 23-XII
 7. New Metalore 25 Charlotteville 9-II
 8. New Metalore 30 Charlotteville 7-7-V
 9. Craven N. Walsingham 7-7-VII
 10. Craven N. Walsingham 3 8-VII
 11. Craven S. Walsingham 3-7-IV
 12. J.F. No.1 Houghton 6 4-II
 13. Consumers 13455 LE 159-C
 - Consumers 13399 LE 159-C (Offshore Elgin)
 14. Consumers 13400 LE 160-1 (Offshore Elgin)
 15. Consumers 13395 LE 183-H (Offshore Elgin)
 16. Consumers 13176 LE 222-V (Offshore Kent)
 17. Consumers 13470 LE 176 U (Offshore Kent)

- Successful oil discoveries in 1977
 1. Bluewater Enniskillen 2-30 IX (Exploratory)
 2. P.H. & H. Malden 3-41-IV (Exploratory)

□ Petrosar Ltd. - Petroleum Products Storage Complex

— Maps or reports issued by the Geological Branch in 1977 (keyed to Table 3)

P - Preliminary Map
 GR - Geoscience Report
 2383 - Coloured Map

▨ Boundary of Southwestern Region

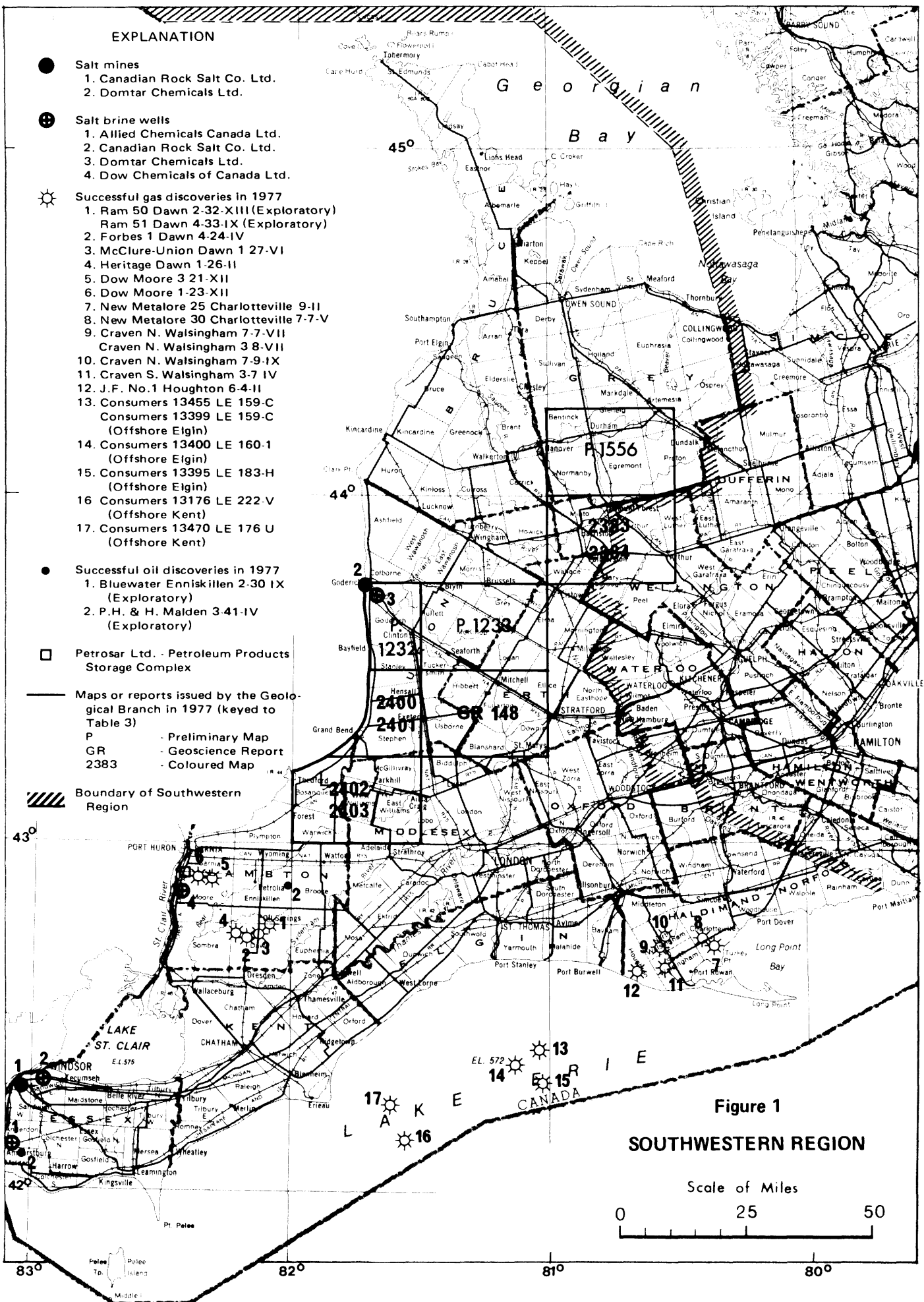
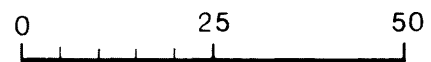


Figure 1

SOUTHWESTERN REGION

Scale of Miles



SOUTHWESTERN

1976 with a total footage of 77989.0 m. This represents an increase of 15.0 percent in the total number of wells drilled and an increase of 22 percent in total amount drilled.

Total footage drilled in Lake Erie amounted to 38887.9 m as compared to 33210.1 m during the previous drilling season, an increase of 17.1 percent. During the past year, 54 exploratory and 114 development wells were drilled, a decrease of 7 percent in the exploratory class but a 24 percent increase in development drilling over 1976.

An additional 19 wells were completed. These consisted of 3 wells for brine production, 4 for petroleum products storage, and 12 for gas storage.

One of the wells drilled for gas storage purposes was eventually completed as an oil producer. This category increased 111 percent from last year.

Offshore drilling for natural gas in Lake Erie decreased 10 percent from the previous year with 65 wells being completed. Even though the total number of wells was down from the previous year, the footage count was greater as certain wells were drilled to evaluate deeper horizons.

Of the 65 wells drilled during 1977, 18 were classified as exploratory and 47 as development attempts. Eight of the 18 exploratory tests were successful as were 27 of the 47 development tests for an overall success ratio of 53.85 percent.

Several major discoveries were made during 1977 which proved significant production acreage in the central portion of the lake. As in the previous year, essentially all of the available acreage in the lake was held by seven operators. At the end of 1977, a total of 2,702,166 acres were under disposition. Of this amount, 2,469,559 acres were under licence of occupation and 232,607 acres were under lease. To the end of 1977, a total of 1038 wells had been drilled in Lake Erie with approximately 506 productive or capable of production. An accumulative figure of approximately 113.4 billion cubic feet of gas has been produced from the lake. Approximately 64 percent of the indigenous gas production was derived from Lake Erie production during 1977.

Several significant discoveries were made on land. A total of six pinnacle reefs, five gas and one oil, were discovered in Lambton County (two in Moore Township, three in Dawn Township and one in Enniskillen Township). This is in direct contrast to only one successful reef discovery during 1976. Additional successful follow up drilling has occurred on the two reefs in Moore Township, and the three discoveries in Dawn Township.

An Ordovician oil discovery in Essex County together with additional development drilling in Gosfield South Township has renewed interests in that portion of the Province.

An increase in reserves in the order of 20 billion cubic feet of gas and 65,000 barrels of oil were realized during the past 12 months. Four of the pools are definite potential gas storage reefs.

The Regional Municipality of Haldimand-Norfolk has experienced a continuing development drilling program into the Clinton-Cataract sands.

Leasing and geophysical activity reports are not available at present, but the intensive land leasing and seismic activity within Huron and Bruce Counties continued as the major oil companies infilled their lease areas and searched for prospective drilling sites.

Actual drilling operations commenced in mid-December with no wells completed as of year end. Leasing activities were heavy in Middlesex, Lambton and Kent Counties but down slightly in Essex. With the continued demand for oil and natural gas in the Province, it is expected that 1978 should compare with or exceed the results obtained during 1977.

Favourable price increases to the producer for both oil and gas together with the high success ratios are encouraging the re-evaluation of previously drilled areas.

MINING ACTIVITY

Southwestern Ontario is underlain by massive beds of salt, extending as a broad band from Essex County northward to the base of the Bruce Peninsula. Conventional underground mining methods for salt are employed at Goderich and near Windsor. Several salt wells have also been completed at Goderich and Windsor from which the mineral is extracted by means of a brining operation. Brine for chemical purposes is extracted from wells at Amherstburg and at Sarnia. Shipments of rock salt from the Goderich mine (Domtar Chemicals Limited) totalled 2.1 million tons, while approximately 2.3 million tons were produced at Windsor (Canadian Rock Salt Company Limited).

PITS AND QUARRIES

There are approximately 900 operational sand, gravel, clay pits and quarries in production in Southwestern Ontario, of which 417 are licenced. Increased awareness both by the public and industry of environmental impact has led to a more critical evaluation of the effects on the landscape of these operations. The Pits and Quarries Control Act was passed in November, 1971 as an attempt to regulate operations under a uniform set of standards. There are 80 designated townships in the region. The Act requires that the operators screen the working operations from public view. An application for a required licence must be

accompanied by a detailed site plan which includes a plan for pit development and progressive and ultimate rehabilitation plans. An annual security based on the previous year's production is required to ensure rehabilitation.

GEOLOGICAL BRANCH ACTIVITIES

Mapping of the Paleozoic bedrock of Southern Ontario was continued in 1977 in the Windsor-Essex area and on Pelee Island by P.G. Telford. There are no natural outcrops of Paleozoic rocks in this area except on Pelee Island but considerable information is available from extensive records obtained during oil and gas exploration and from the several quarries and one salt mine in the area.

Quaternary field parties were active in three general areas in Southern Ontario. Mapping was continued in the Chesley-Tiverton and Warton areas by D.R. Sharpe and in the Walkerton area by W.R. Cowan. Sharpe extended his mapping into the Bruce Peninsula. Two field parties led respectively by A.J. Cooper and W.J. Fitzgerald mapped five areas in the Ridgeway-Strathroy-Sarnia areas extending across the inter-lake region from Lake Huron to Lake Erie.

During the past season, the manuscript for a guidebook on the geology and fossils of Craigleith Provincial Park and a detailed fossil study of the Thedford-Arkona area were completed by H.M. Verma.

TABLE 1 OIL AND GAS STATISTICS: WELL COMPLETION REPORT.

LAND	1977	1976	% Change over 1976
Exploratory	33	34	-3
Development	64	42	+52
Other	19	9	+111
Total Land Wells	116	85	+36
Total Land Footage	186911	146847	+27
LAKE ERIE			
Exploratory	20	24	-17
Development	45	48	-6
Total Lake Wells	65	72	-10
Total Lake Footage	127585	108957	+17
TOTAL SOUTHWESTERN ONTARIO			
Exploratory	54	58	-7
Development	114	90	+27
Other	19	9	+111
Total Wells	187	157	+15
Total Footage	314496	255804	+23

TABLE 2 OIL AND GAS STATISTICS: SUCCESS RATIOS.

		1977	1976
ONSHORE			
Exploratory	Gas	14	5
	Oil	2	0
	Dry	18	28
		34	33
Development	Gas	48	28
	Oil	7	4
	Dry	14	13
		69	45
OFFSHORE			
Exploratory	Gas	6	11
	Dry	14	14
		20	25
Development	Gas	28	26
	Dry	17	21
		45	47
Other		19	9
		187	159

TABLE 3 MAPS AND REPORTS PERTAINING TO THE SOUTHWESTERN REGION, ISSUED BY THE GEOLOGICAL BRANCH OF THE ONTARIO MINISTRY OF NATURAL RESOURCES IN 1977. SEE "LIST OF PUBLICATIONS" (BACK POCKET) FOR DETAILS.

GEOSCIENCE REPORT
GR 148

MINERAL DEPOSITS CIRCULAR
MDC 15

MISCELLANEOUS PAPERS
MP 70
MP 71
MP 73
MP 74
MP 75

MISCELLANEOUS PUBLICATIONS
Mineral Aggregate Study and Geological Inventory Southwestern Region of Ontario
A Summary Report of the Mineral Aggregate Study

COLOURED MAPS
2383
2384
2400
2401
2402
2403

PRELIMINARY MAPS
P. 1232
P. 1233
P. 1235
P. 1556

